MEMORANDUM REGARDING SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL COMMENTS ON DRAFT RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION FOR SITE 3 MCRD PARRIS ISLAND SC
6/11/1999
SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

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ID 202
19.01.03.0012

MEMORANDUM

TO: Jerry Stamps, Engineering Associate
Corrective Action Engineering Section
Division of Hazardous and Infectious Waste Management
Bureau of Land and Waste Management

FROM: Donald C. Hargrove, Hydrogeologist
Hazardous Waste Section
Division of Hydrogeology
Bureau of Land and Waste Management

DATE: 11 June 1999

RE: Parris Island Marine Corps Recruit Depot (MCRD)
Parris Island, South Carolina
Beaufort County
SC6 170 022 767

DRAFT RCRA Facilities Investigation (RFI)/Remedial Investigation (RI) for Site/SWMU 3 - Causeway Landfill
(dated March 1999)

The Division of Hydrogeology has reviewed the DRAFT RCRA Facilities Investigation (RFI)/Remedial Investigation (RI) for Site/SWMU 3 - Causeway Landfill at MCRD. This work plan (dated March 1999) was received on 9 March 1999. This report provides a physical description of SWMU 3 that includes the history of the site. It briefly describes previous studies performed at the site and indicates that the previous studies have data gaps. This report documents the sample strategy utilized to fill the data gaps in order to fully characterize the nature and extent of contamination.

This document was reviewed with respect to R.61-79 of the South Carolina Hazardous Waste Management Regulations (SCHWMR), and appropriate guidance documents. Based on this review, the Division of Hydrogeology finds that this report is technically deficient and should be revised. This report should be resubmitted after being revised to address the following specific comments:

1) Section 3.1, Deviations From The Work Plan, Second Bullet: This section explains that Monitoring Well PAI-03-MW-02(D) was not installed to the top of the Hawthorn Formation.

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Soil Boring PAI-03-SB-01 was drilled to a depth of forty (40) feet below ground surface (bgs), but MW-02 was installed only to twenty-eight (28) feet bgs.

There is no reasoning given that explains why the clay unit encountered from 28 to 40 feet was assumed not to be part of the Hawthorn Formation. Also, the statement that this clay layer "...would act as a confining unit..." is presumptuous at this point. This clay layer was encountered in a single soil boring. The areal extent of this clay is not known. It is not known whether the top or bottom of this clay represents an unconformity, or whether or not the clay is competent and continuous.

The text should be revised to discuss this clay unit further. This discussion should either contain valid arguments for the assumptions made, or the assumptions should be removed from the text.

2) Figure 3-4, Cross Section A-A': This cross section does not provide an adequate characterization of the causeway landfill or the subsurface lithology. Given the shape and dimensions of this landfill, characterization should include cross sections perpendicular to Line A-A' in a couple of locations across the 4,000 foot length of the landfill. The known subsurface lithology should be included in these cross sections (even if it is only inferred), and the relationship(s) to the lithology encountered during this investigation should be discussed in the text.

3) Section 3.3, Site-Specific Geology: This section incorrectly states that the location of Cross Section A-A' is shown on Figure 3-2. Point of fact, the location of Cross-Section A-A' is not depicted on any figures. Please revise to include this cross section on the appropriate figure, as well as any other cross sections created in response to comment 2.

4) Table 4-1, Summary of Background Concentrations:
a) The footnote for this table specifies that "for non detected chemicals, ½ the detection limit was used." The table, however, shows blank spaces for some of the inorganic constituents. These blank spaces indicate a non detect result and should therefore be completed by using ½ the detection limit for that particular constituent. Please revise the table.

b) The inorganic constituents listed in this table do not compare to the background inorganic constituents listed in Appendix C. Please review and revise the appropriate list(s) accordingly.

5) Table 4-4, Summary Statistics - Surface Water: This table indicates that the background inorganics investigation yielded "Non-Detects" (ND) for Antimony, Beryllium, Cadmium, Cobalt, Lead, Mercury, Nickel, and Silver. If the analytical results are ND, then it must be assumed that the background level is zero. Since all of the inorganic constituents listed above showed positive detections, the last column on Table 4-4 should be revised to show background exceedence for said inorganic constituents. Please revise the table.

6) Table 4-6, Summary Statistics - Sediment: Same as comment 4, except that the inorganic constituents in question are Antimony, Selenium, Silver, and Cyanide.

7) Section 8.0, Conclusions and Recommendations, Part 13.0: This recommendation indicates the presumption that sediment contamination has be defined. On the contrary, sediment contamination has not yet been defined. The sediment sampling frequency, locations, and results are not sufficient to define nature and extent of contamination at SWMU-3. SWMU-3 has impacted the sediments in the salt marsh surrounding Ribbon Creek, as well as the sediments in the partially impounded water at the head of Ribbon Creek (unnamed impoundment). Further investigation is necessary in order to define areal extent of the sediment contamination. The Tier I team should discuss this issue further.

8) Appendix A, Chain Of Custody Form, page A-20: The remarks section states that "...purge and sample water very frothy-attempt to reduce bubbles in VOCs for the most part unsuccessful for GW-01." This observation, and the unsuccessful attempt to stop it, should be discussed in the non-conformances section of this document. The result of this is that the VOCs results for MW-01 are suspect (probably biased low). This well should be resampled.

9) Appendix A, CHAIN OF CUSTODY Form, page A-21: The remarks for MW-04 indicate the same effervescence as noted for the samples from MW-01 (see comment 8). As such, the VOCs results for this sample are also suspect (probably biased low). This well should be resampled.

10) Appendix A-2, Soil Boring Logs: There is a discrepancy between the soil boring logs and the well completion logs.

SB-01 is listed as abandoned, not converted into a monitoring well...soil log used for wells MW-01, and MW-02.
SB-02 is listed the soil log for MW-02.
SB-03 is listed as the soil log for MW-03.
SB-04 is listed as the soil log for MW-04.

The Monitoring Well Sheets in Appendix A-3 indicate a different monitoring well-to-borehole configuration:

SB-01 is listed as the soil log for MW-01.
SB-01 is also listed as the soil log for MW-02.
SB-02 is listed as the soil log for MW-03.
SB-03 is listed as the soil log for MW-04.

According to the soil boring logs, MW-02 has two (2) soil boring logs. According to the Monitoring Well Sheets, MW-01 and MW-02 were constructed in the same borehole. Please review the daily logs, the soil boring logs, the Monitoring Well Sheets, or anything else that

can resolve this discrepancy, and revise these two appendices accordingly.

11) Appendix A-3, Well Installation Records:

a) The Monitoring Well Sheets submitted in this appendix are missing information:

- i) Project name
- ii) Project number
- iii) Elevation
- iv) Driller's certification number
- v) Casing elevations
- vi) Type of backfill below well

b) According to these records, the depth to the bottom of the screens is the same as the depth of the boreholes. Permanent Monitoring Wells should be constructed as follows:

- i) The borehole drilled such that the diameter allows at least two (2) inches of annular space around the well casing.
- ii) The base of the borehole extended one (1) foot beyond the depth of the well casing.
- iii) This interval should be filled with filter pack.
- iv) The casing set in place.
- v) The filter pack tremied until it extends two (2) feet above the screen.
- vi) The filter pack settled with a surge block.
- vii) The filter pack measured, and additional filter pack material installed so that the top of the filter pack extends 2 feet above the top of the screen.
- viii) The bentonite seal tremied into place, tamped and measured to ensure at least two (2) feet of thickness, and allowed to hydrate per manufacturer's directions.
- ix) Bentonite grout tremied into place (terminating two feet below ground surface) and allowed to cure for twenty-four (24) hours.
- x) Pour the concrete pad that must extend at least six (6) inches below ground surface, install protective casing, and allow concrete to cure for twenty-four (24) hours.
- xi) Install protective guard posts and identification plate.

As they are reported on these forms, the monitoring wells were not properly constructed due to the depths of the boreholes and the well screens. All of the other information listed above is explicatory. The extra detail has been given here to ensure that MCRD understands that all future permanent monitoring wells must be installed in this manner.

The Tier I team should discuss this issue further so that the Division of Hydrogeology's requirements and expectations can be made clear.

c) The Monitoring Well Sheets indicate that all four of the monitoring wells constructed for this RFI were installed as flush-mount wells. The approved work plan specifies that monitoring wells with above grade stick ups would be installed. These deviations from the approved work plan should be specified and explained in Section 3.1, Deviations From the Work Plan.

In the future, MCRD should note that flush mount wells are a non-standard design and prior approval by the Department must be given and duly indicated in the monitoring well approval before said wells can be constructed.

12) Appendix A-10, Groundwater Sample Log Sheets:

a) According to these log sheets, MW-02 was not adequately purged prior to sampling. If the total depth of the well is 27.67 feet, and the static water level is 7.67 feet, one well volume is 3.26 gallons. The three well volume goal should be 9.78 gallons. The actual total volume purged is specified as 5 gallons or 1.5 well volumes.

b) MW-03 also was not adequately purged. The total volume should have been 4.05 gallons but only 2.84 gallons were actually purged.

c) MW-04 also was not adequately purged. The total volume should have been 3.57 gallons but only 2.5 gallons were actually purged.

In the future, three full well volumes must be purged and the pH, specific conductance, temperature, and turbidity of the ground water removed during purging must be monitored until each parameter has stabilized before sampling takes place. The following table was taken from Section 7 of the USEPA Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOP-QAM), dated May 1996. This offers a quick reference for calculating the volume of water in a well given a specific casing diameter:

WELL CASING DIAMETER vs. VOLUME

WELL CASING DIAMETER vs. VOLUME (GALS.)/FEET of WATER	
CASING SIZE	GALLONS/FT of WATER
1	0.041
2	0.163
3	0.367
4	0.653
5	1.02
6	1.469
7	1.999
8	2.611
9	3.305
10	4.08
11	4.934
12	5.875

13) Appendix C, Analytical Data: This appendix should include the analytical results as they were submitted by the laboratory. The "raw data" analytical results sheets provide more information than just the results. This information is used to verify detection limits, analysis dates, laboratory sample identification, etc. Please revise this appendix to include these data sets.

14) The Division of Hydrogeology has reviewed comments generated by the USEPA (Letter: Lapierre to Battaglini, dated 14 May 1999) and agrees with the comments.

15) The Division of Hydrogeology has reviewed comments generated by the SCDNR (Letter: Duncan to Brayack, dated 25 May 1999) and agrees with the comments.

If you have any questions concerning these comments, please contact me at (803)896-4033.