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C-NAVY-10-98-1263W

October 26, 1998

Project Number 7752

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. 0302

Subject: Responses to Comments to The Draft Final PRGs
Derecktor Shipyard/Coddington Cove, NETC - Newport, Rhode Island

Dear Mr. Shafer:

Enclosed you will find four copies of the responses to comments to the Draft Final Preliminary Remediation Goals for Derecktor Shipyard/Coddington Cove. Comments from RIDEM (dated September 18, 1998) and from USEPA (dated September 15, 1998) are addressed in the attachments. Comments were not received from NOAA.

It should be noted that minor text changes will be incorporated into the final document describing tables revised in conjunction with the responses. For brevity, some of these text changes are not fully described within this response summary.

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

Very truly yours,

Stephen S. Parker
Project Manager

attachment

c: M. Griffin, NETC (w/encl. - 4)
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)
Restoration Advisory Board (w/encl. - 4)
J. Trepanowski/G. Glenn, B&RE (w/encl. - 1)
File 7752-3.2 (w/o encl.)

bc: G. Tracey, SAIC (w/encl. - 1)
File 7752-8.0 (w/encl. - 1)

ATTACHMENT A
Responses to EPA Comments to The Draft Final Report:
Preliminary Remediation Goals (PRGS) for Derecktor Shipyard/Coddington Cove
August 1998
Comments Received September 16, 1998

Comment 1. *p. 6 It is stated that there is little likelihood of "hot spots" existing that are characterized by metals as limiting CoCs that were not identified in this PRG process. Please note that sediments can be extremely heterogeneous within a large area, and that the sample size for this study was not large enough to categorically support an assumption of co-located contamination. It is likely that additional detailed sampling would be needed to confirm contaminant distributions before any remediation (i.e., part of remedial design). In the course of such sampling unexpected distributions may be found. This is the most important reason for retaining PRGs for CoCs that may contribute substantially to risk, as opposed to limiting remediation to a single PRG.*

Response: The Navy concurs that hot spots may exist in the sediment. However, evaluation of paired sample analysis (RIDEM Comment 10) indicates that sediments within approximately 30 meters are fairly homogeneous. This analysis will be presented in the final PRG document.

In addition, it is possible that there could be sediments containing metals for which PRGs have not been calculated. However, the data from the marine studies indicates that the metals of concern are primarily those for which PRGs are calculated. It is impractical and inappropriate to determine PRGs for metals which may exceed a threshold somewhere in the cove, when all the data that we currently have indicates otherwise. The reviewer is also referred to Section 4 of the Feasibility study in regards to different options of predesign investigations that may be used to address chemical distributions.

Comment 2. *p. 11 There appears to have been some confusion regarding the PRGs based upon the avian predator modeling, resulting from incorrect table labeling. It is agreed that the avian predator PRGs are not particularly high if they are expressed as nanograms per gram, however, as pointed out in other comments, Table 16 had two different labels for these PRGs; micrograms per gram and nanograms per gram. Greater quality control in labeling tables would avoid such confusion.*

Response: A footnote at the bottom of the table correctly indicates that units for metals are ug/g, organics ng/g. These units apply to all PRGs presented in Table 16.

Comment 3. § *3.3.2 The Navy response to a former EPA comment questioning the dismissal of the avian exposure pathway appropriately specified the page in the ERA which discusses the conservative assumptions for avian predator exposure. The response to comment indicated that the discussion would be expanded. The draft final PRG document was not revised to either include the specific conservative assumptions or to refer the reader to the page in the ERA addressing the subject. The PRG document should state, "the ERA assumed avian predators forage exclusively at the site even though the available Coddington Cove habitat represents*

approximately 1.2% and 3.4% of the habitat within the species range, for the gull and heron respectively." Also a table presenting avian predator exposure parameters within the PRG document should be considered since exposure parameter values are presented for the recreational fisherman scenario.

Response: The suggested text will be added. The HH parameter table is added since it is needed to calculate the safe shellfish concentrations. In contrast, the Avian TRVs are calculated in the ERA. Hence there derivation does not need to be documented here. The Navy would recommend against including Avian exposure parameter Tables in this document.

Comment 4. *§ 5 A prior EPA comment requested that the FDA 1995 citation be included in the literature references. This citation is used to justify the statement that the toxic fraction of arsenic is typically about 10% of the total arsenic content. Although FDA 1995 was added to the literature references, a complete literature citation is not presented. The citation merely spells out the US FDA acronym.*

Response: The requested reference will added:

USFDA, Center for Food Safety and Applied Nutrition. Guidance Document for Arsenic in Shellfish. Adams, Bolger, Carrington, Coker, Cramer, Dinovi, and Dolan. January, 1993.

Comment 5. *Figure 3.3-7 Pictorial application of the PRGs developed for the resuspended sediment exposure pathway reflect the stations identified in the ERA as high risk. However, stations DSY-26 and DSY-28 exhibited the greatest toxicity in the Arbacia larval development test but these stations do not exceed the resuspended sediment PRG. Please explain.*

Response: Elutriate chemistry data were not measured for the two stations, therefore it cannot be definitely known as to what CoCs in elutriate water (if any) could be the cause of toxicity. The elutriate sum PRG-HQs for stations DSY-26 and DSY-28 did exceed 1, but maximum PRG-HQs did not. Therefore, there exists uncertainty as to the cause of toxicity. Ammonia concentrations at DSY-28 were highest of all stations and above the NOEC (ERA Figure 5.2-5). The ERA concluded that the reduced larval success at this station could be likely due to elevated ammonia.

Results at Station 26 are also ambiguous; corresponding sediment test results using Ampelisca showed completely non-toxic conditions, and no effect on sea urchin fertilization was noted. Thus, while the result can not be completely explained, it does not appear these areas are of significant ecological concern.

Comment 6. *Table 1 This table presents RAOs for sediment and shellfish. The revised sediment RAO is different then what the Navy response to comments stated would be presented. Please explain.*

Response: The revised RAOs are presented in Section 2.2.4 of the draft FS report. These will be reflected in the final PRG document as appropriate.

Comment 7. *Table 3 This table presents the procedure for PRG development for the aquatic, avian predator, and human health exposure pathways. This table was not revised. Although the steps for the aquatic exposure pathway are still essentially the same, there are some distinctions among the steps performed for the resuspended sediment aquatic exposure and the bedded sediment aquatic exposure that warrant revising Table 3.*

Response: This table has been revised to reflect the bedded/resuspended sediment PRG derivations. These revisions will be provided in the final PRG document.

Comment 8. *Table 5A Are the revised 95% UCL PW-HQs presented in Table 5A for o,p'-DDE, p,p'-DDE, and total PCBs because of the substitution with the maximum PW-HQ for non-toxic data where the number of nontoxic samples is 3 or less?*

Response The number of non-toxic samples was sufficient to calculate the 95% UCL. The change is apparently due to a miscalculation in the Draft PRG document.

Comment 9. *Table 6 Has a ratio of elutriate to porewater contaminant concentrations been derived? If so, is it being used to derive the aquatic RSV? The scaling of the reference sediment database to that observed for JPC-1 should be clearly shown in the tables. The aquatic reference screening value (RSV) for o,p'-DDE presented in this revised draft is different then the value presented in the previous draft, is this because of applying a ratio? The RSV for o,p'-DDE was 1.3E- 4 but is now 3.6E- 3. The lead RSV was 2.03 but is now 13.2. Only elutriate data from JPC-1 are presented in the reference screening, there is not an indication that the reference sediment database was scaled as discussed in the response to EPA's comments.*

Response: The change in Table is due to the separation of elutriate and porewater data before calculation of the RSV. Previously the two data sets had been combined. No scaling of the data has been performed. Although this concept was proposed, internal review and discussion led to a decision that the data could not be appropriately scaled given differences in the two types of data.

Comment 10. *Table 6 It is not clear why data for various reference stations are not presented in the revised Table 6. Also, the data presented for JPC-1 are not consistent with the data for JPC-1-SUR that were presented in the previous draft. Please explain and clarify Table 6.*

Response: As explained above, The change in Table is due to the separation of elutriate and porewater data before calculation of the RSV. Previously the two data sets had been combined. The list of analytes has completely changed based on recalculation of the TEVs presented in Table 5, accounting for differences in data presented.

Comment 11. *Table 7 The order of magnitude change in the o,p'-DDE reference screening value results in a higher aquatic TEV.*

Response: The TEV for o,p'-DDE increased from 1.0 E-3 in the Draft PRG (reflecting PW & Elutriate combined) to 3.6E-3 in the Draft Final PRG (reflecting Elutriate alone) or about a 3.6X increase.

Comment 12. *Table 16 The PRGs presented in Table 16 may need to be adjusted pending resolution of issues raised within these comments.*

Response: The final PRGs will be reviewed and revised if necessary based on the outcome of revisions described in the above and all other responses to comments described in this summary.

Comment 13. *Table A-2.3 Although the column headings were revised in this table to reflect the EPA comment, the final row of the table needs to be re-labeled to indicate that it presents the mean proportion of solids and mean percent lipid contents.*

Response: This table will be revised as noted.

Comment 14. *Table A-3.1 This table presents the equilibrium-partitioning calculated concentrations of organic contaminants in sediment porewater for stations DSY-25 through DSY-41. Stations DSY-1 through DSY-24 are not presented. Please explain why these have been deleted from the document and how this affects the overall evaluation.*

Response: The EqP calculations for URI data were unnecessarily included in the Draft PRG document, since only data with co-located toxicity information is used to derive PRGs (i.e., ERA Stations DSY-25 to DSY-41).

Comment 15. *Tables A-3.1 The equilibrium partitioning calculated concentrations for total PCBs, & .3B benzo(g,h,i)perylene, and benzo(k)fluoranthene have changed, were different K_{oc} values used? The PCB change appears to have been significant. The DSY-27 and DSY-28 stations exhibiting toxicity have higher hazard quotients. The DSY-27 porewater hazard quotient is now two orders of magnitude higher then it was previously.*

Response: The correct Koc values for benzo(g,h,i)perylene =6.59 and benzo(k)fluoranthene = 6.09, as correctly indicated in Draft and Draft Final PRG table A-1. However, There is an error in the Koc values for benzo(g,h,i)perylene, and benzo(k)fluoranthene, which had been incorrectly switched in the roll-up to Table A-3.1. This error will be corrected. Estimated porewater concentrations for Total PCBs appear to have been underestimated by two-fold in the previous draft (Table A2.-2) as compared to the present document (Table A-3.1), apparently because the sum of congeners vs. sum of congeners x 2 was used. This error was corrected in current draft.

Comment 16. *Table A-3.3A The mean porewater hazard quotients are not consistently presented. Some of the values are presented as zero when they are very small while others are presented in scientific notation. The presentation should be consistent.*

Response: The notation will be revised to show up to 3 decimal places in Arabic format (e.g., 0.006) and scientific notation to one decimal place for numbers less than 0.001.

Comment 17. *Table A-4.4B DSY-26, DSY- 28 and DSY- 41 exhibited toxicity in the Arbacia larval development test; however, elutriate chemical concentration analysis were not performed on these samples. Therefore, the data for these stations were not included in the toxic data set used to derive the NOEQ. If the porewater to elutriate ratio derived from the background data set were used to estimate elutriate chemical concentration data for these stations, would the NOEQ and the resulting PRG change significantly?*

Response: As discussed in comment response 6 above, no scaling or ratio development of the data has been performed. Although this concept was proposed, internal review and discussion led to a decision that the data could not be appropriately scaled given differences in the two types of data. Also, as indicated in the response to comment on Figure 3.3-7, above, toxicity responses to DSY-26 and DSY-28 were ambiguous. Similarly, DSY-41 was not toxic to amphipod in bulk sediments or to fertilization of sea urchins. It cannot be definitively stated how additional elutriate data (measured or predicted) would affect the PRG, or in what direction it would change.

Attachment B:
Responses to RIDEM Comments on the Draft Final Report:
Preliminary Remediation Goals (PRGS) for Derecktor Shipyard/Coddington Cove
August 1998
Comments Received September 18, 1998

1. **General Comment**

As previously stated, a number of parameters were utilized during the evaluation conducted under the Ecological Risk Assessment. These parameters included sediment chemistry, water chemistry, biotoxicity test, tissue analysis, biota condition analysis and modeling. This comprehensive evaluation was deemed necessary, as no single parameter was considered adequate in an ecological risk assessment. As an illustration, chemical analysis of the sediment may not reveal a problem that would be evident through a biota condition analysis. However, the process developed for the PRG derivations has relied heavily upon chemistry, toxicity and modeling. This is of concern as it was realized that all of the aforementioned parameters were needed to conduct the risk assessment. However, only a limited number of parameters were used in the PRG process. This may be the reason why there is disagreement between the output of the ecological risk assessment and the PRG document. It is this Office understanding that the evaluation of all of the parameters, at least qualitatively, would be incorporated into the PRG document. Please indicate which section\sections contain this evaluation.

Response: An analysis of CoC selection based on WQC application will be evaluated to determine whether the biotoxicity has failed to identify potentially important CoCs for PRG development. This will be presented in the final PRG Document.

2. **Section 2.1, PRG Development Approach;**
Page 4, Paragraph 2.

The report notes that the actual toxicity of sediments may be less than that predicted by direct comparisons to bulk sediment concentrations due site specific factors which limit the bioavailability of the contaminants. Accordingly, exposure to water as opposed to bulk sediments is used in the PRG development process. It is known that a number of organisms: clams, worms, etc. ingest sediments directly. Even in human health risk assessments, incidental ingestion of contaminants found on soil or sediments is included in the overall risk assessment. Since organisms are exposed via both pathways sediments, and dissolved constituents, incorrect PRG values will be obtained if only one route is evaluated. Therefore, the PRG process should evaluate exposure to bulk and dissolved contaminants at the site. Please modify the report accordingly.

Response: The separate analysis of exposure of sediment intake vs. porewater for PRG development is unnecessary because the two matrices are likely to contribute to CoC bioaccumulation similar amounts under equilibrium conditions. The bioavailability of CoCs attached to organic particles vs. CoC dissolved in organic-rich water is controlled by the organic carbon partitioning coefficient. The digestive processes of typical sediment associated biota are not

strong enough to remove more contaminants than that which is attached to the organic matter on the coatings of surface particles. This is in stark contrast to mammalian systems that have complex and highly efficient (e.g., low pH, highly enzymatic) systems. In these mammalian systems, sediment ingestion vs. water vs. food is a very important component of the exposure analysis.

3. **Section 2.1, PRG Development Approach;**
Page 4, Paragraph 2.

This section of the report notes that elutriate concentrations were compared to WQSVs. Elutriates are not obtained by allowing the water to drain from the sediment samples. Elutriates are obtained by mixing one part sediment with four parts water. This represents a dilution and should be treated as such in any comparison of WQSV to elutriate concentrations (i.e. direct comparison is not possible, dilution should be factored into the comparisons). Please modify the report accordingly.

Response: The elutriate dilution was selected by the EPA/USACE to represent the worst case exposure concentration of CoC that occurs during the release of large volume of sediment during dredged material disposal in the ocean. More concentrated exposure scenarios are not evaluated because they are unrealistic. In fact, the actual degree of dilution which occurs in the field is likely to be several orders of magnitude larger than 4. However, as part of conservative approach, the WQSV comparison is even more conservative than worst case conditions, since these sediments are not being evaluated for dredged material disposal in Coddington Cove. In summary, the Navy would agree to incorporating realistic exposure scenarios, but disagrees with the RIDEM proposal of the use of undiluted sediment as being at all realistic.

4. **Section 2.1, PRG Development Approach;**
Page 4, Paragraph 2.

Porewater/elutriate concentration are then divided by the water quality screening values derived from available water and sediment benchmark representing thresholds for adverse effects to obtain porewater hazard Quotients (PW-HQ) and elutriate Hazard Quotients (ELU-HQs).

Note the above would imply that porewater concentrations are compared to bulk sediment values. This is not the case. The sediment values used in this assessment are Long and Morgan values translated into porewater values using the EqP model. Therefore, the above should note this and be modified as follows:

Porewater/elutriate concentration are then divided by the water quality screening values derived from available water and modified sediment benchmarks representing thresholds for adverse effects to obtain porewater hazard Quotients (PW-HQ) and elutriate Hazard Quotients (ELU-HQs).

Response: The Navy agrees with the assessment described above. The report will be modified accordingly.

5. **Section 2.1, PRG Development Approach;**
Page 4, Paragraph 2.

These predicted values for organic contaminants are combined with direct measurements of SEM/AVS measures of metal bioavailability to constitute the porewater data set.

The report indicates the SEM/AVS information will be used to determine whether inorganic contaminants are a concern at the site. This approach may be valid under static conditions, that is no resuspension of sediments. Resuspension events will change the SEM/AVS values (i.e. metal bioavailability is increased). Therefore, the AVS/SEM modifications should not be applied for areas subject to resuspension. Please modify the report accordingly.

Response: The report will be modified to indicate the following:

"The application of SEM: AVS data can be modified to be relevant to sediments deposited as a result of resuspension. By assuming that all AVS is oxidized during resuspension (AVS = 0) the SEM concentration data can be evaluated directly against the SEM benchmark (5 uMol/g). It is noted that this evaluation was performed in the ERA (Table 6.1-1) . In this case, only four stations marginally exceeded the benchmark (DSY-27, 28, 29, 30) and only one station by more than a factor of two (DSY-27 12.1 uMol/g). Noting that the SEM value the sum of five metals (Cu, Cd, Pb, Ni, Zn) , and that AVS was extremely high in this sediment (176 uMol/g) it is unlikely that the combined effect of metals (let alone individual metals) are responsible for adverse effects at this or any other sampled location."

6. **Section 2.1, PRG Development Approach:**
Page 4.

This section of the report has compared the results of the biotoxicity test in the evaluation of whether contaminated sediment represents a threat. In numerous meetings this Office has indicated that due to variability in biotoxicity test and sampling, the biotoxicity test may be used as an indicator of contamination. It cannot be used as a stand alone test in the determination as to whether contaminated sediments represent a problem. The PRG document has used the biotoxicity test to discount contaminated sediments. The biotoxicity test performed at the site would not have sufficient rigor to meet this task and should not be used as such. Please modify the report accordingly.

Response: In response to previous comments on this issue, the Navy has stated that the biotoxicity test is not used to assess problem sediments; rather is only used to identify which CoCs are contributing to the problem. After further discussion on this issue, the Navy will review the CoC list to determine whether the application of the biotoxicity test has led to the exclusion of primary risk drivers that might other wise be selected via consideration of WQC alone.

7. **Section 2,1, PRG Development Approach:**
Page 4.

This section of the report appears to state that the No Observable Effect Quotient represents the highest concentrations of contaminants for which adverse affects are unlikely. As stated, this method does not appear to be conservative, in that instead of using the lowest concentration of a contaminant that does not produce an adverse affect, the highest concentration of the contaminant is used. Please clarify. As this is a public document the Office recommends that an example be used to illustrate this concept, (ex. Effect was observed at 2, 3 and 4 ppm, but not at 0.5 and 1 ppm. Therefore, 1 ppm was selected as the NOEC.

Response: The Navy agrees with the assessment stated above. The requested example will be provided.

8. **Section 2,2, Aquatic TEV Derivation:**
Page 7

This section of the report indicates that EPA WQC values were used in the PRG development. Please be advised that RIDEM WQC values are used throughout this State. Therefore, in order to be consistent, RIDEM's WQC values must be used in the PRG derivation process.

Response: The Navy has not yet received RIDEM's written determination and justification of applicability of WQC as a regulatory requirement for sediment evaluation. After this determination is provided to the Navy, it can be reviewed and the processes can be revised to the extent necessary. However, until then the Navy is required to continue to meet the deadlines stated in the FFA for report deliveries, and these will continue to be prepared based on current policies and guidelines.

It should be noted that other Trustees have discounted such a determination as technically indefensible, so the Navy has determined that it is best to not wait for this determination to proceed with further work.

9. **Section 2.4.1, Benchmark Selection HQ Derivation;**
Page 13, Whole Section.

This section of the report notes that the "receptor population for the consumption of locally-caught shellfish include local adult subsistence fisherman." The report also note that the consumption rate is 15.6 g/day. As noted in the Human Health Risk Assessment the exposure rate for subsistence fisherman would be greater than the 15.6 g/day value. Therefore, the report should note that the exposure for the subsistence fisherman would be greater than the 15.6 g/day.

Response: The final HHRA report (September 1998) describes the consumption rate for shellfish taken from the Derecktor/Coddington Cove site and ingested by subsistence fishermen as 15.6 g/day. This is the rate that is used for development of PRGs, and it is not anticipated to be revised.

10. **Section 3.2, Approach for Spatial Implementation of PRGs; Page 22, Paragraph 1.**

This section of report discusses the comparability of sediments samples collected from the EPA investigation (0-15 cm) and the URI study (0-2 cm). In support of incorporating the URI data the report has noted that the Relative Percent Difference for paired samples is within an acceptable range. Samples used in this comparison include DSY 3/29, 11/31, 18/26, 19/32 and 20/31. Using the distance criteria employed for the above sets the following groups should also be included in this analysis; 1/41, 1/40, 2/28, 21/33, 10/41. Please modify the report accordingly.

Response: The requested comparisons will be added to the revised document.

11. **Section 3.2, Approach for Spatial Implementation of PRGs; Page 21, Whole Section.**

The report has incorporated the results from previous studies in the PRG development process (i.e. URI study). However, the report has not incorporated results from other studies specifically the ACOE investigation that was conducted in the Pier 1 area. Historically two large floating dry docks and a barge was moored at Pier 1. Operations carried out on these docks resulted in the uncontrolled continuous release of contaminated sand blast grit into the environment during sand blasting operations. In addition, it was common practice to either remove the contaminated sand blast debris from the dry docks by either dumping the material over the side or submerging the dry docks. Other waste from operations conducted on the dry docks were also dumped over the side. These waste included, bilge waste, waste oils and sludges from either the dry docks or the ships being serviced by the dry docks. These actions resulted in a Cease and Desist Order being issued against Derecktor Shipyard. The amount of material dumped in this area was considerable as it could be measured by a bathymetric survey of the area, (the survey was conducted in order to determine the extent of contamination in the area). Twenty sediment samples collected in this area were analyzed for lead, copper and zinc. The concentrations of these contaminates in the majority of these samples exceeded the proposed PRGs for Derecktor Shipyard. As previously noted in meetings and correspondence, this area was not sampled during the recent ERA. Therefore, the proposed PRGs should apply to these results.

Response: The Navy understands the RIDEM's concern regarding this issue. The Draft Feasibility study report describes various scenarios for remediation, and associated pre-design investigations. It is more appropriate to use these pre-design investigations to determine existing extent of contaminant concentrations at levels above PRGs prior to remedial action. In addition, the reviewer should note that much of the area that was investigated in the 1987 ACOE study is included in the areas where PRGs are exceeded.

12. **Section 3.3, Assessment of PRGs for Risk Assessment Reduction; Page 22, Whole Section.**

The correlation between PRG and ecological risk assessment appears to be limited to high risk areas and not intermediate risk stations. Please confirm. Note, it is this Offices position that intermediate risk stations should be addressed, and the PRGs development should incorporate these stations.

Response: The ERA has not quantified the magnitude of risk, but rather has ranked various portions of the cove as to the likelihood that some degree of CoC impact has or is occurring. The Navy would agree that additional discussion be given as to the intermediate risk probability areas with regard to appropriate for remedial action. However, it is not possible to alter the process to quantify PRGs for areas which have only an intermediate probability that some degree of risk is occurring, since the sensitivity of all endpoints is insufficient to identify which CoC, if any, is causing an adverse impact. Only in cases where true exposure-response relationships are apparent is it possible to identify CoCs and related concentrations which are amenable to PRG development. Finally, the areas to be "addressed" are further discussed in the feasibility study report. It would be appropriate to address this comment to the FS.

13. **Section 3.3, Assessment of PRGs for Risk Assessment Reduction; Page 23, HWW PAHs.**

This section of the report discusses the relationship between observed risk and the PRG value. The report notes that eight stations exceeded the PRG value (6923 ng/g). However the report recommends a PRG of 13846 ng/g apparently based upon the fact that two stations close to Station 20 did not show similar exceedence of the PRG-HQ and the fact that the recommend value is within the Long and Morgan range. The concentrations of contaminants at two closely located stations probably represents sediment heterogeneity. It is unclear how sample concentrations at different stations can be used in support of a higher PRG. Therefore, the PRG value of 6923 ng/g should be employed.

Response: The paragraph expanded as follows to better justify the recommended PRG:

> HMW PAHs: The PRG for HMW PAHs (6,923 ng/g dry weight) was exceeded at eight shipyard/cove stations (DSY-2, DSY-3, DSY-18, DSY-19, DSY-20, DSY-27, DSY-29, and DSY-30; Figure 3.3-1). PRG exceedences were observed primarily for the harborfront stations, particularly Stations DSY-3/29 where PRG-HQs ranged from 4.3 to 10.5. Another area in the vicinity of Station DSY-20 also exceeded the PRG by approximately three-fold, although closely located stations did not show similar exceedences (PRG-HQs < 1 were observed for DSY-11 and DSY-31). This suggests localized heterogeneity in HMW PAH concentration.

Response
Text con't

Among the stations exhibiting PRG exceedences, only Station DSY-29 was at high probability of risk, PRG exceedences at this station (PRG-HQ = 4.3) and proximal station DSY-3 (PRG-HQ = 10.5). In contrast, PRG exceedences at low risk probability station DSY-30 (PRG-HQ = 1.49) are equivalent to that found at high risk station DSY-27 (PRG-HQ = 1.47), suggesting that PRG exceedences less than two are likely to preferentially address higher risk vs. lower risk areas. Further support for a Recommended PRG equal to 2 times the baseline PRG is seen in the risk/PRG comparison of the Station DSY-32 area; this location was classified as low risk while nearby station DSY-19 was exceeded the PRG by less than two fold. Similarly, PRG exceedence at Station DSY-18 (PRG-HQ = 1.86) is adjacent to intermediate risk station DSY-26 with no PRG exceedence (PRG-HQ < 1) such that implementing a PRG-HQ < 2 would not be reliably address intermediate risks.

Based on the above analysis of PRG exceedence vs. risk reduction potential, a Recommended PRG equal to two times higher than the baseline PRG is selected. The Recommended PRG value (13846 ng/g) was compared to the NOAA Effects Range concentrations as a check on the degree of protection that would be afforded to aquatic biota (Long et al., 1995). The Recommended PRG concentration was found to be 1.4X higher than the NOAA ER-M (9600 ng/g dry weight) but 1.2X less than the it is intermediate between the State of Washington Apparent Effects Threshold - Low (AET-L; 17,000ng/g) concentration; (Barrick et al., 1988). Hence, the PRG is within the range of values expected to protect aquatic biota from adverse exposures.

14. Section 3.3, Assessment of PRGs for Risk Assessment Reduction; Page 24, Copper.

This section of the report discusses the relationship between observed risk and the PRG value. The report notes that two stations sediment concentrations above the PRG value had non detect elutriate concentrations and therefore copper should not be used in the PRG assessment. The two referenced stations (27 and 29) were high risk stations with high concentrations of copper in the sediment. As stated above, exposure to site contaminants is not limited to elutriates. Therefore, copper should be retained in the PRG assessment.

Response: Copper concentrations at DSY-27 and DSY-29 are not high; measured bulk concentrations were marginally above the ER-L, and SEM-AVS < 5, indicating that metals including copper are not at concentrations high enough to contribute significantly to risk. The lack of measured copper in elutriate is consistent with the low/non-bioavailable concentrations in the sediment. Hence copper is not a primary contributor to risk and should not be retained as a PRG. The reviewer should note that stations 27 and 29 have other contaminants at concentrations that exceed recommended PRGs.

15. Section 3.3, Assessment of PRGs for Risk Assessment Reduction; Page 24, Lead.

This section of the report discusses the relationship between observed risk and the PRG value. The report notes that five stations exceeded the proposed PRG value (84 ng/g). Two stations had high risk (two stations employed URI data, risk assessment were not

conducted at these locations), however, one station had low risk (Station 32). The report recommends adopting the higher PRG-HQ equal to 2 (this translates into a concentration of 166 ug/g). In essence, even though high risk was observed at a station with a HQ less than two, the lack of similar risk at the other station supports adopting a HQ value of 2.

A review of the risk assessment for these stations reveal that the weights of evidence sediment hazard quotients for metals, elutriate HQ, laboratory toxicity, and field effects indicators are similar amongst the three stations. However, the tissue concentration ratios for Station 32 is lower than Stations 27 and 29, thus the overall lower risk for this station. It should be noted that this lower risk is not based upon the fact that the tissue samples had lower concentrations of contaminants; it is due to the lack of data, tissue samples were not collected at Station 32. That is, the lower risk is not based upon data but the lack there of. Therefore, it would be inappropriate to recommend a PRG value based upon a HQ equal to two and the PRG value of eighty four should be employed.

Response: The three stations being discussed are high risk probability stations DSY-27, DSY-29 and low risk probability station DSY-32. The Navy disagrees with RIDEM's evaluation of the data:

Exposure data (sediment/elutriate HQs) are not comparable between locations; DSY-29 is clearly unique because of high sediment PAH concentrations; DSY-27 and DSY-29 are clearly distinguished from DSY-32 due to higher PCB concentrations, while the elutriate HQs are similar and low for all three locations. These differences in CoC exposure among stations (DSY-29: high PAH and PCBs; DSY-27: high PAHs, moderate PCBs; DSY-32; low PAHs, low PCBs) contribute substantially to the selection of PRGs used to address risks at these locations.

The Navy disagrees that there is a lack of data; those species that were available for sampling (*Pitar*) were sampled. This is not a data gap, but rather a reflection of the habitat and the species it supports. The chemistry residue for *Pitar* (2.7 ug/g) at DSY-32 was intermediate between concentrations observed at the reference locations for mussels (ND-3.3 ug/g). Lead concentrations at DSY-27 and DSY-29 are also in the range of reference locations, hence there is no evidence to suggest that elevated Pb exposure is occurring at these three locations. Thus, the availability of additional tissue data at DSY-27 and DSY-29 further supports the higher PRG.

Exposure response relationships between benthic community (% dominant taxa) and Pb concentration in sediments suggest possible impact (ERA Figure 6.5-1) above about 150 ug/g. The ordinance analysis (Figure 6.5-4D) suggests that Pb at DSY-29 may explain the degraded at this location but otherwise no relationships are observed for DSY-27 or other stations. Since there is no effect of Pb at DSY-27, A PRG for Pb should not be set to concentrations that would suggest a Pb risk at this or any station other than DSY-29. Given that the DSY-27 and DSY concentrations are 150 and 185 ug/g a PRG of 166 ug/g appears more than conservative to protect risk to aquatic biota at DSY-29.

16. **Section 3.3, Assessment of PRGs for Risk Assessment Reduction; Page 24, Total PCBs.**

This section of the report discusses the relationship between observed risk and the PRG value. The report notes that four stations exceeded the proposed PRG value (530 ng/g). Two stations had high risk (the other stations employed URI data, risk assessment were not conducted at these locations), however, one station had a hazard quotient that only slightly exceed the PRG-HQ equal to one. The report therefore recommends adopting the higher PRG-HQ equal to 2 (1060 ng/g). High risk observed at a slight exceedence of the HQ would seem to validate the lower value (560 ng/g) not higher value. Therefore, the lower PRG value (560) should be employed at the site.

Response: The following revised paragraph will be used to better support the Navy's recommended value:

> Total PCBs. The PRG for Total PCBs (530 ng/g dry weight) was exceeded at four stations (DSY-2, DSY-11, DSY-27 and DSY-29; Figure 3.3-6). Good agreement was observed between observed risk and PRG exceedence; the highest PRG-HQ (6.25) was observed at high risk Station DSY-27 (Figure 3.3-6). Sediment concentration at DSY-27 was 3,310 ng/g dry wt, which is six-fold higher than the next highest surface sediment concentration (DSY-29). Reduced condition of indigenous mussels at DSY-27 was associated with increased tissue concentration, and possible PCBs for amphipod survival (Figure 6.4-2B) were noted, hence supporting the selection of Total PCBs as PRG to address risks at this location.
>
> Station DSY-29 was also designated as a high risk area but had a marginal PRG exceedence (PRG-HQ = 1.03). Unlike Station DSY-27, PCBs effects at Station DSY-29 were not indicated in exposure-response analyses for amphipod survival (Figure 6.4-2) or benthic community structure in the ERA (Figure 6.5-3D). Thus there is a lack of supporting data to suggest that implementation of a PRG for PCBs is needed to address risks at this station. Instead, risks are more likely related to other CoCs notably Pb (see discussion above).
>
> As with lead, PRG thresholds below PRG-HQ < 2 could not be discerned which could discriminate between high and low risks, and thus adopting a PRG concentration below 1060 ng/g is not recommended. Adopting a sediment concentration at 1060 ng/g would conservatively ensure risk reduction in one of the high risk areas. While the RPRG concentration (1060 ng/g) is well above the NOAA ER-M (180 ng/g dry weight), the value is comparable to the State of Washington Apparent Effects Threshold (AET)-low (1000 ng/g dry) and well below the AET-high (3100 ng/g dry) benchmarks. Thus, the RPRG is within the range of independent estimates of threshold effects levels for aquatic biota.

17. **Section 3.3, Assessment of PRGs for Risk Assessment Reduction; Page 24, Total PCBs.**

The proposed PRG for PCBs is 1638 ng/g, which is well beyond the Long and Morgan value of 22-180 ng/g. Previously, in support of the proposed PRG value for PAHs the

document referenced the Long and Morgan value. This comparison was not done for PCBs. Please explain why the proposed PRG for PCBs greatly exceeds the Long and Morgan values.

Response: The text directly states "the RPRG concentration (1638 ng/g) is well above the NOAA ER-M (180 ng/g dry weight)", hence the suggested comparison was performed. The following text will be added to the document to explain why the proposed PRG is protective despite exceedence of the Long and Morgan values:

> "Although the baseline aquatic PRG for total PCBs (1638 ng/g) is about nine-fold higher than the NOAA ER-M (180 ng/g), the corresponding TEV value was set equal to the WQC-SC value (0.03 ug/L) without site-specific modification. This apparent discrepancy between the level of protection afforded by water- vs. sediment-based benchmarks is attributed to the fact that the latter benchmark is field-based and correlative in nature; the ER-L/ER-M benchmark is reflective of effects caused by complex mixtures of CoCs, not PCBs acting alone. Hence, the PCB benchmark is artificially lowered because the presence of other CoCs in the mixture will likely make the sample more toxic than would otherwise occur in the PCB-only case. In contrast, the WQC is based solely on PCB toxicity. Thus, the baseline PRG value, being set equivalent to the WQC-SC concentration, is expected to be completely protective of risks to aquatic biota from PCB exposure in sediment. In addition, the TEV value (i.e., 0.03 ug/L) is 300X less than the WQC-SA criteria (10 ug/L) and thus also indicates the level of protection for possible PCB impacts to aquatic biota in high ecological risk areas. Finally, the recommended PRG for Total PCBs is only about 1.5X lower than the Sediment Effect Concentration of 2700 ng/g calculated by MacDonald (1994) based on PCB-spiked sediment bioassays. Hence, considering factors such as characteristics of the sediment characteristics and composition of PCBs, the recommended PRG should be adequately protective of aquatic receptors."

18. **Section 3.3, Resuspension Evaluation;**
Page 25, Whole Section.

This section of the report employs a model to predict the areas subject to resuspension by prop wash. The model predicts that any area greater than 10 meters in depth will not be subject to resuspension from prop wash. It is known that the ability of a model to assess or predict conditions at a site is limited by a number of factors, including the assumptions used in the model and the prevailing site conditions. These limitations can result in the model not being representative of field conditions. That is, the model's predictions are incorrect. Accordingly, when possible, it is common practice to test the predictions of a model. Such a test occurred at the Derecktor Shipyard during the docking of the USS Saratoga. The Rhode Island Department of Environmental Management inspected the area after the Saratoga had been docked. Resuspension of sediments was observed from the propellers of the tugboats used to dock the ship. The resuspension of sediments was extensive as the entire area in between Pier 1 and Pier 2 was muddied by the tender vessels. It should be noted that these observations were made well after the ship had been docked. In addition, the tug boats were not operating at moderate high propeller RPMs (as assumed by the model), but instead

were idling as the ship had already been secured to the dock, (vessel was tied to the dock). Therefore, the predictions of this model are incorrect, (the model predicted no resuspension in area where the Saratoga was docked; resuspension was observed), and this model should not be used to evaluate resuspension from vessels operating at the site. Finally, it is unnecessary to expend monies and manpower employing another model as the conditions at this site has been proven to be subject to resuspension. Therefore resuspension via propeller action should be considered for the entire study area.

Response: The comment above reports a sediment resuspension event evaluated based on visual discoloration of seawater. The Navy does not believe that the tug operation has produced a resuspension that exceeded PRGs. It is almost certain that the degree of dilution of bottom sediment is orders of magnitude higher than that evaluated in the biotoxicity test (4-fold dilution at a constant state for a 30 minute period). Hence, while propeller-driven resuspension might even occur across the study area at specific times, risk to aquatic biota cannot be presumed.

19. **Section 3.3, Resuspension Evaluation;**
Page 25, Whole Section.

This part of the document notes that resuspension is possible due to vessels operating in the area and storm action. The report has indicated that resuspension is most likely for areas known to contain silt and clay. Resuspension of courser grain material is possible during storm events. Resuspension of the sands and the corresponding scouring action in the Stillwater Basin has been proposed as the responsible agent for the lack of life in this area (report indicates entire basin is subject to resuspension even though the sediment in the basin is heterogeneous, areas of sands, or silts).

Response: The report will acknowledge that resuspension of sand is possible, but of far lesser concern because of low TOC content and associated CoC concentration.

20. **Section 3.3, Resuspension Evaluation;**
Page 25, Whole Section.

The PRGs developed for resuspension appear to applied to the surface sediment, (0-7 cm, 0-2.5 inches). Resuspension due to storm action or ship traffic is not expected to be limited to the top 2.5 inches. Therefore, the report should be modified to include contaminants from the deeper sediments in this evaluation.

Response: Sediment samples for elutriate characterization were collected from the top 0-15 cm (0-6 inches). The Navy has no data to determine how much deeper, if at all, resuspension may occur. In the Feasibility Study, PRGs are applied to sediment samples collected from other depth intervals. The requested information is presented in Table 2-2 and Appendix C of the Draft FS report.

21. **Section 4.0, Conclusion and Recommendations;**
Page 28 Whole Section.

This section of the document summarizes the results of the PRG process. The Office recommends that a figure be included which depicts the areas which exceeds all of the recommend PRGs (aquatic, avian, and human health). This figure would also indicate the exceedence for the particular polygon, (i.e., a letter A for aquatic, AV for avian and H for human health would be in the polygon). In this manner the reader can quickly determine the bases for the exceedence in each polygon.

Response: This figure has been prepared and is presented in the Draft FS report (Figure 2-1). The reviewer is requested to refer to that report for this information.