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LETTER REGARDING U S EPA REGION IV COMMENTS ON THE DRAFT SITE
INVESTIGATION REPORT FOR SITE 14 MCRD PARRIS ISLAND SC
9/19/2012
U S EPA REGION IV



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

September 19, 2012

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Naval Air Station, JAX
Navy Facilities Engineering SE
Installation Restoration, SC IPT
Attn: Mr. Charles Cook
PO Box 30
North Ajax Street, Bldg 135
Jacksonville, FL 32212-0030

AND

Commanding General
Marine Corps Recruit Depot
Natural Resources & Environmental Affairs Office
Attn: Ms. Lisa Donohoe
PO Box 5028
Parris Island, SC 29905-9001

Dear Mr. Cook and Ms. Donohoe:

The U.S. Environmental Protection Agency (EPA) has completed its review of the Draft Site Investigation Report for Site 14(SI Report), Marine Corps Recruit Depot (MCRD), Parris Island, South Carolina (July 2012). The review resulted in comments which will require revisions to the document. The comments are attached. Please feel free to contact EPA with any questions there may be regarding these comments. I can be reached at 404-562-9969.

Sincerely,

A handwritten signature in cursive script that reads "Lila Llamas".

Lila Llamas
Senior RPM
Federal Facilities Branch
Superfund Division

Attachment

cc: Meredith Amick, SCDHEC
Peggy Churchill, TtNus

**EPA COMMENTS ON THE DRAFT
SITE INVESTIGATION REPORT FOR SITE 14
MARINE CORPS RECRUIT DEPOT
PARRIS ISLAND, SOUTH CAROLINA
APRIL 2012**

GENERAL COMMENTS:

1. The report inappropriately makes conclusions regarding the necessity of investigations of CERCLA sites associated with outfalls. All references to CERCLA sites not needing investigation based on the outcome of sediment and/or storm water investigations at outfalls which drain the CERCLA site should be removed from the report. All CERCLA sites must be investigated as called for during the normal CERCLA process. Please modify the report to address this issue.
2. The report should evaluate and make recommendations pertaining to the sample data from the NPAO data set which was determined to be outliers. Since these are not typical of anthropogenic impacts, then an evaluation such as was conducted on the PAO data should be conducted on the NPAO outliers to determine if they may represent potentially significant impacts from unknown sources. Please modify the report to address this issue.
3. The report is confusing in that analytical results are not evaluated in a consistent manner followed through from beginning to end. It would be helpful if for each outfall, evaluations by receptor category (human health versus ecological) followed a COPC from initial identification through to a final recommendation by receptor category by outfall and by media. The final result should be a list of COPCs for a specific outfall for human health potential impacts from sediment, human health potential impacts from storm water, ecological potential impacts from sediment, and ecological potential impacts from storm water; with a recommendation for each regarding whether or not additional investigation is recommended, and when and where that additional investigation should take place (see below). Please modify the report to address this issue.
4. Due to apparent inconsistencies in the report, insufficient clarity in the decision-making process, limited number of samples taken at PAO sites, and various stages of investigation at the related CERCLA sites, at this point EPA cannot agree with excluding from any further consideration the possible need for additional samples at outfalls associated with known CERCLA sites during the investigation of those CERCLA sites. Therefore, although the Site 14 Report may recommend no further investigation for the outfalls, the data should be referred over for use and consideration in the other CERCLA site investigations.
5. Subsequent to submittal of this report, the Navy has mentioned the intention of the Navy to conduct additional investigation for Site 14 under an Extended Site Investigation (ESI). It is unclear if the Navy intends all of the further investigation recommended in the report to be conducted as part of the ESI, or only part of it. Please clarify this issue in the appropriate sections of the report, especially Section 8.

Additionally, considering this potential ESI, EPA offers the following:

- a. EPA would like to discuss the potential outcomes of any additional investigation under Site 14 for outfalls associated with other CERCLA sites, and whether any of the outcomes actually benefit the Navy with respect to completing investigations. It appears the majority of the outfalls recommended for additional investigation are potentially related to CERCLA sites which we already know need additional investigation. The work plan indicated that exceedances which could potentially be related to a CERCLA site would be addressed with that CERCLA site. The data should be referred over for use and/or consideration in that investigation regardless of what recommendation is made in the Site 14 report or what additional data is gathered. EPA suggests the Navy consider referring the outfall data for these sites now, rather than conducting additional investigation for these outfalls in a Site 14 ESI, unless it is a matter of funding being available now, but not later. (Also see comment 4 above.)
 - b. Additional investigation may be appropriate under "Site 14" for those exceedances which may be the result of NPAO outliers and/or any concentration (NPAO or PAO) which is significantly elevated above background and screening levels, but not obviously potentially related to another CERCLA site. A measure for what constitutes "significantly elevated" may need to be agreed to by the team on a case-by-case basis. The report does not currently address these exceedances. However, in accordance with decisions made during scoping of the Site 14 work plan, these elevated hits were to be considered for additional investigation under Site 14. Please modify the work plan to address this issue and determine if any additional investigation should be conducted under a Site 14 ESI.
6. Some outfalls had exceedances which were evaluated as being "significantly greater than the NPAO concentrations", but were eliminated from concern because they were not potentially related to another CERCLA site. A few of these will likely be captured and addressed in 4b however, many will likely remain as exceedances of some level of significance but may not warrant further investigation. Perhaps a contaminant class-specific evaluation/discussion (e.g. "metals" or "pesticides" or "PAHs" be elevated at these outfalls at levels outside the range of the NPAO, and why is it or isn't it appropriate to not consider them any further) of these exceedances would be appropriate. Is there anything that can be learned from this data that may be useful outside of CERCLA but perhaps within MCRD's Natural Resources office, or Public Works construction management office, or in the Base Master Plan for development (e.g. setting per acreage limitation goals for asphalt in future development)? For completeness in evaluation and for clarity in the public record, address these exceedances in Section 8 of the report, Conclusions and Recommendations.
7. The outlier analysis of the NPAO data does not include all information specified in EPA's Data Quality Assessment: Statistical Methods for Practitioners (DQA). The DQA identifies five steps in treating extreme values:
 - a. Identify extreme values that may be potential outliers.
 - b. Apply statistical test.
 - c. Scientifically review statistical outliers and decide on their disposition.
 - d. Conduct data analysis with and without statistical outliers.
 - e. Document the entire process.

The Draft PA/SI report cites the DQA and the above steps, but additional information is needed to provide the information to support the conclusions as follows:

- The Draft PA/SI does not thoroughly support the scientific decisions regarding the disposition of statistical outliers. The document states that

“statistical tests like Rosner’s Test, Dixon’s Test, and Tukey’s Outlier Test are useful tools for identifying outliers in a data set, they need to be used in conjunction with visual tools, an evaluation of the nature of the data (frequencies of detection), and the application of the Conceptual Site Model (CSM) for each outfall to ultimately decide whether a specific value should be considered an outlier.”

However, no application of such considerations is provided. The general rationale appears to be that the NPAOs are not impacted by Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) site releases, and therefore would have a naturally occurring, normal distribution of contaminants. However, analysis of NPAO data led to the exclusion of one outfall, Outfall 305, from the data set, illustrating the acknowledgement and possibility of “real” elevated concentrations. In general, data points should never be removed from any data set (background or otherwise) solely on the basis of an outlier test unless an independent weight of evidence indicates that the data points are not representative of the underlying population of interest.

- The Draft PA/SI does not indicate that the effects of removing statistical outliers were assessed. It is unclear whether the impacts were evaluated and what decision process was used to validate decisions to exclude or retain statistical outliers. Removal of an outlier changes, among other things, the mean, variance and possibly the distribution of a data set, as well as the numerical output of any statistical test. The different output may or may not impact conclusions, but a discussion of the decision process and consideration of data sets with and without the outliers would further clarify the outlier analysis.
- The outlier analysis is not thoroughly documented. As mentioned above, effects of including or excluding statistical outliers are not discussed. In addition, it is unclear whether efforts were made to transform non-normally distributed data sets. Within Section 6.1.2 Identified Outliers, no specific reasoning is provided other than “...should be considered outliers.” To promote clarity, all steps taken, rules applied and test/principle followed for identifying outliers should be added to Section 6.1.1 and 6.1.2.

8. The figures in Section 6.0, Analytical Results and Summary, do not refer to the appropriate screening tables. Further, several of the screening tables include incorrect units of measure for storm water. To promote clarity in the screening results and spatial presentation of the data, the discrepancies between the figures and tables should be addressed along with the discrepancies in the units of measure for storm water criteria. The discrepancies are highlighted below.
 - Figures 6-1 through 6-4: The figures include a footnote that states that the criteria used for screening are presented in Table 6-1. However, the screening criteria for sediment and storm water are presented in Tables 6-3 and 6-5.
 - Tables 6-4: This table list storm water criteria in units designated as milligrams per kilogram (mg/kg) for metals, and micrograms per kilogram ($\mu\text{g}/\text{kg}$) for pesticides, polycyclic aromatic hydrocarbons (PAHs) and semivolatile compounds; however, for

water, the units should be expressed in units of volume (e.g, milligrams per liter (mg/L), micrograms per liter ($\mu\text{g/L}$)).

- Figure 6-5: The figure includes a footnote that states that the criteria used for screening are presented in Table 6-2. However, the background screening criteria for metals in sediment and storm water are presented in Table 6-3.
- Table 6-3: This table lists storm water criteria in units designated as mg/kg for metals and $\mu\text{g/kg}$ for pesticides and PAHs; however, for water, the units should be expressed in units of volume such as mg/L or $\mu\text{g/L}$.
- Figures 6-5 through 6-13: The figures include a footnote that states that the criteria used for screening are presented in Table 6-2. However, the screening criteria for sediment and storm water are presented in Tables 6-3 through 6-5.

9. COPCs were identified based on screening against human health and ecological criteria as well as ecological statistical evaluations. However, final COPCs recommended for further evaluation considering these three analyses are not clearly summarized in Section 8.0 or Table 8-1. Consequently, Section 8.0 is unclear on which media (storm water and/or sediment) and which COPCs by media require further investigation. For example, Section 7.6.2.3 Statistical Conclusions identifies the ecological COPCs in storm water and sediment, however, Table 8-1 does not clearly specify the master list of COPCs based on the three evaluations. Examples of these inconsistencies are provided below:

- a. Outfall 106: The statistical evaluation in Section 7.6.2.3 indicates there are no COPCs in storm water and polychlorinated biphenyls (PCBs) are the only ecological COPC in sediment. According to the conclusions discussed in Section 8.1, arsenic, PCBs and PAHs were COPCs based on human health risk. However, Table 8-1 only lists PCBs in sediment as requiring further investigation and not arsenic or PAHs. Clarification is warranted to explain if arsenic and PAHs are captured under another site or whether the concentrations represent a new release, or if other lines of evidence can be provided to discount arsenic and PAHs altogether from further evaluation.
- b. Outfall 358: The statistical evaluation in Section 7.6.2.3 identified zinc as a storm water ecological COPC and chromium and mercury as ecological COPCs in sediment. According to Section 8.1, arsenic and vanadium in sediment and delta-hexachlorocyclohexane (gamma-BHC in storm water were COPCs based on the human health screening. However, Table 8-1 only lists chromium and mercury in sediment as requiring further investigation and does not include zinc in storm water or any of the human health COPCs. Clarification is warranted to explain why zinc and the human health COPCs do not require further investigation. Zinc in stormwater appears to be addressed by outfall 608DNF see Table 8-1
- c. Outfall 405: The statistical ecological evaluation in Section 7.6.2.3 identifies aldrin and gamma-BHC as storm water COPCs and pesticides and PAHs as COPCs in sediment. According to Section 8.1 Conclusions, PAHs and pesticides were identified as sediment COPCs based on human health risk. However, Table 8-1 lists dichlorodiphenyltrichloroethane (DDT) as a storm water COPC which was not identified previously in the ecological statistical evaluation or in the conclusions discussed in Section 8.1. Clarification is warranted to explain why DDT has been selected as a storm water COPC.

- d. Outfall 457: The statistical ecological evaluation in Section 7.6.2.3 and Table 7-1 Statistical Summary of PAO and NPAO Data Comparisons, identifies lead as a storm water COPC, while Section 8.1 identifies lead as an ecological and human health COPC for storm water. Further, Section 8.2 recommends further investigation of lead. However, Table 8-1 does not list lead for the contaminants that are recommended for further investigation. It is recommended that lead be included in Table 8-1 to support the recommendations in Section 8.2.
- e. Outfall 592: The statistical ecological evaluation in Section 7.6.2.3, Table 7-1, and Section 8.1 identifies PAHs as sediment COPCs. However, Section 8.1 then states that Outfall 592 is not recommended for further investigation because PAHs are not part of the conceptual side model (CSM) for the site. Clarification is warranted to explain whether PAHs may be captured under another site, represent a new release, are an outlier, or if other lines of evidence can be provided to discount PAHs altogether from further evaluation.
- f. Outfall 608DNF: Section 8.1 indicates that Outfall 608DNF PAHs were identified as human health COPCs in sediment. However, because PAHs are not part of the CSM for the site, they are not recommended for further investigation. Clarification is warranted to explain whether PAHs may be captured under another site or whether the concentrations represent a new release are an outlier, or if other lines of evidence can be provided to discount PAHs altogether from further evaluation.

To support further risk management decisions at Site 14, it is recommended that the conclusion sections specify and identify the COPCs within each outfall's storm water and sediment which require further investigation based on the three evaluations.

SPECIFIC COMMENTS:

- 10. Executive Summary, Page ES-2: ~~The first paragraph on Page ES-2 of the Executive Summary~~ describes how the non-process area outfalls (NPAOs) drain residential areas, parking lots, sidewalks, and grassy areas, and are considered to be anthropogenically influenced. According to the discussion presented in Section 6.1, Non-Process Area Outfall Data Set, Page 6-1, the NPAOs may also drain areas that include underground storage tanks (USTs) or oil/water separators. For consistency and completeness, revise the text on Page ES-02 of the Draft Preliminary Assessment/Site Investigation Report for Site 14 – Storm Sewer Outfalls, for the Marine Corps Depot, Parris Island, South Carolina dated July 2012 (Draft PA/SI) to clearly indicate that NPAOs may also drain areas including USTs and/or oil/water separators.
- 11. Executive Summary, Page ES-3: The last paragraph on Page ES-3 summarizes the outfalls that are recommended for further investigation at any process area outfall (PAO) and includes Outfalls 106, 358, 608DNF, 405, and 555. However, based on the site investigation (SI) data, Outfall 457 is also recommended for further investigation. For completeness and consistency revise the Executive Summary to include Outfall 457 in the summary of outfalls recommended for further investigation.
- 12. Table 4-1, Outfall Sampling Design and Rationale, Page 1 of 12: Table 4-1 indicates that oil/water separators #1938 and #1885 are located in PAOs associated with Outfalls 358 and 405, respectively. However, Table 4-2, Installation Restoration and Munitions Response Program

Site Associated with Site 14 – Storm Water Outfalls, indicates oil water separator (OWS) 22 is associated with Outfall 358. Additionally, Table 4-3, Process Area Outfalls and Potentially Discharged Wastes, indicates OWS 19 is associated with Outfall 405. OWS 19 is depicted in Figure 5-1, Northwest Quadrant Outfall Locations, located near Outfall 405 and OWS 22 is depicted in Figure 5-2 Northeast Quadrant Outfall Locations, located near Outfall 358. Revise the Draft PA/SI to ensure that the respective OWS designations are consistently reported across all tables, figures and text and are consistent with Table 10-2, MCRD Parris Island Oil/Water Separators Locations and Description, of the Site 14 SI Work Plan (Tetra Tech, 2011).

13. Section 5.1.2, Storm Water Sampling, Page 5-2: The second paragraph indicates geochemical parameters were measured prior to the collection of storm water samples. The text refers the reader to sample log sheets presented in Appendix A-3, Storm Water Sample Log Sheets, for the specific geochemical data recorded. However, in order to assess the comparability of the specific geochemical parameter results, the storm water geochemical data that were recorded should be tabulated and the table included in the Draft PA/SI. Revise the Draft PA/SI to address this issue.
14. Section 5.2, Deviations from the Work Plan, Page 5-5: This section discusses the deviations from the Site 14 SI Work Plan (Tetra Tech, 2011) that occurred during SI field activities. The text discusses the locations where sediment samples and storm water samples could not be collected and explains the reasons for the deviation. However, the Draft PA/SI does not further address the noted deviations. As such, it is uncertain whether the deviations resulted in data gaps that would impact the adequate determination of the presence or absence of sediment and storm water contamination originating from identified Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites at MCRD Parris Island. Revise the Draft PA/SI to address this issue.
15. Section 6.1, Non-Process Area Outfall Data Set, Page 6-1: This section discusses the NPAOs that drain residential and other areas of storm water that have been in contact with parking lots, sidewalks, and grassy areas and may also drain areas that include USTs or OWSs and are considered to be anthropogenically influenced. However, Section 6.1 does not discuss which NPAOs contain USTs and/or OWSs or identify which outfalls service these areas. As such, it is not clearly understood how the NPAOs that service drainage basins containing USTs and/or OWSs could be considered anthropogenically influenced areas. For example, if polynuclear aromatic hydrocarbons (PAHs) were detected at levels exceeding screening criteria, it is not certain whether the contamination is the result of parking lots, etc., or the USTs, OWSs. To ensure that these NPAO areas where USTs and/or OWSs are located are adequately investigated, revise the Draft PA/SI to address this issue.
16. Section 6.1.1 Outlier Test, Page 6-2: Section 6.1.1 states that the appropriate hypothesis tests were chosen based on the recommendations in the DQA, and correctly states that the DQA does not have a recommendation for an outlier test when 1) the data are not normally distributed and 2) the sample size is less than 50. The report then states that “Tukey’s rule of thumb” was used in these cases. However, there is no indication that efforts were made to transform data to achieve a normal distribution. According to the DQA, “If the data are not normally distributed, then either transform the data, apply a different test, or consult a statistician.” If a normal distribution were attained, the appropriate statistical test could then be applied. If transformations were attempted, a discussion of transformation efforts should be added to promote clarity. If no efforts to

transform data were conducted, such efforts should be considered to include a statistical test rather than Tukey's outlier test.

17. Section 6.1.1 Outlier Test, Page 6-2: Section 6.1.1 states that Tables 6.1 and 6.2 summarize the values that correspond to the mean plus 3 standard deviations (3-sigma rule), which can be used to identify outliers. However, the table does not indicate which, if any, outliers were identified with this method. Additional explanation of the use of the 3-sigma rule, in the text and Tables 6.1 and 6.2 would promote clarity.
18. Section 6.1.2 Identified Outliers, Page 6-3: Section 6.1.2 does not provide specific reasoning behind the identification of outliers. To promote clarity, additional discussion is needed given the use of various statistical tests, the 3-sigma principle, and the need for subsequent scientific reasoning for the acceptance of an outlier determination.
19. Section 6.1.2 Identified Outliers, page 6-3: The second paragraph of Section 6.1.2 summarizing the outliers in sediment recommends that data from Outfall 305 be excluded from the NPAO data set because most of the outliers for PAHs were identified in samples collected from this outfall. However, the disposition of Outfall 305 is not further discussed in the Draft PA/SI report. For example, it is unclear if Outfall 305 should be reclassified as a PAO or whether further evaluation will occur to determine if it should be a PAO associated with a CERCLA site or if the PAHs are from anthropogenic sources (e.g., parking lot). The Draft PA/SI report should explain how Outfall 305 will be addressed, as the disposition of this outfall is unclear since it is no longer considered a NPAO.
20. Section 6.2.1, Metals, Storm Water, Page 6-7: The first paragraph on Page 6-7 indicates lead concentrations exceeded the maximum contaminant level (MCL) of 15 micrograms per liter ($\mu\text{g/L}$). However, the 15 $\mu\text{g/L}$ drinking water standard for lead is based on an "action level" and not an MCL. Revise the text as appropriate.
21. Section 7.6.2 Statistical Methodology, Page 7-11: ~~Section 7.6.2 states that the "comparative~~ statistical method involved a graphical evaluation and a hypothesis test comparing the central tendency (mean/median) concentrations and a hypothesis test comparing the right tails (largest values). The graphical evaluation consisted of visual inspection of boxplots, normal probability plots and histograms." This information suggests that conclusions regarding the data appear to rely on visual inspection of graphical presentations of the data rather than inferences made from the statistical outputs. While informative, inspection of such graphics does not justify inferences in the place of statistical tests. For example, the paragraph about probability plots states that "if there is grouping of the two data sets then data sets are most likely different." The statistical test is what gives credibility to the reporting of whether two data sets are significantly different. It is recommended that less emphasis be placed on visual inspections and more emphasis be placed on the application of appropriate statistical tests. Note that it is acceptable to place emphasis on visual inspection of graphics in cases where statistical tests could not be conducted due to limited data sets.
22. Section 7.6.2 Statistical Methodology, Page 7-11: This section states that one-half the detection limit was used for non-detected concentrations (i.e., censored data) for the hypothesis tests, but does not provide a reference or justification for this rule. The decision about how censored data are included can have a great effect on statistical outcomes. An explanation of the rationale for

using the detection limit and inclusion of any references would add clarity to this section. See page 53 of the DQA document for additional discussion.

23. Section 7.6.2.2 Hypothesis Tests, Page 7-12: This section describes the hypothesis tests applied to the data sets, all of which are non-parametric. However, the basis for selecting non-parametric tests is not provided. Because parametric tests generally have more statistical power than nonparametric tests, it is recommended that the use of nonparametric tests in the analysis be explained.
24. Section 8.1, Conclusions, Outfall 106, Pages 8-1 and 8-2: The text in this section indicates that based on the conceptual site model (CSM) for Site 39 and 48, a CERCLA related release would most likely result in metals and polychlorinated biphenyls (PCBs) in sediment and/or storm water. Arsenic and Aroclor-1262 were identified as exceeding human health criteria and background at Outfall 106. Table 8-1, Process Area Outfalls COPC [Contaminant of Potential Concern] Analysis, recommends that further investigation of Outfall 106 consist of PCB analysis of sediment samples. However, metals analysis was not recommended in the table although arsenic in sediment exceeded the applicable screening criteria. Currently, Table 8-1 and/or the text do not indicate whether a statistical evaluation of metals in sediment was conducted to determine if concentrations are consistent with NPAO or PAO concentrations. If concentrations are indicative of PAO, then sampling for metals (i.e., arsenic) in sediment is warranted. Revise the Draft PA/SI to address this issue.
25. Section 8.1, Conclusions, Outfall 408, Page 8-2: The text in this section indicates that based on the CSM for Sites 9, 16, 46, 47 and 49, a CERCLA related release would most likely result in paint waste and pesticides. Statistical analysis concluded that the concentrations of pesticides that were identified as COPCs in sediment were not statistically greater than the NPAO concentrations. As such, Table 8-1, Process Area Outfalls COPC Analysis, recommends no further investigation of Outfall 408. However, arsenic and PAHs were identified as exceeding human health criteria and background at Outfall 408. Based on the CSM for Site 9, metals contamination as result of the release of paint waste is possible. Currently, Table 8-1 and/or the text do not indicate whether a statistical evaluation of metals in sediment was conducted to determine if concentrations are consistent with NPAO or PAO concentrations. If concentrations are indicative of PAO concentrations, then sampling for metals (i.e., arsenic) in sediment is warranted. Revise the Draft PA/SI to address this issue.
26. Section 8.2 Recommendations, Page 8-6: Section 8.2 does not discuss the further investigation required for stormwater at Outfall 358, despite the conclusions presented in Section 8.1 and Table 8-1, which identified zinc to be further investigated in stormwater. It is recommended to include Outfall 358 in Section 8.2 with proposed investigatory actions or revising the previous conclusions in Section 8.1 to explain why metals do not require further investigation.
27. Table 8-1, Process Area Outfalls COPC Analysis: The table indicates that the zinc PAO concentrations for storm water were greater than the NPAO concentration at Outfall 358. However, the recommended further investigation does not include analysis of zinc in storm water. The text in Section 8.1, Conclusions, on Page 8-2 states that the COPCs identified in storm water were collected in a manhole upgradient of Site 5 and are not believed to be site related. For clarity and completeness, Table 8-1 should be revised to note why the zinc surface water exceedances at Outfall 358 were not carried forward and recommended for further investigation.