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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, S.W.
ATLANTA, GEORGIA 30303

March 4, 2004

Mr. Roger Jackson
LANTNAVFACENGCOM
Code EV23RJ
1510 Gilbert Street
Norfolk, VA 23511-2699

SUBJ: MCAS Cherry Point
Draft Remedial Investigation
Operable Unit 5, Sites 1 & 2

Dear Mr. Jackson:

The Environmental Protection Agency (EPA) has completed its review of the above subject document. Comments are enclosed. If there are any questions, I can be reached at (404) 562-8538.

Sincerely,

A handwritten signature in blue ink, appearing to read "Gena D. Townsend", is written over a horizontal line.

Gena D. Townsend
Senior Project Manager

Enclosure

cc: George Lane, NCDENR
Jeff Christopher, MCAS Cherry Point

**U. S. Environmental Protection Agency Comments for the
Remedial Investigation Report
Operable Unit 5, Sites 1 and 2
Marine Corps Air Station, Cherry Point, North Carolina
December 2003**

GENERAL COMMENTS

1. One of the major problems that exist with this document is the apparent failure to visualize the site and review the data from a more holistic perspective. During data review, important questions were not answered. Questions such as:
 - 1) Why are the highest concentration of constituents detected in sediment located upgradient of Site 1 in Reeds Gut and at the most downgradient location for Site 2?
 - 2) Should the samples have been analyzed for other constituents besides inorganics and volatiles?
 - 3) Are 8 soil samples sufficient to determine the constituents potentially present in landfill waste especially since this waste is often heterogeneous in nature?
 - 4) Does the location of soil samples, while somewhat biased, take into account surficial runoff from the sites toward the adjacent water bodies? Apparently, no sampling was done to try to determine surficial runoff of contaminants.
 - 5) Has the data that has been collected been sufficient to answer risk questions and resolve any major uncertainties?

The answer to these questions would provide a more comprehensive and holistic understanding of the two sites and the risks posed by the contaminants present.

2. The conclusion of no further action is based on the determination that the analytical values were "slightly" over twice average background (2xAB) concentrations and therefore acceptable. The term 'slightly' is imprecise and thus misleading. For example, three lead concentrations in surface soil at Site 1 were 11.4, 11.6, and 34.6 mg/kg, all in excess of the 2xAB of 10.52 mg/kg. Similarly arsenic in surface soil at 4.9 mg/kg vs. 3.9 mg/kg (2xAB) is an exceedence. Subsurface soil and groundwater showed the same type of arsenic exceedences. Exceedences of the 2xAB are still exceedences. There is no clear delineation of any contaminant of potential concern in the entire document (one of the main goals in a remedial investigation). Please provide a figure of each exceeding contaminant or group of contaminants in a figure form that includes horizontal and vertical boundaries. If delineation is not demonstrated in the figures, then the investigation should move on to the next step of complete delineation of all media with exceedences. The "No Further Action" recommendation proposed is not supported.
3. There appears to be a major discrepancy between the original outline of the site and the location of waste piles. The aerial extent of Sites 1 and 2 are not clearly presented with respect to the waste piles. Based on rough estimate of the size of

Site 1, using an outline of the identified waste/fill areas, it appears that the site is about 10 acres. For Site 2, the total disturbed area of Site 2 was previously estimated to be approximately 4 acres. Based on rough estimate of Site 2 size using an outline of the identified waste/fill areas, it appears that the site is roughly 8.0 acres. Due to the unique nature of landfill waste, it is questionable if 8 soil sample locations at each Site are sufficient to demonstrate whether or not there are chemicals present at the two Sites that contribute to human health and/or ecological risk.

4. It is unclear if earlier data associated with OU5 media has been collected but was not discussed in this document. Based on a review of Section 2.0, the only historical data that exist was limited to groundwater sampling. If this data does exist, it is recommended that a summary of historical data be added to this document.
5. There is no discussion or consideration of fill material depth at the site or comparison to soil sampling depths. Surface sampling from 0-1 ft bls and subsurface sampling from 3-4 ft bls leaves a 2 foot data gap in soil, but more significant is the gap from 4ft to 7ft bls, the top of the water table estimated for OU5. Historically, fill material often reaches to the top of the water table in these borrow pit type of landfills. Please discuss how this may have influenced sampling location selections. Also, it does not appear that the soil and groundwater samples were collected from the same location. Although there may not be an identifiable plume, the lack of soil data at the groundwater interface does not verify that the soil levels are protective of groundwater.
6. There is a concern about the site and proximity to nearby waterways and the Atlantic Ocean. There should be a discussion of tidal influence on groundwater elevation, which includes consideration of back flow of groundwater toward the west and south. It is understood that diurnal tides may have minimal affect in the Neuse River but a seiche (wind blown) tide across the considerable fetch of Pamlico Sound could back the water up a foot or two in Reeds Gut. As such, this may not be a huge influence within a particular sampling period, but it may, over time, show some contaminant migration in areas west or south of a source. For instance, contaminant in sediment further upstream in Reed's Gut might be caused by this affect. For this reason, please include a discussion of tidal affects on contaminant and groundwater movement.
7. Several sections within the Risk Characterization subheading state that arsenic in the sediment and groundwater is the main contributor to risk for the residential child. In addition, the text states that the maximum concentration of arsenic in the groundwater was only slightly above two times the average background concentration, and the arsenic concentration used in the quantitative risk evaluation for groundwater was the maximum detected level at the site. Arsenic is also stated to be a compound that is ubiquitous in the environment. Therefore, the discussion concludes that the risk associated with arsenic may not be related to

site activities, but may be associated with background conditions. This line of reasoning is not appropriate for eliminating arsenic from further consideration. Arsenic does exceed two times the average background concentration and has been proven to contribute to risk. Therefore, arsenic risks should not be discounted. Additional geochemical evaluation may be warranted or the uncertainties regarding arsenic risks should be presented in the uncertainty section.

8. Several compounds possessed method detection limits (MDLs) above screening values or were found to be constituents that were retained as COPCs for other media. These constituents were categorized as Group 2 and Group 3 COPCs, and risks were quantified in the uncertainty section of the report. By including these compounds in the analysis, calculated risks did exceed the EPA's target risk management range. For example, the total current RME carcinogenic risk exceeds EPA's carcinogenic target risk range due to surface water (3×10^{-3}). The carcinogenic risk associated with exposure to surface water by an industrial worker is primarily associated with the PAHs analyzed for in surface water. The PAHs were retained as Group 2 COPCs. PAHs were not detected in surface water; however, their MDLs were greater than the applicable screening level. Due to the uncertainty associated with the concentrations of these constituents and the composition of the waste disposed of at the sites, further sampling with a more sensitive analysis should be considered and discussed.
9. It is unclear why assessment endpoints are being chosen in this stage of the Ecological Risk Assessment. While it is appropriate to select preliminary assessment endpoints, more specific assessment endpoints are not selected until Step 3b. The text should be clarified to state that the assessment endpoints presented in this section are preliminary in nature.
10. Reconsidering the measurement versus background concentrations for inorganic materials at this Operable Unit may alter the thought of natural concentrations at the site. If this is the case, sections of the recommendations chapter will need to be reconsidered: This includes the statements of natural background in Section 9.5.1.1, paragraph 2; Section 9.5.1.2 paragraph 2; Section 9.5.4.1, paragraph 2; Section 9.5.4.2, paragraph 2; Section 9.5.5.1, paragraph 2; Section 9.5.5.2, paragraph 2; Section 9.5.6, paragraph 2.
11. The sampling scheme should be discussed in more detail. The fill areas have been identified as being approximately 200' to 400' in length and there has been only one sample collected at the edge of the fill area. This layout is more in line with a "Site Investigation" rather than a "Remedial Investigation". It is also stated that samples were collected from the area of crushed drums, however, the photos show drums that appear to be intact. Please elaborate on the conditions of the drum area and their contents.

SPECIFIC COMMENTS

1. **Page vi, Executive Summary, OU5 Physical Characteristics, paragraphs 4 and 5.** This section discusses the Columbian Aquifer in detailed but confusing relationship to the Yorktown confining unit and surficial aquifer. The later section 4.3 and subsections discussing hydrology never mention the Columbian Aquifer in text or figures. It appears The Columbia aquifer is not in the region and this section needs revision.
2. **Page 2-4, Section 2.2.1, paragraph 1, and Table 2-2.** Text states that screen intervals for the existing wells are listed as available in Table 2-2. No screen intervals are presented in the corresponding table. Please revise table to include screen intervals. It would also be useful to discuss screen depths with respect to fill areas and the suspected depths.
3. **Figure 2-3, Debris and Fill Location Site 1.** This figure depicts a yellow line, which represents the original Site 1 boundary. However, many of the fill areas are located outside of the yellow line. An additional line should be added to this figure (and others, as appropriate) identifying the new boundary under investigation at Site 1. This same comment applies to Figure 2-9, Debris and Landfill Map Site 2.
4. **Figure 3-1.** Based on a review of the figure, Sampling Locations at Site 1, there are no surficial soil sample locations located downgradient of the Site. These sample locations would have addressed the potential for surficial flow of contaminants to be redistributed off of the actual site. The same problem exists with Site 2.
5. **Page 4-2, Section 4.2, paragraph 3.** Site 1 undergoes controlled burning. Is this considered in risk analysis?
6. **Page 4-4, Section 4.3.2.** The section does not reference figures, and thus is very confusing. Please refer to figures and show where OU5 sits with respect to these known layers. Thickness of layers and at what depth is not clearly defined, so reader has very little to mentally interpret the underlying groundwater zones.
7. **Figure 4-2.** Please identify OU5 in the figure.
8. **Figure 4-5.** Please approximate and label location of OU5 in the figure.
9. **Table 4-2.** Screen intervals should be included in the table. The data is available in appendices, but would be more useful in this table.
10. **Page 5-5, Section 5.2.1.3, paragraph 1.** Please revise conclusive statement regarding small magnitude of 2xAB inorganic exceedence per General Comment 2.

11. **Page 5-5, Section 5.2.1.5, paragraph 1.** Please revise conclusive statement regarding small magnitude of 2xAB inorganic exceedence per General Comment 2.
12. **Page 5-6, Section 5.2.2.3, paragraph 1.** Please revise conclusive statement regarding small magnitude of 2xAB inorganic exceedence per General Comment 2.
13. **Page 5-6, Section 5.2.2.4, paragraph 2.** Please revise conclusive statement regarding small magnitude of 2xAB inorganic exceedence per General Comment 2.
14. **Page 5-9, Section 5.2.4.5.** Please expand this section to include a discussion of how the hardness of water potentially affects the occurrence of the inorganic detections.
15. **Page 5-9, Section 5.2.5.** S1-SD05 (which is located potentially upstream of Site 1 in Reeds Gut) had chemicals with maximum detected sediment concentrations that exceeded their respective ESVs and background include chromium, lead, and mercury. It is unclear if the chemicals detected at this site are site-related and this issue should be resolved
16. **Page 5-11, Section 5.3.1.3, paragraph 1.** Please revise conclusive statement regarding small magnitude of 2xAB inorganic exceedence per General Comment 2.
17. **Page 5-12, Section 5.3.1.3, top paragraph.** Replace “2 of 8 samples” with “3 of 8 also produce a discussion of mercury where concentrations exceed 2xAB by 25%, 9% and 369%, which should be included. This may alter the conclusions regarding mercury conclusions.
18. **Page 5-12, Section 5.3.1.5, paragraph 1.** Please revise conclusive statement regarding small magnitude of 2xAB inorganic exceedence per last comment and General Comment 2.
19. **Page 5-14, Section 5.3.3.3, paragraph 2.** Text states that”... none of the results exceeded any regulatory screening criteria.” Please change, since arsenic was detected above tap water criteria.
20. **Page 5-16, Section 5.3.5.** S2-SD05 had the maximum concentrations of cadmium, carbon disulfide, and Freon 11, in sediments. It is the furthest most downstream sample location and may potentially be influenced by contaminants from Site 2. It is unclear if the chemicals detected at this site are site-related and this issue should be resolved. Additionally, the contaminants are not delineated.

21. **Table 5-9**. Mercury reported in OU5-S2-SS05 at 0.6mg/kg should be in blue, well above 2xAB.
22. **Page 6-9, Section 6.2.3.1, paragraph 4**. Please revise conclusive statement regarding small magnitude of 2xAB inorganic exceedence per general comment above.
23. **Page 6-12, Section 6.2.5.5, paragraph 1**. Final conclusions of upgradient groundwater using the 2 upgradient temporary wells show barium and lead and 1-1, DCE detections. Again use of these as “upgradient wells” is questioned. Regardless, also noted were higher concentrations of DCE, lead and barium in soil across these sites, which could contribute to the existing groundwater concentrations. Although there are low levels of detection upgradient, there is still a possible source contribution across these sites. Defining impacted areas here should be attempted across OU5.
24. **Page 7-4, Section 7.2.1.1, paragraph 2**. Depths of the surface and subsurface soil samples collected at both sites were not included in this section. Please include these sample depths for the purpose of clarity.
25. **Page 7-4, Section 7.2.1.2, paragraph 4**. The text states that an additional sediment sample (S1-SD01) was collected at Site 1. Please provide justification regarding the reason a coexisting surface water sample was not collected at this location.
26. **Page 7-5, Section 7.2.1.3, paragraph 1**. This section discusses the status of monitoring well 1GW01. This monitoring well location cannot be located on the respective figure. However, there is a monitoring well location 1MW01. Please correct the discrepancy if this is the well being discussed in this section.
27. **Page 7-9, Section 7.3.1.1, paragraph 3**. The text indicates that the most important aquifer in the vicinity of the MCAS Cherry Point is the Castle Hayne Aquifer. Please include the proximity of this aquifer in relation to the site.
28. **Page 7-20, Section 7.5.1.2, paragraph 5**. The text states that a 2×10^{-6} excess lifetime carcinogenic risk means that for every one million people exposed to the carcinogen throughout their lifetimes, the incidence of cancer may increase by two cases. The description of 1×10^{-x} risk estimates is not accurate, and it may provide confusing information to potentially exposed sub-populations. The calculated cancer risk represents the probability of excess individual cancer risk. Rather than indicate that 1 person in a population of 10^x people will get cancer, risk values estimate the probability of an excess cancer for an individual with the exposure parameters selected (i.e. each roving worker would have an individual excess cancer risk of 1×10^{-x}). Please change the definition accordingly.

29. **Page 7-23, Section 7.5.2.4, paragraph 5.** The text in this section states that exposure to sediment in Reed's Gut was evaluated for industrial site workers, adolescent trespassers/visitors, and future adult and child residents who could be exposed to surface water through incidental ingestion and dermal contact while wading. This section discusses those receptors that could be exposed to sediment. Please address this discrepancy.
30. **Page 7-37, Section 7.7, paragraph 1.** The text states that due the fact that arsenic is a ubiquitous element, and the calculated hazard is most likely associated with background condition, it is not necessary to calculate RGOs for either site. See General Comment 7 above regarding arsenic.
31. **Page 8-4, Section 8.2.2., Para 4.** This section discusses the results of the sampling for the two sites. It is important to note that no results were reported for PCBs, dioxins, and/or pesticides/herbicides. Since these two landfills are comprised of a variety of fill and dump material, it is highly likely that these constituents may be present in any or all of site related media. Until this major data gap is resolved, the potential ecological risk that may be present at either Site cannot clearly be determined.
32. **Page 8-5, Section 8.3, Para 1.** The text states that food chain modeling was not conducted in Step 3A due to the lack of bioaccumulative chemicals being detected in sediment and soil at concentrations in excess of background over a wide area. This statement is putting the cart before the horse. One must first do the steps stated earlier for 3A (i.e., background comparison) before any decision not to perform modeling can be supported. In addition, the need to perform modeling for bioaccumulative chemicals is not based on having exceedances over a wide area. Step 3A still retains some level of conservatism and an area use factor of 1 should be applied during modeling. In Step 3A, until the two Sites have been separated, the use of mean values is meaningless.
33. **Page 8-6, Section 8.3.3.** Frequency of Detection. In this section, the summary of chemicals detected at the site was reviewed based on frequency of detection. It is believed that the data from the two sites should not have been combined, thus, making the use of frequency of detection inconclusive until two sites are reviewed individually.
34. **Tables 8-1 through 8-3.** These tables present a summary of the results for surface soil, sediment, and surface water. In all of these tables, no results were reported for PCBs, dioxins, and/or pesticides/herbicides. Since these two landfills are comprised of a variety of fill and dump material, it is highly likely that these constituents may be present in any or all of site related media. No text could be found in the document documenting why these constituents were not part of the analytical program.

35. **Based on Table 8-4 Soil Screening table.** It is unclear why some chemicals were carried forward to Step 3a when they were non-detected, had ESVs, and no other chemical in the same group were carried forward. For example, benzo(a)pyrene was not detected (reporting range 360 to 460) had an ESV of 100 µg/kg, yet the HQ was stated as being 4.80. Please review the table and revise as necessary.
36. **On Table 8-6, Step 2 Screening - Surface Water.** Cadmium and mercury were not detected in any of the samples. However, they have calculated HQs of 37.9 and 16.7, respectively. Even using 1/2 of the SQL, the ESVs for each chemical would not be exceeded. It is unclear where the concentrations used to calculate the HQs were obtained and this issue should be clarified. Of additional concern is the fact that toluene was detected in surface water according to Table 8-6. However, a review of Table 2.3 (Human Health Risk Assessment) found that toluene was not detected in surface water. The discrepancy between the two tables should be resolved and all tables reviewed to ensure consistency for all constituents.
37. **Table 8-8 Step 3 Screening Surface Soil.** For chemicals with non-detects, the arithmetic mean is presented. Normally, 1/2 of the sample quantitation limit (SQL) is used. It is unclear where these values were obtained.
38. **Page 9-1, Section 9.1, surface soil bullet 2.** Please revise conclusive statement regarding small magnitude of 2xAB inorganic exceedence per General Comment 2.
39. **Page 9-1, Section 9.1, surface soil bullet 3.** Please revise statement regarding small magnitude of 2xAB inorganic exceedence per General Comment 2.
40. **Page 9-1, Section 9.1, subsurface soil bullet 3.** Please revise statement regarding small magnitude of 2xAB inorganic exceedence per General Comment 2.
41. **Page 9-2, Section 9.2, bullet 2.** Text states that metal migration is not likely significant to sediment/water from soils. Section 6.2.3.1 paragraph 4, last sentence says that Sites 1 and 2 are potential sources of metals to surface water. Low pH in some samples, appendix H, supports this, as low pH often leads to high inorganic compound mobility.
42. **Page 9-3, Section 9.4, Screening Level Ecological Risk Assessment.** It is stated that no soil compounds were found to have a HQ greater than 1. This statement is not correct. The correct statement would be that several chemicals were detected at both Sites with HQs greater than 1. However, many of the chemicals were screened out when comparing maximum concentrations to twice the mean background concentration or due to low frequency of detection. Based on a review of the data and at a minimum, for Site 1, selenium and silver remain as COPECs. For Site 2, barium and cadmium remain as COPECs. It is impossible to

fully determine which chemicals should remain as COPECs due to the manner in which the SLERA was conducted.

43. **Page 9-4, Section 9.5.1.1, paragraph 2.** Please revise conclusive statement regarding small magnitude of 2xAB inorganic exceedence per General Comment 2.
44. **Page 9-4, Section 9.5.1.2, paragraph 2.** Please revise conclusive statement regarding small magnitude of 2xAB inorganic exceedence per General Comment 2.
45. **Page 9-7, Section 9.5.6.** Please comment on the 1,1-DCE detections. This section does not actually give recommendations other than a general statement for a feasibility study in the last few sentences. Please show what is to be conducted in the feasibility study and discuss in more detail what is shown in attached tables.
46. **Section 9.5.6., Page 9-8, Para 0.** It is recommended that No Further Action is requested for site related media. The finding of No Further Action is not supported due to the exceedances of ESVs, the present of debris at the site, and the failure to sample dioxins, PCBs, pesticides and herbicides.
47. **Table 9-1.** Arsenic detections statistics for Site 1 has a maximum of detection of 4.9 mg/kg, not 2.6 mg/kg. The mercury maximum detection is 0.058 mg/kg. Please revise.
48. **Table 9-2.** Chloroform was detected in 5 of 8 samples not 1 of 8 in Site 1. Please revise.
49. **Table 9-3.** For Site 2, arsenic was detected in 2 permanent wells. Please include arsenic in the table.
50. **Appendix C.** shows a detection of toluene in sediment at a concentration of 96mg/kg at S1-SD01, and 0.6mg/kg in S1-SW01. This is not presented in text or tables before the risk assessment. The same is true for Freon-11, detected in several soil samples across Sites 1 and 2. Again, the document expresses lack in organization and stepwise story telling about this site. Present all detections and exceedences in Chapter 5.
51. **Appendix E.** Well Completion diagram S1-TW08, appears to have an unknown depth and unknown depth to screen. Please provide these values.
52. **Appendix G.** Tables G-1 and G-2 indicate that upgradient sampling locations for groundwater and surface water have lowest pHs. Flow toward the Reed's Gut and downstream in Reed's gut becomes progressively less acidic. This should be discussed with respect to contaminant migration.