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RHODE ISLAND

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

235 Promenade Street, Providence, RI 02908-5767

TDD 401-222-4462

July 25, 2006

James Colter  
U.S. Department of the Navy, Northern Division  
Naval Facilities Engineering Command  
10 Industrial Highway, Code 1823-Mail Stop 82  
Lester, PA 19113-2090

Re: Response to Comments on the Draft Background Soil Investigation Report, Site 9, NUSC Disposal Area, NETC

Dear Mr. Colter,

The Rhode Island Department of Environmental Management, Office of Waste Management (RIDEM) has reviewed the response to comments on the Draft Background Soil Investigation Report, Site 9, NUSC Disposal Area dated June 28, 2006. Attached is an evaluation of the Navy's response to comments generated as a result of this review.

. If the Navy has any questions please contact this office at (401) 222-2797, extension 7111.

Sincerely,

*Paul Kulpa*  
Paul Kulpa  
Office of Waste Management

cc: Mathew DeStefano, DEM OWM  
Richard Gottlieb, DEM OWM  
Cornelia Mueller, NSN  
Kymberlee Keckler, EPA Region I

**Evaluation of Responses to Comments from RIDEM on the  
Draft Background Soil Investigation Report,  
Site 8, NUSC Disposal Area  
Comments Dated June 2, 2006**

**1. General Comment**

*Please be advised that background studies are limited to metals.*

Response: The comment is noted. It is our understanding that previous versions of RIDEM regulations allowed the adjustment of cleanup criteria for metals by conducting background studies. However, RIDEM should be aware that EPA and Navy policies allow for background evaluations be conducted for anthropogenic chemicals such as PAHs and pesticides. Therefore, the Navy opted to identify PAH and pesticide concentrations in the background areas as well. This data may be used in the future to continue to gain understanding as to anthropogenic contaminants in the region.

*Evaluation of Response*

*The Navy acknowledges that RIDEM regulations does allow for modification to cleanup standards for metals. This was the intent of the comment.*

**2. General Comment**

*The report has produced a table containing the range, arithmetic and geometric average for arsenic in different soil types. Please indicate whether the proposed background concentration is the range, arithmetic, geometric average or some other value*

Response: The report notes that the background data set was developed to allow comparison of site data to background data, and to be incorporated into a base wide background data set. Rather than set a single background value for any specific chemical constituent for this site specifically, any and all statistics developed from the background data groups should be available for different comparisons, and specific comparisons should be made as appropriate to the ends that are being tested. Thus, the response to the comment is all these values are pertinent to the comprehensive understanding of background conditions.

*Evaluation of Response*

*It appears that the Navy feels that all of these values should be considered in the background analysis and at this time the Navy has not selected a particular value. The Office of Waste Management concurs that the background values for a particular metal lies within the ranges in the report (with the understanding that*

*for certain metals these ranges will have to be modified to address concerns broached in the comments below). As a particular value each metal has not been selected at this time, the Office of Waste Management will withhold concurrence until such time that the Navy proposes a value for review and approval.*

**3. General Comment**

*The executive summary focuses on arsenic. Please indicate whether arsenic is the only metal that the Navy is seeking a background value for. If the Navy is seeking a background value for more than one metal please provide a table with these metals and the associated background values.*

Response: The executive summary focuses on arsenic because it is the metal that is more consistently found above the RIDEM direct exposure criteria not only at NUSC, but at many sites on Aquidneck Island. It appears that this has come to RIDEM's attention as well, since 7 of the 18 comments on the subject report focus on the evaluation of the arsenic data. However, other chemical constituents were analyzed and the background conditions for any and/or all chemical constituents measured may be used at some point during the RI/FS process to qualify data, risk, design and construction considerations, etc.

*Evaluation of Response*

*Again it appears that the Navy will select a particular background value, as or when found to be necessary during the RI/FS process. Accordingly, the Office of Waste Management will withhold concurrence until such time that the Navy proposes a value for review and approval.*

**4. General Comment**

*Please provide a table, with the following information, for each metal that the Navy is seeking a background concentration for:*

*Sample result arranged in ascending order for the particular soil type (for example for Se soils the Navy would list all the sample results for arsenic in ascending order for this soil type).*

*Descriptive statistics for each contaminate and each soil type, typically place below abovementioned soil types, (for example, below the list of arsenic sample results for Se soil would be the range, medium, mode, mean, standard deviation, kurtosis, skew, etc).*

*Non Descriptive Statistic for each contaminates and each soil type, typically below the abovementioned descriptive statistics. The sample value obtained and the critical value for each test must also be included in this table, (for example, below the descriptive statistics for arsenic for Se soil would be the results of the test for normality, outliers test,*

*etc (critical values and sample values, as well as a statement indicating the significance of being above or below the critical value for a particular test.)*

Response: Regarding the first portion of the comment, the Navy is not currently seeking a single background value for any analyte (refer to the response to comment 2, above). Regarding the remainder of the comment, rearranging the data tables, the statistical analysis and testing spreadsheets for all the analytes would result in an extensive revision and lengthening of the report. Since the Navy is not seeking a state-approved background value for all these analytes, the report will not be revised to provide this information.

However, since the discussion subject at the current time is the elevated concentrations of arsenic at this site, providing the summaries described above for arsenic will be provided as requested. This will be provided in a new Appendix E of the report. Existing evaluations will remain as previously published.

#### *Evaluation of Response*

*The Navy has reiterate its position that they are not seeking a single background value for any particular contaminate at this time. However, since the discussion topic at this time is arsenic they have provided the rearranged tables.*

#### **6. Section 4.2.3, Examination of Extreme Values and Outliers Arsenic Page 4-3.**

*This section of the report notes that the Sample 06 (arsenic concentration 71 ppm) has been identified an outlier by the statistical test. The report should also note that inclusion of this value results in a non normal distribution, which does not allow for the use of parametric test.*

Response: Table 4-9 indicates that, before considering removal of the candidate arsenic outlier at 71.7 mg/kg, the arsenic data set for Non-Hydric Soil Type Se acceptably matches the shape of a lognormal distribution (W-score 0.9162, critical value 0.905), but does not have a normal distribution (W-score 0.5162, critical value 0.905). Table 4-14 reveals that, after removal of the candidate outlier, the lognormal fit is slightly better (W-score 0.963, critical value 0.901), but the normal fit now also matches acceptably (but not as good as the lognormal fit). This is to be expected with outlier removal, since lognormal distributions are necessarily skewed with a tail reaching out to include a few data points at much higher or lower concentrations. It will be noted in the report that this precludes background tests that require the assumption of normality (parametric tests)

*Evaluation of Response*

*RIDEM's calculation for log normality generates different sample values and critical values. Please indicate what significance level was employed. In addition, in order to verify that the same data is being used please list the sample number and the actual value for each sample, which were used in the calculation.*

7. **Section 4.2.3, Examination of Extreme Values and Outliers**  
**Arsenic**  
**Page 4-3.**

*The report notes that the concentration of arsenic observed in sample 06 is almost twice the magnitude of the second highest observed arsenic concentration and 4 times the 75 quintile of the combined data set. Further, it is noted that the value is a J value due to iron interferences. The report also notes that probable source for this high result is use of pesticides. The Office of Waste Management agrees that the arsenic concentration observed in this sample does not represent natural background conditions.*

Response: The report does not state that the probable source for the high arsenic result is the use of pesticides, it states "it is conceivable that use of arsenic containing pesticides or herbicides may have contributed to regional background conditions", a statement that has a completely different meaning. The paragraph concludes that this sample was retained for use in the final background data set.

Additionally, the comment implies that use of pesticides resulted in an unacceptable condition. RIDEM should be aware that contaminant concentrations present as a result of the use of pesticides in accordance with the manufacturers' instructions do not constitute a release. This input would be considered an anthropogenic condition, and part of background. This will be clarified in the revised report.

*Evaluation of Response*

*Please be advised that RIDEM does not concur with the exemption for a release noted above.*

8. **Section 4.2.3, Examination of Extreme Values and Outliers**  
**Arsenic**  
**Page 4-3.**

*Please be advised that the concentration at Sample 06 indicates that it should not be used in the background analysis. Therefore, please remove this value from the assessment and all subsequent statistical tests must be performed without this data point.*

Response: As noted in the first full paragraph on Page 4-14 of the draft report, arsenic and iron have a correlation coefficient is 0.96, which indicates arsenic concentrations increase with iron due to adsorption capacity of iron in the soil. Based on the soil conditions found in this area, the iron is clearly a natural feature, a result of mineral leaching and bedding over time as soils have developed. The sample in question shows the highest concentration of iron and thus the highest concentration of accumulated arsenic. Therefore sample SO-06 is not an anomaly, it is just the high end of the sample group. Additional discussion on origins of arsenic and iron will be added to the revised report.

#### *Evaluation of Response*

*The response focuses on the correlation to iron not the actual concentration of arsenic, which reflects a release.*

9. **Section 4.2.3, Examination of Extreme Values and Outliers**  
**Arsenic**  
**Page 4-4, Paragraph 2.**

*This section of the report deals with Sample 25 and the fact that the observed concentration makes it a potential outlier. The report notes that the average concentration for this sample was 23.1 ppm. This concentration reflects an averaging of the duplicate samples, which were collected at this location. The concentration of the duplicate s0 25 was 10.3. and 32.3 ppm respectively. This translates into a relative percent difference of 103 percent, which is beyond acceptable QA/QC protocol. As such, both data points must be rejected and all subsequent statistical test and must be performed without these two data points.*

Response: The data validation process noted the RPD >50% for this field duplicate pair for arsenic, iron, lead, and manganese. Under the USEPA validation guidelines used for this project, standard practice in this situation is to qualify the values with a J and not reject the values. This approach is appropriate because adequate consideration must be given to the variability in the soil matrix.

#### *Evaluation of Response*

*The Navy states that if the relative percent difference is above fifty percent the approach is to labeled the value as J and used the data. One also has to consider the magnitude of the difference. A relative percent difference of 103 % is high and is not acceptable. Accordingly both data points must be rejected. The Navy may elect to perform this analysis without these points, even though it will translate into not having twenty samples.*

**10. Section 4.2.3, Examination of Extreme Values and Outliers  
Arsenic  
Page 4-5, Paragraph 1.**

*This section of the report notes that the high concentration of arsenic observed in sample 20 (23.5 ppm) is attributable to the high iron concentration in this sample 23,500 ppm. The concentration of arsenic observed in sample 10 was 11.3 ppm. The concentration of iron observed in this same sample was 23,800 ppm, higher than that observed in sample 20. In essence despite the essentially equivalent iron concentration the arsenic concentration is approximately one half. As such, the iron concentration does not appear to be the culprit for the high arsenic concentration. It is more likely that the high arsenic observed in this location reflects use of pesticides or other materials.*

Response: Figure D-1 in Appendix D provides an assessment of the use of sample SO-20 in the correlation of arsenic to iron. It is noted on the right margin that within the Se soil data set, correlation of iron to arsenic in the data set would actually drop if this sample were removed from the mix. This observation indicates the value of evaluation of data points as a group and not individually.

*Evaluation of Response*

*The response focuses on the correlation to iron not the actual concentration of arsenic which reflects a release.*

**12. Section 4.2.3, Examination of Extreme Values and Outliers  
Arsenic  
Page 4-5, Paragraph 1.**

*Please be advised that the concentration at Sample 20 indicates that it should not be used in the background analysis. Therefore, please remove this value from the assessment and all subsequent statistical test and must be performed without this data point*

Response: As noted in the first full paragraph on Page 4-14 of the draft report, arsenic and iron have a correlation coefficient is 0.96, which indicates arsenic concentrations increase with iron due to adsorption capacity of iron in the soil. This means that if high iron is present in a soil sample, arsenic would have accumulated within that soil regardless of it's origin. There is no justification for elimination of sample SO-20.

*Evaluation of Response*

*See response to comment 10.*

**13. Section 4.2.4, Statistical Constrains to identify Sub Groups by Soil Type  
Page 4-26, Whole Section.**

*Sediment samples were taken at two different locations SD 1-10 immediately up gradient of the site and SD 11-20 approximately 1200 feet up gradient of the site. A review of the concentrations of the contaminants detected in these sub groups indicate that the groups are different. Further, it does not appear that the contaminants observed at SD 11-20 affect the contaminant distribution at SD 1-10. Therefore, as the two subgroups are different and do not influence each other, the contaminant distribution in SD 1-10 which is closer to the site, should be used as the background samples.*

Response: The comment indicates that RIDEM conducted either qualitative or quantitative evaluation of the two groups of data to arrive at the observation that the groups are different. It was requested on 6/12/06 that RIDEM provide any information to the Navy and USEPA on the analysis used to draw the conclusion that the two sediment subgroups are different. However RIDEM has not provided any further information as of the date of this letter. Since no reason has been given to separate the data sets, no revision on this point is anticipated. If a technical argument is made to separate the data groups, the Navy will certainly consider that argument.

*Evaluation of Response*

*Recommend that the Navy evaluate the data and perform a Students t test.*

**14. Section 4.2.4, Statistical Constrains to identify Sub Groups by Soil Type  
Page 4-26, Whole Section.**

*A review of the contaminants distribution between sediment samples SD1-10 and SD11-20 indicates that they are different and should be treated as such in the statistical analysis.*

Response: Please refer to the response to Comment no. 13 above.

*Evaluation of Response*

*See evaluation to comment 13 above.*