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Project Number 7397

Mr. James Shafer
Remedial Project Manager
Northern Division, Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop 82
Lester, Pennsylvania 19113

Reference: CLEAN Contract No. N62472-90-D-1298
Contract Task Order No. 0269

Subject: Transmittal of Response to Comments,
Draft Final Marine Ecological Risk Assessment Report, Old Firefighting Training Area
Naval Station - Newport, Newport Rhode Island

Dear Mr. Shafer:

Enclosed please find four copies of responses to comments to the draft final Marine Ecological Risk Assessment report for the Old Firefighting Training Area (Site 09), at Naval Station Newport, in Newport Rhode Island. This material includes responses to comments from U.S. EPA dated September 7, 1999 and responses to comments from RIDEM dated September 8, 1999.

Some of these comments request additional sampling and analysis for background data. The attachments provide responses we feel address these comments. However, if EPA or RIDEM disagrees with these responses and cannot accept or discuss our proposals for resolving the associated uncertainties, the schedule for completion of the RI will be delayed substantially. To meet the short term deliverable schedule for the ERA and to effectively continue work on the RI, we will need a reply from the regulators on or before October 8, 1999. If no word is received by that date, we will move forward with the final ERA report as described in the attachment.

If you have any questions regarding this material, please do not hesitate to contact me.

Very truly yours,

Stephen S. Parker
Project Manager

enclosure

- c: M. Griffin, NETC (w/encl. - 1)
- K. Keckler, USEPA (w/encl. - 3)
- P. Kulpa, RIDEM (w/encl. - 4)
- J. Stump, Gannett Fleming (w/encl. - 2)
- K. Finkelstein, NOAA (w/encl. - 1)
- D. Egan, TAG (w/encl. - 1)
- M. Imbriglio (w/encl. - 8)
- J. Trepanowski/G. Glenn, TtNUS (w/encl. - 1)
- File 7397-3.2 (w/o encl.)

Attachment A

Responses to Comments from USEPA On the Draft Final Marine Ecological Risk Assessment Report, OFFTA Comments dated September 7, 1999.

Comment 1:

It does not appear as if all of the figures and tables provided in the transmittal of additional text for uncertainty provided in June 1999 have been incorporated into the uncertainty section or an appendix of this version of the ERA. These data presentations are useful to support retaining OFF-23 as a reference condition

Response: All figures (i.e., Figures 4.4-1 - 4.4-3) provided on June 1999 were included in this version of the ERA. Tables 4.4-1 and 4.4-2 were accidentally omitted. Copies of the Tables are attached. They have been included in the Final ERA

Comment 2:

It is stated in the first sentence of the last paragraph that results of site/baseline ratios for normalized sediment and tissue concentrations are summarized in Tables 4.4-1 and 4.4-2, respectively. These two tables are not included with the rest of the Chapter 4 tables. Tables 4.4-1 and 4.4-2 should be included in subsequent versions of this ERA.

Response: Tables 4.4-1 and 4.4-2 were accidentally omitted. They will be included in the Final ERA.

Comment 3:

Table 6.2-2 presents the tissue screening concentration (TSC) benchmarks. The table has been appropriately revised to provide derivation information. The TSC values for metals have changed significantly from the version provided in draft ERA. This change is owing to the update of water quality screening values. However, it appears as if some of the bioconcentration factors (BCFs) have also been revised. For example the TSCs for cadmium and chromium have significantly changed although the water quality screening criteria have not changed. Shepard 1998 was cited in the last version of the ERA and is again cited in this version of the table. The BCFs presented on the revised table are similar to the BCFs presented in Shepard 1998 as being from the Superfund Public Health Evaluation Manual, EPA 1986. However, no source citation is provided in Table 6.2-2 specifically for the BCFs. Please provide a source for the BCFs. Also, please clarify why the TSC benchmarks have changed for chemicals for which the water quality screening value have not changed.

Response: TSCs in the draft version of the ERA were cited from Shepard (1995 and 1998). Shepard often used freshwater chronic and acute or marine acute AWQC as WQSVs to develop TSCs using the formula "TSC = WQSV X BCF" in his '95 and '98 manuscripts. In the draft final version of the ERA, SAIC used marine chronic AWQC as WQSVs and Shepard's formula (with the exception of silver as no chronic saltwater value is available for silver). For instance, Shepard used freshwater chronic values to calculate the TSCs for cadmium and chromium presented in Table 6.2-2 of the draft ERA. Since SAIC used marine chronic rather than freshwater chronic values in the draft final ERA, TSCs changed even when water quality screening criteria did not change. The text (6.2.2.1) was modified to clarify this information.

The BCFs presented in the draft final ERA are those presented by Shepard (1995). Table 6.2-2 was modified to provide this citation.

Regretfully, there was an error in the draft final version of the ERA for the TSC for silver. The acute/chronic ratio of 8.1 was inappropriately applied to the saltwater acute value of 1.90. In the draft final version of the ERA the WQSV is listed as 15.20 when, actually, it is 0.24. This changes the silver TSC from 46.82 to 0.74 µg/g wet. Tables 6.2-2 and 6.2-3 will be modified to reflect this change. Changes to the text were not required. A "+" was assigned to Station OFF-20 (LOB) in Table 6.2-3. The overall risk ranking for LOB at OFF-20 did not change.

Comment 4:

This table (Table 6.3-4) presents the overall summary of TRV-dose HQs for avian aquatic receptors consuming prey. There is some information missing from the table that was not translated from Table 6.3-3. For the Cunner and Pitar, both the Heron and Gull risk rankings for OFF-23, are presented as low "+" in Table 6.3-3, but those cells are blank on Table 6.3-4. This information should be included in Table 6.3-4.

Response: Some information from Table 6.3-3 was omitted from Table 6.3-4 in the draft final version of the ERA. All information from Table 6.3-3 has been translated to Table 6.3-4 in the final version.

Comment 5:

This table (Table 6.6-1) presents a summary of exposure-based weights of evidence for bedded sediment, resuspended sediment, and bioconcentration. This table has been revised to reflect earlier EPA comments and to adjust for the use of updated water quality screening criteria. However, there are still discrepancies in the table.

There are some discrepancies between Tables 6.2-1 (a and b) and Table 6.6-1. For example, the indigenous mussel rankings for OFF-02, OFF-05, and OFF-6 on Table 6.6-1 are not consistent with the ranks on Tables 6.2-1 (a and b). There are also discrepancies in the Mercenaria, Cunner, and Pitar rankings for other stations. These discrepancies should be corrected. Related information presented in Table 6.6-3 may also need to be revised to reflect changes to Table 6.6-1.

Also, as a minor point, the revised footnotes at the bottom of Table 6.6-1 do not include a footnote 3. There is a superscript 3 in the column labeled "Bioconcentration" and on the sub-heading "Ranking." The footnote 3 should be included in this table.

Response: The discrepancies in Table 6.6-1 have been corrected in the final version of the ERA. Related information presented in Table 6.6-3 has also been revised. These changes did not impact overall risk rankings and do not require changes in the text. The footnotes for Table 6.6-1 will be modified to more accurately convey information needed to understand the table.

Comment 6:

This table (Table 6.6-2) presents a summary of effects based weights of evidence for sediment toxicity, field effect indicators, and tissue residue effects. Footnote 2C specifies that Hematopoietic neoplasia information is presented in Table 5.3-4. This is not correct. Please change the footnote to refer the reader to Appendix B-2-3.

Response: Footnote 2C in Table 6.6-2 will be changed to refer the reader to Appendix B-2-3 for hematopoietic neoplasia information.

Comment 7: *This table (Table 6 6-3) provides the overall summary of exposure and effects-based weights of evidence and characterization of risk. The bedded sediment, resuspended sediment, and tissue residue effects rankings have been revised to either reflect prior comments or because of the use of updated water quality criteria. These revisions are consistent with the revised supporting tables.*

Response: No action was required

Comment 8: *This section (Section 7.4) presents the ecological risk assessment conclusions. The conclusion presented for station OFF-05 is "determined to pose a high probability of ecological risk from harbor-related contaminants of concern." The conclusion that the contaminants of concern are "harbor-related" is out of place without supporting evidence (e.g., a toxicity identification evaluation) and should more appropriately be discussed as a risk management issue in subsequent studies. Please delete "harbor-related."*

Response: The Navy concurs with the comment, and the term "Harbor-related" will be deleted from Section 7.4 **Note:** Column headings in Table 6.3-1 in the final version of the ERA will be changed as listed below:

- **from** Food Consumption Rate (FCR; kg dry wt/day) **to** Food Consumption Rate (FCR; g dry wt/day);
- **from** Feeding Fraction, FF (kg prey/kg total diet) **to** Feeding Fraction, FF (g prey/g total diet); and
- **from** Exposure Factor (EF, kg dry wt/day) **to** Exposure Factor (EF, g dry wt/day)

The changes do not effect the text, calculations or risk rankings related to the avian exposure assessment.

Attachment B:

Responses to Comments From RIDEM On the Draft Final Marine Ecological Risk Assessment Report, OFFTA Comments dated September 8, 1999

1. General Comment

Throughout the report comparisons to the background station are made. Therefore the report should include a discussion of background station. This discussion should note, amongst other things, whether there are any potential sources of contamination at this background station, whether the observed concentration of contaminants at the background station are within the values expected for an unimpacted area, etc. The report should also include a comparison of the reference station used for OFFTA with the ones employed for Derecktor Shipyard and McAllister Point Landfill.

Evaluation

The Navy has submitted a comparison of the reference stations at OFFTA to those taken at other sites. In subsequent meetings to discuss this comparison, the DEM has stated that the Navy has not demonstrated that the OFFTA reference stations are comparable to those taken at other sites or that the OFFTA stations has not been impacted. Accordingly, these stations should not be used as reference stations in the OFFTA risk assessment report. Therefore, the Office does not accept the use of these reference stations in the report and all sections containing comparisons to the reference stations should be revised. As stated during the last EAB meeting the Office is still willing to review proposals to collect samples from additional reference stations or evaluate whether stations from other sites can be employed.

Response: With the exception of PAH in sediment at Station OFF-23, the Navy believes concurrence was reached with RIDEM during the conference call held June 14, 1999, that the OFFTA reference station sediment concentrations are generally comparable to other reference stations in Narragansett Bay and therefore have a similar degree of non-site related impact.

At that and previous meetings, the Navy discussed the fact that OFF-23 sediment PAHs are elevated relative to other reference stations in Narragansett Bay, but this was likely due to both higher organic content in the sediment and the general industrialized nature of the general study area. It was also stated that only a portion of the risk assessment for the site (i.e., subtidal stations) is affected by this uncertainty (intertidal lines of evidence used the intertidal reference station OFF-22, which was not found to chemically be elevated), and only a portion of the WoE upon which this assessment was based (tissue concentration ratios, benthic community effects) is quantitatively dependent on the reference data. Thus it should be clear that the primary concern at OFFTA appears to be the intertidal area, and the risk assessment conclusions are not affected by the OFF-23 results. It is also apparent from the results that conditions at subtidal stations would not be ranked appreciably worse even if OFF-23 conditions were completely pristine

The Navy's recommended approach is to accept the uncertainty regarding the subtidal reference concentration as presently acknowledged and described in the ERA. The Navy proposes to discuss additional reference station collections, and would like to agreement on what data would be collected, how it would be interpreted, and what conclusion would be reached based on the evaluation, before the data is collected. The Navy does believe that such data will be useful in PRG development in support of FS evaluation, since the

existing reference database does not adequately reflect the concentrations of PAHs that would be present after any remediation takes place. The merits of the data with respect to the present interpretation of risk would be evaluated once the data is available and appropriate action could be taken.

The Navy's goal is to make these agreements and move forward to completion of the RI and the FS. The Navy believes this approach will achieve this goal while addressing RIDEM's concerns. Should RIDEM not permit the finalization of the ERA without this new data, it is certain that substantial delays in the remedial schedule for Site 09 will occur.

2. General Comment

Please indicate whether all of the contaminants detected in the soil and the groundwater samples were analyzed for in the sediment and tissues samples collected for the Ecological Risk Assessment.

Evaluation

The Office requested that the Navy indicate in the report whether all of the contaminants detected in the soil and groundwater were analyzed for in the sediment. The Navy has indicated that selected contaminants of concern were analyzed for in the ecological risk assessment. Please indicate which section of the report contains this statement and which table contains this comparison.

Response: Target analytes for chemical characterization in sediment are listed in Table 3.2-1. This list is the same as that which was provided in the approved work plan. This list does not contain all analytes detected in soil or groundwater during the onshore study. Should RIDEM be interested in those analytes that are not common to the two (onshore vs. offshore) studies, RIDEM should compare the analyte lists for the two studies.

3. General Comment

It is known that free product was detected at the site. In addition, it is known that petroleum products contain a wide range of compounds, many of which are not detected in standard VOC/SVOC runs. Therefore, as this is a public document the report should state why a simple TPH analysis was not performed on the sediment samples.

Evaluation

The Navy has revised the report as follows.

Total Petroleum Hydrocarbon (TPH) were detected in the onshore soils and groundwater at the site. TPH is typically measured in soil and groundwater to meet regulatory requests, since there are cleanup criteria enforced by RIDEM that apply to TPH in groundwater and soil. In addition, there is no toxicity information that can be used to characterize risk to ecological receptors from TPH.

The Navy has indicated that TPH analysis was not performed due to a lack of a regulatory requirement for this test and the lack of toxicity information with respect to TPH. Please be advised that the State may require TPH testing in the sediment. In addition, toxicity comparison to TPH levels have been made in the past. Therefore, the above should be modified as follows:

Total Petroleum Hydrocarbons (TPH) were detected in the onshore soils and groundwater at the site. TPH analysis was not performed on sediment samples as it was thought that analysis for specific constituents would suffice. As it is now known that constituent testing may not be sufficient, all future sediments sample collected in areas of suspected petroleum contamination will under go analysis for TPH.

Response. The suggested text implies that an error was made in determination of the analyte list. No such error was made, since TPH was considered for inclusion and rejected because as previously stated, it is inappropriate for measurement of ecological risk due to lack of solid toxicity values. PAHs, which make up a large portion of TPH, were analyzed as is appropriate, and as was described in the work plan.

However, the Navy is willing to discuss the role of TPH in determination of the PRGs for the site. This is an appropriate avenue to address the possibility of TPH in sediment and the applicability of the regulatory requirements that pertain.

4. General Comment

The report should note what procedures were employed in the risk ranking if a compound was not analyzed for, collected, rejected or evaluated at a particular sample station.

Evaluation

The Navy has addressed the first part of the comment, namely that all compounds were analyzed for at every station. Please reply to the remaining portion of the comment, that is, what procedures were employed if a contaminant was rejected or not included in the evaluation.

Response: Procedures employed for all data passing data validation were evaluated as described throughout the document, and specifically, by risk ranking criteria summarized in Tables 6.0-1 and 6.0-2. No procedures were developed for evaluation of data that were rejected. Only data which were rejected were not included in the evaluation. The uncertainty discussion of the risk evaluation considers the limitations of missing data, should it occur. The Navy notes that the overall completeness objectives of the sampling program were met (the addition of porewater samples was taken in order to fill the data gap caused by the lack of biota samples that were not available at the site at intended stations, primarily soft shell clams). The only possible data gap was for porewater mercury, although it was otherwise measured in sediment and/or biota at every station. Thus, it was concluded that the lack of porewater Hg does not represent a significant data gap with respect to risk evaluation.

6. Figure 1.2.1, Sampling Stations

Please include a figure that depicts what was sampled for or what analysis was performed at each sampling stations, i.e. depth of sample, chemistry biotoxicity, various tissue analysis, deployments, collections, community structure, etc.

Evaluation

The Navy has indicated that the requested figure may be found in a support document. Please be advised that the appropriate location for this figure is in the main document, and not the support document. Therefore, please include this figure in the main document.

Response. The Navy concurs with this request. These figures will be added to the main report.

**7. Section 3.3, Contaminants of Concern,
Page 3-16, Paragraph 2.**

The bench marks employed for determining contaminants of concern are equivalent to those employed in the draft Ecological Risk Assessment for Dereecktor Shipyard dated July 1996. Please indicate whether any other benchmark from other states or other Regions, have been developed since that time. It is the Office's understanding that Region IV and New Jersey are developing or have developed sediment-screening values. These values should be incorporated into the report. The Office recommends investigating whether the other coastal states or Regions have developed standards.

Evaluation

The Navy has indicated that the selected benchmarks agree with an EPA summary. Please indicate whether this summary included other States as well as the Region reference in the comment.

Response: The referenced document does include values from the State of Florida, Washington, and the Great Lakes. The Navy is unaware of promulgated or final recommended values from EPA Region IV or New Jersey, and requests full references of these documents from RIDEM. The Navy, (in teleconference between G. Tracey and P. Kulpa) has requested that RIDEM provide these values, and they have not done so. Note, however, that at this late date the Navy will not be revising the ERA document based on these values, regardless of present status.

**8. Section 4.1, Sources and Exposures Pathways of CoCs,
Page 4-3, Paragraph 2.**

This section of the report states that the concentration of organic contaminants in aquatic organisms is based upon lipid content of the organisms and not due to other factors such as biomagnification. That is the external surface of the respiratory systems of water borne organisms facilitate the transfer of lipid soluble contaminants and thus biomagnification is not present. This would seem to imply that respiratory systems of aquatic organisms have a detoxification function, and as such contaminants absorbed by the organism, through ingestion, respiration or dermal content is removed via the respiratory system. Since biomagnification is known to exist in the aquatic environment, please indicate whether any other studies other than the 1977 reference support his position.

Evaluation

The State requested additional literature sources in support of the position that lipid contact not biomagnification is important in determine concentrations of contaminants in organisms. The Navy has noted that the results for Cunner samples taken at OFFTA support this position and have include an additional study performed by the authors of the report. Please confirm whether these two studies are the only one available in support of this position.

Response: The RIDEM comment states that evidence of organic contaminant bioaccumulation "would seem to imply that respiratory systems of aquatic organisms have a detoxification function, and as such contaminants absorbed by the organism, through ingestion, respiration or dermal content is removed via the respiratory system" The technical basis for RIDEM's implied meaning to the mode of bioaccumulation is confusing, and the Navy is unaware of any studies which would support this position.

**9. Section 4.1, Sources and Exposures Pathways of CoCs,
Page 4-4, Paragraph 1.**

This section of the report indicates that PAHs do not bioaccumulate in organism. As the report states it is known that PAHs are rapidly metabolized, and the metabolites themselves may be more harmful than the original PAHs. The report should note whether the PAH metabolite bioaccumulate.

Evaluation: The report should note whether the PAH metabolite bioaccumulate.

Response: The reviewer has unfortunately misinterpreted this section of the report. The report does not state that PAHs do not bioaccumulate. The report does state that PAHs bioaccumulate to a lesser extent than [other] lipophilic organics. The Navy acknowledges the possibility that PAH metabolites could also bioaccumulate, although the Navy is not aware of any specific studies conducted that would lend some quantification of this possibility. The Navy also considers performance of such studies out of scope of the marine ERA and are more appropriate for scientific research

**10. Section 4.1, Sources and Exposures Pathways of CoCs,
Page 4-4, Paragraph 1.**

This section of the report states combusted forms of PAHs are more highly particle bound than what is suggest by their chemical structure. Please provide the basis for this statement.

Evaluation

Please indicate whether there are other literature references in support of this position.

Response: The report states that these compounds *may be* more highly particle-bound than suggested by the structure. The basis of the statement is that the extent of PAH bioaccumulation is less than that observed for other organic chemical classes, and therefore there must be some cause for it. This phenomena has been observed in previous ERA studies for McAllister Point and Derecktor Shipyard. The Navy is not aware of any studies examining the affect of PAH combustion on bioavailability. Additional research on this topic is not within the scope of the ERA investigation.

**16. Section 4.3.1.2, Porewater,
Page 4-16, Paragraph 2.**

This section of the report states that mercury values were not used due to insufficient sample volume. As discussed in previous correspondence the mercury values are valid and should be treated as such in this report.

Evaluation

It is the States understanding that, although the data may not fall within the confidence intervals used for the other contaminants, the laboratory results are valid and that the procedures employed are consistent with sample concentrations of this nature. Therefore, this data should be incorporated into the report, how be it with a higher degree of uncertainty. If the Navy is uncomfortable with the data the State will evaluate any request by the Navy to collect additional samples for mercury.

Response: The laboratory procedures employed were not sufficient to produce reliable concentrations of mercury due to the volume of porewater available. The Navy believes that, based on on-shore and off-shore data, mercury is not a site related contaminant. Based on the good data on both sediment and tissue, the Navy has concluded that the uncertainty from lack of porewater Hg data is not sufficient to prevent finalizing the site-specific ERA report.

**20. Section 4.3.2.4, Tissue Residues,
Page 4-28, Whole Section.**

It is not clear from this section of the report whether tissue samples analyzed for mercury, from all the species collected, including Cunner were included in this section of the report. As stated in previous correspondence, the Office considers all of the tissue samples analyzed for mercury as valid and should be considered such in the report.

Evaluation

The States comment was not addressed. The Office simply requested if mercury samples from all species, including Cunner were included in the report (the State is aware that samples from the other species was included in the report). Therefore, the State reiterates its comment. Was tissues samples for mercury from all species collected, including Cunner, included in the report, i.e. was the mercury results from Cunner excluded and were there any results from clams, mussel, lobsters etc, which were excluded from the report.

Response: All tissue samples that were collected were analyzed for Hg and were reported in the ERA.

**21. Section 5.0, Toxicity Evaluations,
Page 5-50, Whole Section**

This section of the report discusses the different toxicity test performed on the sediments and water samples. As these are standardized test the report should include a table that lists the typical cut off values inherent in these test. In addition, the report should include a discussion of the standard interpretation of these values.

Evaluation

The Navy has stated that the exact relationship between the toxicity of a sample and the extent of risk is not known therefore arbitrary cutoff values were selected. Accordingly, the Navy has assigned a low risk to samples in which forty percent of the organisms die with respect to the control and fifty percent had development problems with respect to the control. As the former is close to a LC 50 the Office does not agree with the assignment of a low risk to this value. The Office recommends that either different arbitrary cutoff values be evaluated or that the results of the toxicity test be evaluated with a higher degree of uncertainty and therefore these results would have less weight in the overall evaluation.

Response: The Navy does not determine risk directly and solely from toxicity results. Rather, the magnitude of toxicity is graded into no, low, intermediate and high effects. Given that no sample had amphipod survival less than 72%, the debate over appropriate breakpoints for this endpoint is mute. For sea urchin larval development, only one sample exhibited an effect in less than 60% of full strength porewater and even in this case, the threshold for effect was a 10% reduction in larval development. Thus, the Navy does not believe that effects indicated by toxicity tests are under-represented in the overall weight of evidence leading to the risk conclusions, and revision of the evaluation criteria are not likely to affect the outcome of the risk assessment.

**28. Section 5.3.1.2, Benthic Community Assessment Protocols
Page 5-62, Whole Section**

This section of the report includes a discussion of the different indexes that were used to analyze the data. The significance of the values obtained from these indices has not been included for all the assessment, which were conducted. As an illustration, the Shannon Weiner Diversity Index was performed at the site. However, the significance of the values obtained the critical values and the limitations of the analysis was not discussed in the report. Please modify the report accordingly.

Evaluation

The Navy has addresses the first part of the comments but has not addressed the latter half. In regards to the first part of the comment the Navy has stated that no literature base benchmarks exist for the diversity indexes employed at the site. The State disagrees with this statement as an illustration as noted in comment number 30 literature base benchmarks have been employed for the Shannon Weiner Diversity Index (see Wilhm, J.L. Range of Diversity Index in Benthic Macro invertebrate Populations). Therefore, the statement that literature values do not exist should be removed from the report and the text should note that the comparisons to the reference stations were used at the site

Response: The Navy has previously indicated in their response that we were unaware of the "critical values" requested RIDEM to provide documentation of critical values. The Navy, (in teleconference between G. Tracey and P. Kulpa) has requested that RIDEM provide any reference documenting such criteria, but has not received it. RIDEM has now referenced a paper by Wilhm. The Navy has been able locate and review the reference, published in the Journal of Water Pollution Control Federation (May, 1970, pp. R221-224) The research involves a single 30-year old freshwater stream study of benthic diversity. Wilhm calculated the Margalef diversity index d' for community diversity data obtained in several clean and polluted freshwater streams (d' was calculated using the total number of organisms enumerated, the number of individuals per taxon, and the number of taxa in the community). Wilhm states that diversity values were different in "clean" ($d' = 3-4$) vs. polluted freshwater streams ($d' < 1$).

This study does not have much relevance to the benthic communities of Narragansett Bay, particularly because diversity of marine communities is much higher than freshwater habitats. Thus, the report will be revised to indicate that "Benchmarks for evaluation of diversity indices are not generally available nor widely used".

The Navy has not addressed the second part of the comment, that is the limitations if the different indexes employed at the site. As an illustration, the basic equation for the Shannon Weiner Diversity index breaks down if less than one hundred organisms are present, (i.e. the index will generate erroneous results if less than one hundred organisms are present). Therefore, the report should note and discuss the limitations of this and other indexes employed at the site as this information has obvious implications concerning the use of these indexes.

Response: Uncertainties and limitations of the indices used to evaluate benthic community structure and biota condition are discussed in the uncertainty section of Section 5 (i.e., Section 5.5). Again, the Navy is willing to add additional discussion of limitations of indices that are of concern to RIDEM and again requests assistance from RIDEM in providing this information. However, additional research into the indices and their weaknesses is beyond the scope of the program

30. Section 5.3.1.2, Infaunal Community Assessment Results, Benthic Community Assessment.

Page 5-66, Paragraph 2.

Ranges were calculated using an arbitrary division system dividing the benchmark values into ranges.

The above states that an "arbitrary division system" was used to segregate the various matrixes and determine the final ranking, low, intermediate or high. This would by definition translate into an arbitrary ranking system. One of the results of this approach is that a sample with only fifty percent of the matrix of the reference station is ranked as a low risk. In essence a sampling locations with half of the number of individuals or diversity may be given a low risk. Therefore, the ranking system should revised and the arbitrary division should be replaced by one reflective of risk.

Evaluation

The Navy has assigned a low risk to stations which exhibit half the diversity or total number of individuals as the control. This arbitrary system was assigned due to unknowns in population stability. It is assumed that the environments between the sample and reference stations are similar, otherwise a comparison between the both would be in appropriate. Since the stations are located in the same general area one would expect to have similar natural stressors at both locations which would affect the populations. Therefore, the Office does not agree with the assignment of a low risk to populations which have fifty percent of the individuals or diversity with respect to the control and the arbitrary ranking system should be revised.

Response. The RIDEM statement that the evaluation criteria were selected based on population stability is incorrect. The document simply states that given a lack of knowledge on population stability given individual mortality rates complicated the definitive selection of criteria for the study. Also, *the ranking system does not determine risk.* It merely grades the observed response into quartiles following the example given by the U.S. EPA Rapid Bioassessmental Protocol, and specifically, the quartile method of evaluating the data. Use of the quartile method was agreed to by Mr. Bob Richardson, and adopted for Derecktor Shipyard. In the future, the Navy will be willing to entertain other breakpoints relevant to marine benthic communities should this information be available from RIDEM.

38. Table 6.02, Indicator specific and Overall Weight of Evidence Ranking for Effects Concentrations.

Bedded/Resuspended Sediment Toxicity. This section of the report provides cut off values for assign low and intermediate risk based upon survival or development rates. The report is a public document and therefore justification should be provided for the different cutoff values. As an illustration, as presented a low risk value is assigned for a sampling site in which forty percent of the organisms died

Evaluation

The Navy has noted that "The 80 % cutoff is based upon a statistical evaluation of toxicity results to determine the minimum degree of toxicity need to result in a finding of a statistical significant reduction relative to controls."

Please indicate whether the 80 % figure is a literature value (and if so please provide a photocopy of the section which contains this value) or if a value based upon a professional review of other findings, (if this professional review of other findings has been compiled please provide a copy of this document).

Response: The following reference citation documenting the 80% value will be added to the document

Thursby, G.B., J. Heltshe and K.J. Scott, 1997. Revised approach to toxicity test acceptability criteria using a statistical performance assessment. Environ. Sci. Tech. 16(6):1322-1329.

42. Table 6.6-3, Overall summary of exposure and Effects-based Weights of Evidence.

This table assigns a low overall risk to areas, which have intermediate risk for one weights of evidence summary and a low risk for the other weights of evidence summary. Using this scheme a sampling site with intermediate risk for bedded sediment, resuspended sediments and bioconcentration would be assign a low risk if sediment toxicity, field effects and tissue effects are low. The Office recommends that an overall intermediate risk be assigned if two or more individual exposure effects in either summary are intermediate, i.e. if two or more exposure effects in one weights of evidence summary are intermediate and the other weights of summary overall assessment is low the station would be assigned an intermediate value.

Response: The Navy concurs with this approach. While the Navy believes the rankings were a fair characterization of the data, the Navy also acknowledges an inconsistency with the approach agreed upon in the Final McAllister Point ERA and Final Derecktor Shipyard ERA. The Navy proposes to revert to the prior ranking approach in its entirety to maintain consistency in evaluation of risks for all the NSN sites.

The individual exposure and effects evaluation procedures will also be used as described in these prior ERA's. The description of the corrected ranking approach is contained in the footnotes 7 and 8 of Table 6.6-3. As a result of the modified procedure, rankings for three stations will change from low to intermediate risk (OFF-13, OFF-15 and OFF-17), while ranking at two additional stations will change from intermediate to low risk (OFF-3 and OFF-20). Other stations remain unchanged

Revised Table 6.6-3 is attached to this response summary.

43. Table 6.6-3, Overall summary of exposure and Effects-based Weights of Evidence.

Please explain the following difference between the draft and draft final versions of this table:

*OFF-4 Resuspended changed from high to intermediate.
OFF-13 Tissue Effects changed from intermediate to low
OFF-14 Field Effects changed from intermediate to low*

Response: The Resuspended Sediment exposure ranking for OFF-4 in Table 6.6-3 changed because the acute and chronic AWQC were updated (new values released by EPA in 12/98) between the draft and draft final version of the ERA as requested by the EAB.

The Tissue Effects ranking for OFF-13 in Table 6 6-3 changed because primarily because the TSC benchmarks for arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver and zinc were revised in the draft final version of the ERA (see Table 6 6-2), reflecting change in underlying WQC. Also, the CBR benchmark for Total PCBs and the CBR-HQs calculated for p,p'-DDE were corrected in the Draft Final ERA.

The risk Field Effects ranking for OFF-14 and OFF-15 in Table 6.6-3 changed from an intermediate ranking in the draft version of the ERA to a low ranking in the draft final version of the ERA because the mercury risk rankings for both gulls and herons were revised from "+++" in the draft version to "+" in the draft final version (see Table 6.3-3) in response to EAB comment.

The reviewer is also referred to the response to comment 42, above, which notes additional changes to stations 13 and 15

Table 6.6-3. Summary of Exposure and Effects-based Weights of Evidence and Characterization of Risk for the OFFTA ERA Investigation.

WEIGHT OF EVIDENCE SUMMARY									
Station	CHEMICAL EXPOSURE INDICATORS				BIOLOGICAL EFFECTS INDICATORS				RISK PROBABILITY
	Bedded Sediment ¹	Resuspended Sediment ²	Bioconcentration ³	Exposure Ranking ⁷	Sediment Toxicity ⁴	Field Effects ⁵	Tissue Residue Effects ⁶	Effects Ranking ⁷	Overall Ranking ⁸
OFF-01	+	+	++	L	+	+	-	L	Low
OFF-02	+++	++	++	H	-	+	-	B	Intermediate
OFF-03	+++	+	+	I	-	+	-	B	Low
OFF-04	++	+++	++	H	-	+	-	B	Intermediate
OFF-05	+++	++	++	H	+++	++	-	H	High
OFF-06	+++	+	++	H	-	+	-	B	Intermediate
OFF-07	++	+	++	I	-	+	-	B	Low
OFF-08	++	+	+	L	-	+	-	B	Low
OFF-09	++	++	NA	I	++	-	-	L	Intermediate
OFF-10	++	+	++	I	-	+	-	B	Low
OFF-11	++	+	++	I	-	+	-	B	Low
OFF-12	++	++	+	I	-	+	-	B	Low
OFF-13	++	++	+	I	+	+	+	L	Intermediate
OFF-14	+	++	+	L	-	+	-	B	Low
OFF-15	++	+	++	I	-	+	+	L	Intermediate
OFF-16	++	+	+	L	-	+	-	B	Low
OFF-17	++	++	+	I	-	+	+	L	Intermediate
OFF-18	++	++	+	I	++	+	-	L	Intermediate
OFF-19	+	+	+	L	-	+	+	L	Low
OFF-20	+	++	+	L	++	+	-	L	Low
OFF-21	++	+	++	I	+	+	-	L	Intermediate
OFF-22	++	++	NA	I	-	+	-	B	Low
OFF-23	+	++	NA	I	++	+	-	L	Intermediate

1- Bedded Sediment Exposure Ranking based on sediment and porewater Hazard Quotients, see Table 6 6-1

2- Resuspended Sediment Ranking based on Elutriate Hazard Quotients see Table 6 6-1

3- Bioconcentration Ranking based on Tissue Concentration Ratios for mussels, clams, lobster and cunner; see Table 6 6-1

4- Sediment Toxicity Risk Ranking based on sediment and porewater toxicity tests see Table 6 6-2

5- Field Effects Ranking. Based on results of Condition Index, Benthic Community Structure, Hematopoietic neoplasia, cytochrome P450, and avian predator exposures, see Table 6 6-2

6- Tissue-based Risk Ranking Based on risks of CoCs in tissues to aquatic receptors, see Table 6 6-2

7- Overall Exposure/Effects (E/E) Ranking based on indicators ("-" = Baseline, "+" = Low, "++" = Intermediate, "+++ " = High, see also Section 6 6)

Baseline (B) = Low (+) E/E ranking observed for only one indicator,

or baseline E/E ranking observed for all indicators,

Low (L) = Intermediate (++) E/E ranking observed for only one indicator with no greater than low (+) E/E ranking observed for other indicators,

or high (+++) E/E ranking observed for only one indicator with no greater than baseline (-) E/E ranking observed for other indicators,

or low (+) E/E ranking observed for all indicators

Intermediate (I) = High (+++) E/E ranking observed for only one indicator with no greater than low (+) E/E ranking observed for other indicators,

or intermediate (++) E/E ranking observed for two or more indicators

High (H) = High (+++) E/E ranking observed for one indicator with intermediate (++) or greater E/E ranking observed for other indicators

E/E Rankings for stations for which two or fewer WoE observations were available are equal to the highest WoE ranking

NA = Ranking not available

8- Overall Risk Ranking based on E/E WoE summaries (see also Section 6.6)

Baseline = No greater than Baseline (B) ranking for both E/E WoE summaries,

Low = No greater than Low (L) ranking for both E/E WoE summaries,

or Intermediate (I) ranking for one WoE summary and no greater than Baseline (B) ranking for the other WoE summary,

Intermediate = Intermediate (I) ranking for both E/E WoE summaries,

or High (H) ranking for one WoE summary and no greater than Low (L) ranking for the other WoE summary,

High = High (+++) E/E ranking observed for one WoE summary with greater than intermediate (++) E/E ranking observed for the other WoE summary