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MCRD PARRIS ISLAND
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EMAIL OF TRANSMITTAL AND GROUNDWATER MONITORING DATA FOR SITE 3
CAUSEWAY LANDFILL MCRD PARRIS ISLAND SC
1/28/2009
U S EPA REGION IV

From: Llamas.Lila@epamail.epa.gov
To: streetjs@dhec.sc.gov
Cc: charles.cook2@navy.mil; AmickMS@dhec.sc.gov; Sladic, Mark
Subject: Fw: Site 3 info
Date: Wednesday, January 28, 2009 11:01:36 AM
Attachments: [PAI SWMU03 2006 Tables1-3.xls](#)
[April 03 SEDIMENT SAMPLING SUMMARY.doc](#)
[MCRD Sed Table.xls](#)
[Site 3 A4 04-03 Figures.ppt](#)

Hi Sommer,

I FOUND IT!!!

Here is Art's email submitting the GW data for Site 3, along with the Site 3 Post IROD Sediment data on August 15, 2007.

See attached XL file labeled PAI SWMU03 2006 tables 1-3, then see Table 3 in the worksheet. It shows the RFI results plus 5 years of sampling results, and is inclusive of the constituents sampled for during those events.

As for the potentiometric maps, you are on your own!! I would think there would be some in the Site 3 RI Report, and I believe I sent at least pieces of that to Meredith at one point, but also I think either I or Mark sent her the whole file. It is a big one!! But if you or Meredith do not have it, I can try to send what I have, but it may crash your system. Or maybe Mark can put it on the ftp site where you can download it. He has been very responsive when I have asked him to do this kind of thing for me. Actually, it may already be out there.... Call Mark if it is not. Then at the same time I think Charles is checking to see where he can get potentiometric maps as well. So between the two of them, there should be success.

As I understand from Charles, he does not intend to allow the contractor to mobilize until after the LTM Work Plan is revised and approved by EPA/DHEC and will give us at least the 2 weeks notice as required by the FFA. Good plan : -) He also stated that he will have the objectives regarding the IROD requirements clearly stated in the revised work plan, and submitted separately from the AvGas Pipeline document. We have been heard ! : -) Since this sampling is a requirement of the IROD it is not dependent upon finalization of the Site 3 PP and/or Final ROD. So hopefully we will be able to move forward if you get what you have asked for and they make the revisions as asked for.

We shall see....

Thanks for your clarifications this morning,

Lila

----- Forwarded by Lila Llamas/R4/USEPA/US on 01/28/2009 10:38 AM -----

"Sanford, Art F
CIV NAVFAC SE"
<art.sanford@navy.mil>

To
Lila
Koroma-Llamas/R4/USEPA/US@EPA,

08/15/2007 12:15 PM <timothy.j.harrington@usmc.mil>,
"Meredith Amick"
<AmickMS@dhec.sc.gov>
CC
<mark.sladic@ttnus.com>
Subject
Site 3 info

Lila,

I spoke with Mark Sladic about the tech memo and site 3. The Navy proposed a risk analysis of Site 3 sediment to 'risk' it away but we did not have traction. So the document never was completed. Instead the EPA sent MAC out to sample at Site 3 area 4 and the results showed no problems so we discontinued thinking about sediment issues at Site 3. Below are the results. Below also is a table showing GW results. Hope this helps fill in gaps.

Art

<<PAI SWMU03 2006 Tables1-3.xls>>

<<April 03 SEDIMENT SAMPLING SUMMARY.doc>>

<<MCRD Sed Table.xls>>

<<Site 3 A4 04-03 Figures.ppt>>

(See attached file: PAI SWMU03 2006 Tables1-3.xls)(See attached file: April 03 SEDIMENT SAMPLING SUMMARY.doc)(See attached file: MCRD Sed Table.xls)(See attached file: Site 3 A4 04-03 Figures.ppt)

**Table 1. Groundwater Elevations for SWMU 3 - Causeway Landfill, MCRD
Parris Island, South Carolina**

| Well No. | Date | Time | Top of Casing Elevation (ft msl) | Depth to Groundwater (ft BTOC) | Groundwater Elevation (ft msl) |
|-----------------|-------------|-------------|---|---|---|
| PAI-03-MW-01SR | 31-Oct-06 | 0823 | NA | 5.99 | - |
| PAI-03-MW-02DR | 31-Oct-06 | 0822 | NA | 6.18 | - |
| PAI-03-MW-03SR | 31-Oct-06 | 0818 | NA | 7.71 | - |
| PAI-03-MW-04SR | 31-Oct-06 | 0810 | NA | 8.81 | - |

Tides: High at approx. 1509; Low at approx. 0856

ft - foot/feet

BTOC - below top of casing

msl - mean sea level

NA - data not available

- elevations cannot be calculated with available data

**Table 2. Summary of Groundwater Quality Parameters Collected During Purging of Wells -
SWMU 3 - Causeway Landfill, MCRD Parris Island, South Carolina**

| Well Location | Date | Initial Water Level (ft TOC) | Recommended Purge Volume (gal) | Purge Method | pH | Specific Conductivity (mS/cm) | Temperature (°C) | Turbidity (NTU) | Dissolved Oxygen (mg/L) | Salinity (%) | Total Purged Volume (gal) | Final Water Level (ft TOC) | Time Elapsed (min) |
|----------------|-----------|------------------------------|--------------------------------|--------------|------|-------------------------------|------------------|-----------------|-------------------------|--------------|---------------------------|----------------------------|--------------------|
| PAI-03-MW-01SR | 31-Oct-06 | 6.35 | 5.1 | Low Flow | 6.08 | 1.28 | 25.1 | 0 | 0.0 | 0.05 | 5.2 | 7.30 | 90 |
| PAI-03-MW-02DR | 31-Oct-06 | 7.99 | 11.2 | Low Flow | 5.97 | 38.2 | 22.8 | 0 | 0.3 | 2.43 | 11.25 | 8.95 | 105 |
| PAI-03-MW-03SR | 31-Oct-06 | 7.71 | 4.71 | Low Flow | 6.68 | 2.87 | 25.7 | 0 | 0.34 | 0.14 | 5 | 8.24 | 60 |
| PAI-03-MW-04SR | 31-Oct-06 | 8.81 | 4.5 | Low Flow | 6.67 | 22.4 | 25.4 | 0 | 0.15 | 1.36 | 4.6 | 9.14 | 115 |

Notes

NA - Data not available

min - minute(s)

gal - gallon(s)

ft TOC - feet below top of casing

mS/cm - milliseimens per centimeter

°C - degrees celsius

NTU - nephelometric turbidity units

mg/L - milligram(s) per liter

Table 3. Positive Groundwater Monitoring Results for SWMU 3 - Causeway Landfill, MCRD Parris Island

| WELL | FEDERAL MCL (µg/L) | SCDHEC MCL (µg/L) | PAI-03-MW-01SR | | | | | |
|----------------------------------|--------------------|-------------------|----------------|----------|----------|---------|--------|----------|
| | | | RFI | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
| | | | 8/1/1998 | 2002 | 2003 | 2004 | May-06 | Oct-06 |
| TCL Volatiles (µg/L) | | | | | | | | |
| Acetone | NS | NS | U | 6.5 B | 3.3 J | 49.9 JD | U | U |
| Benzene | 5 | 5 | 21 | 108 | 146 | 65.7 D | 68.1 J | 42.6 J |
| Carbon disulfide | NS | NS | U | U | U | U | U | U |
| Chlorobenzene | 100 | NS | 130 D | 1050 | 1260 | 800 D | 878 | 1040 J |
| Chloroform | NS | NS | U | U | U | U | U | U |
| Ethylbenzene | 700 | 700 | 0.3 J | 0.48 J | 0.54 J | 0.44 J | 1.7 J | 0.513 J |
| Methylene chloride | 5 | 5 | U | U | U | 71.4 D | U | U |
| Styrene | 100 | 100 | U | U | U | U | 2.6 J | U |
| Toluene | 1000 | 1000 | U | U | 0.82 J | U | U | U |
| o-Xylene | 10000 | 10000 | U | U | U | U | 2 J | U |
| Xylene (total) | 10000 | 10000 | 0.3 J | U | U | U | 2 J | 0.261 J |
| TCL Semi-volatiles (µg/L) | | | | | | | | |
| 1,3-Dichlorobenzene | NS | NS | - | U | 7.8 J | U | U | U |
| 1,4-Dichlorobenzene | 75 | 75 | 10 | 7.4 J | 8.1 J | 5.7 J | 3.8 J | 4.94 J |
| 2-Chlorophenol | NS | NS | U | 5.4 J | 9.8 J | 6.9 J | 4 J | 7.85 J |
| 2-Methylnaphthalene | NS | NS | U | U | 1.1 J | 0.71 J | U | U |
| 4-Methylphenol | NS | NS | U | U | U | U | U | U |
| Acenaphthene | NS | NS | - | U | U | U | U | U |
| Acenaphthalene | NS | NS | U | U | U | U | U | U |
| Anthracene | NS | NS | U | U | U | U | U | U |
| Benzoic Acid | NS | NS | U | U | U | U | U | U |
| bis(2-Ethylhexyl)phthalate | 6 | NS | 1 J | 6.6 J | 4.2 J | 5.1 J | 3.8 J | 3.85 J |
| Diphenylamine | NS | NS | - | U | 1.9 J | 1.6 J | U | U |
| Fluorene | NS | NS | U | U | U | U | U | U |
| n-Nitrosodiphenylamine | NS | NS | 1 J | U | U | U | U | U |
| Napthalene | NS | NS | 1 J | U | 1.4 B | U | 0.78 J | 1.28 |
| Phenanthrene | NS | NS | - | U | U | U | U | U |
| Phenol | NS | NS | U | 1.3 J | U | 1.3 J | U | U |
| TCL Pesticides (µg/L) | | | | | | | | |
| 4,4'-DDD | NS | NS | U | 0.009 J | 0.0231 J | 0.022 J | U | 0.0115 J |
| 4,4'-DDE | NS | NS | U | U | 0.0144 J | U | U | U |
| alpha-BHC | NS | NS | U | U | U | U | U | U |
| delta-BHC | NS | NS | U | U | U | U | U | 0.0278 J |
| gamma-BHC (Lindane) | 0.2 | 0.02 | U | U | U | U | U | 0.0192 J |
| 4,4'-DDT | NS | NS | U | 0.036 JP | 0.0296 J | U | U | U |
| TCL PCBs (µg/L) | | | | | | | | |
| Aroclor-1221 | 0.5 | 0.5 | U | U | U | U | 0.26 J | U |
| Aroclor-1242 | 0.5 | 0.5 | - | U | 0.098 J | 0.22 | 0.32 J | 0.14 |
| TAL Inorganics (µg/L) | | | | | | | | |
| Aluminum* | 200 | 200 | 22 U | 21.5 B | UN | 45.1 B | U | U |
| Antimony | 6 | 6 | - | U | U | U | U | U |
| Arsenic | 10 | 10 | 31.1 | 5.15 | U | U | 13.9 J | U |
| Barium | 2000 | 2000 | 109 B | 108 | 83.6 B | 78.1 | 72.1 | 70.7 |
| Cadmium | 5 | 5 | U | 0.419 B | U | U | 1.4 J | U |
| Calcium | NS | NS | 76100 | 226000 | 163000 | 157000 | 164000 | 157000 |
| Chromium | 100 | 100 | U | 4.22 B | U | U | U | U |
| Cobalt | NS | NS | U | 1.07 B | U | U | 1 J | U |
| Copper | 1300 | 1000 | U | 1.95 B | U | U | U | U |
| Iron* | 300 | 300 | 24400 | 11200 | 20100 | 20200 | 15100 | 11900 |
| Lead | 15 | NS | U | 5.28 | UN | 2.48 B | U | U |
| Magnesium | NS | NS | 75400 | 37100 | 30100 | 25100 | 21200 | 22400 |
| Manganese* | 50 | 50 | 360 | 454 | 471 B | 448 | 491 | 449 |
| Nickel | NS | NS | U | 2.14 B | U | U | U | U |
| Potassium | NS | NS | 64800 | 14500 | 13900 | 12800 | 10600 | 12900 |
| Selenium | 50 | 50 | U | U | U | U | 6 J | U |
| Silver* | 100 | 100 | - | U | U | U | U | U |
| Sodium | NS | NS | 576000 | 138000 | 103000 | 75200 | 49400 | 65200 J |
| Vanadium | NS | NS | 4.2 B | 1.7 B | U | 0.689 B | U | U |
| Thallium | 2 | 2 | U | U | U | U | 11.6 J | U |
| Zinc* | 5000 | 5000 | 10 B | 6.02 | U | U | U | U |

Shaded concentrations exceed drinking water standard

U - not detected

J - estimated concentration

B (organics) - analyte was detected in method blank;

* Published Secondary Standard

NS - no standard available for this analyte

B (inorganics) - the reported result is above the MDL but below the CRDL

D - analyte(s) quantified in an analysis performed at a secondary dilution factor.

E - analyte exceeds the upper level of the calibration range of the instrument.

P - the pesticide/PCB target analyte is greater than 25% difference for the detected concentrations between the two GC columns.

N (inorganics) - the matrix or pre-digested spike sample recovery was not within the specified control limit.

Table 3. Positive Groundwater Monitoring Results for SWMU 3 - Causeway Landfill, MCRD Parris Island (Continued)

| WELL | FEDERAL MCL (µg/L) | SCDHEC MCL (µg/L) | PAI-03-MW-02DR | | | | | |
|----------------------------------|--------------------|-------------------|----------------|-------------|-------------|-------------|---------------|---------------|
| | | | RFI 8/1/1998 | Year 1 2002 | Year 2 2003 | Year 3 2004 | Year 4 May-06 | Year 5 Oct-06 |
| TCL Volatiles (µg/L) | | | | | | | | |
| Acetone | NS | NS | 5.3 | 2.7 JB | U | 9.6 | U | U |
| Benzene | 5 | 5 | U | U | U | U | U | U |
| Carbon disulfide | NS | NS | 0.3 J | U | U | U | U | U |
| Chlorobenzene | 100 | NS | 0.6 J | 0.66 J | 1.8 | U | U | U |
| Chloroform | NS | NS | U | U | U | U | U | U |
| Ethylbenzene | 700 | 700 | U | U | U | U | U | U |
| Methylene chloride | 5 | 5 | 0.3 JB | U | U | 5.6 | U | U |
| Styrene | 100 | 100 | U | U | U | U | U | U |
| Toluene | 1000 | 1000 | 0.3 J | U | 0.56 J | U | U | U |
| o-Xylene | 10000 | 10000 | U | U | U | U | U | U |
| Xylene (total) | 10000 | 10000 | U | U | U | U | U | U |
| TCL Semi-volatiles (µg/L) | | | | | | | | |
| 1,3-Dichlorobenzene | NS | NS | - | U | U | U | U | U |
| 1,4-Dichlorobenzene | 75 | 75 | U | U | U | U | U | U |
| 2-Chlorophenol | NS | NS | U | U | U | U | U | U |
| 2-Methylnaphthalene | NS | NS | U | U | U | U | U | U |
| 4-Methylphenol | NS | NS | U | U | U | U | U | U |
| Acenaphthene | NS | NS | - | U | U | U | U | U |
| Acenaphthalene | NS | NS | U | U | U | U | U | U |
| Anthracene | NS | NS | U | U | U | U | U | U |
| Benzoic Acid | NS | NS | U | U | U | U | U | U |
| bis(2-Ethylhexyl)phthalate | 6 | NS | 1 JB | U | U | U | U | U |
| Diphenylamine | NS | NS | - | U | U | U | U | U |
| Fluorene | NS | NS | U | U | U | U | U | U |
| n-Nitrosodiphenylamine | NS | NS | U | U | U | U | U | U |
| Napthalene | NS | NS | U | U | U | U | U | U |
| Phenanthrene | NS | NS | - | U | U | U | U | U |
| Phenol | NS | NS | U | U | U | U | U | U |
| TCL Pesticides (µg/L) | | | | | | | | |
| 4,4'-DDD | NS | NS | U | U | U | U | U | U |
| 4,4'-DDE | NS | NS | U | U | U | U | U | U |
| alpha-BHC | NS | NS | 0.12 | U | U | U | U | U |
| delta-BHC | NS | NS | U | U | U | U | U | 0.0194 J |
| gamma-BHC (Lindane) | 0.2 | 0.02 | U | U | U | U | U | 0.0158 J |
| 4,4'-DDT | NS | NS | U | 0.035 JP | U | U | U | U |
| TCL PCBs (µg/L) | | | | | | | | |
| Aroclor-1221 | 0.5 | 0.5 | U | U | U | U | U | U |
| Aroclor-1242 | 0.5 | 0.5 | - | U | U | U | U | U |
| TAL Inorganics (µg/L) | | | | | | | | |
| Aluminum* | 200 | 200 | - | U | UN | 1880 B | U | U |
| Antimony | 6 | 6 | - | U | 66.5 BN | U | U | U |
| Arsenic | 10 | 10 | - | U | U | 5.41 | 94.9 J | U |
| Barium | 2000 | 2000 | - | 101 B | 121 B | 91.2 | 95 | 93 |
| Cadmium | 5 | 5 | - | 0.348 B | 49 B | U | U | U |
| Calcium | NS | NS | - | 252000 | 219000 | 256000 | 288000 | 253000 |
| Chromium | 100 | 100 | - | U | U | 0.875 B | U | U |
| Cobalt | NS | NS | - | U | U | U | U | U |
| Copper | 1300 | 1000 | - | 46.1 | 122 B | U | U | U |
| Iron* | 300 | 300 | - | 15100 | 3840 B | 14900 | 12300 | 10700 |
| Lead | 15 | NS | - | 6.74 | UN | U | U | U |
| Magnesium | NS | NS | - | 939000 | 806000 | 942000 | 996000 | 963000 |
| Manganese* | 50 | 50 | - | 284 B | 282 B | 239 B | 245 | 222 J |
| Nickel | NS | NS | - | U | U | 0.779 B | U | U |
| Potassium | NS | NS | - | 203000 | 194000 | 197000 | 224000 | 214000 |
| Selenium | 50 | 50 | - | U | U | U | 190 | U |
| Silver* | 100 | 100 | - | U | 108 B | U | U | U |
| Sodium | NS | NS | - | 7080000 | 7490000 | 7730000 | 7450000 | 7870000 J |
| Vanadium | NS | NS | - | U | U | U | U | U |
| Thallium | 2 | 2 | - | U | U | U | 63.9 J | U |
| Zinc* | 5000 | 5000 | - | U | U | U | 30.2 J | U |

Shaded concentrations exceed drinking water standard

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B (organics) - analyte was detected in method blank;

* Published Secondary Standard

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D - analyte(s) quantified in an analysis performed at a secondary dilution factor.

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P - the pesticide/PCB target analyte is greater than 25% difference for the detected concentrations between the two GC columns.

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Table 3. Positive Groundwater Monitoring Results for SWMU 3 - Causeway Landfill, MCRD Parris Island (Continued)

| WELL | FEDERAL MCL (µg/L) | SCDHEC MCL (µg/L) | PAI-03-MW-03SR | | | | | |
|----------------------------------|--------------------|-------------------|----------------|-------------|-------------|-------------|---------------|---------------|
| | | | RFI 8/1/1998 | Year 1 2002 | Year 2 2003 | Year 3 2004 | Year 4 May-06 | Year 5 Oct-06 |
| TCL Volatiles (µg/L) | | | | | | | | |
| Acetone | NS | NS | U | 3.6 JB | 3.2 J | 4.4 J | U | U |
| Benzene | 5 | 5 | 0.3 J | U | U | U | U | U |
| Carbon disulfide | NS | NS | U | U | U | U | U | U |
| Chlorobenzene | 100 | NS | U | U | U | U | U | U |
| Chloroform | NS | NS | U | U | U | U | U | U |
| Ethylbenzene | 700 | 700 | U | U | U | U | U | U |
| Methylene chloride | 5 | 5 | 0.3 J | U | U | 5.4 | U | U |
| Styrene | 100 | 100 | U | U | U | U | U | U |
| Toluene | 1000 | 1000 | U | U | 1.1 | U | U | U |
| o-Xylene | 10000 | 10000 | U | U | U | U | U | U |
| Xylene (total) | 10000 | 10000 | U | U | U | U | U | U |
| TCL Semi-volatiles (µg/L) | | | | | | | | |
| 1,3-Dichlorobenzene | NS | NS | - | U | U | U | U | U |
| 1,4-Dichlorobenzene | 75 | 75 | U | U | U | U | U | U |
| 2-Chlorophenol | NS | NS | U | U | U | U | U | U |
| 2-Methylnaphthalene | NS | NS | 1 J | U | U | U | U | U |
| 4-Methylphenol | NS | NS | 73 | U | U | U | U | U |
| Acenaphthene | NS | NS | - | U | U | U | U | U |
| Acenaphthalene | NS | NS | 2 J | U | U | U | U | U |
| Anthracene | NS | NS | U | U | U | U | U | U |
| Benzoic Acid | NS | NS | 540 E | U | U | U | U | U |
| bis(2-Ethylhexyl)phthalate | 6 | NS | 1 J | U | U | U | U | U |
| Diphenylamine | NS | NS | - | U | U | U | U | U |
| Fluorene | NS | NS | U | U | U | U | U | U |
| n-Nitrosodiphenylamine | NS | NS | U | U | U | U | U | U |
| Napthalene | NS | NS | 1 J | U | U | U | U | U |
| Phenanthrene | NS | NS | - | U | U | U | U | U |
| Phenol | NS | NS | U | U | U | U | U | U |
| TCL Pesticides (µg/L) | | | | | | | | |
| 4,4'-DDD | NS | NS | U | U | U | U | U | U |
| 4,4'-DDE | NS | NS | U | 0.023 J | U | U | U | U |
| alpha-BHC | NS | NS | U | U | U | U | U | U |
| delta-BHC | NS | NS | U | U | U | U | U | U |
| gamma-BHC (Lindane) | 0.2 | 0.02 | U | U | U | U | U | U |
| 4,4'-DDT | NS | NS | U | 0.036 JP | U | U | U | U |
| TCL PCBs (µg/L) | | | | | | | | |
| Aroclor-1221 | 0.5 | 0.5 | U | U | U | U | U | U |
| Aroclor-1242 | 0.5 | 0.5 | - | U | U | U | U | U |
| TAL Inorganics (µg/L) | | | | | | | | |
| Aluminum* | 200 | 200 | U | U | UN | 281 B | U | U |
| Antimony | 6 | 6 | - | U | UN | U | U | U |
| Arsenic | 10 | 10 | 2.9 B | U | U | 4.22 B | 52.5 J | U |
| Barium | 2000 | 2000 | 386 | 45.3 B | 97.1 B | 160 | 194 | 230 |
| Cadmium | 5 | 5 | U | U | U | U | U | U |
| Calcium | NS | NS | 63400 | 169000 | 145000 | 121000 | 124000 | 163000 |
| Chromium | 100 | 100 | U | U | U | U | U | U |
| Cobalt | NS | NS | U | U | U | U | U | U |
| Copper | 1300 | 1000 | U | 3.17 B | U | U | 30.7 J | U |
| Iron* | 300 | 300 | 14600 | 7690 | 19600 | 24400 | 16700 | 17600 |
| Lead | 15 | NS | U | 2.44 B | UN | U | U | U |
| Magnesium | NS | NS | 125000 | 104000 | 92100 | 102000 | 83300 | 102000 |
| Manganese* | 50 | 50 | 113 | 945 | 1040 | 682 | 461 | 508 |
| Nickel | NS | NS | 6.9 B | 4.23 B | U | 4.9 B | U | U |
| Potassium | NS | NS | 117000 | 51000 | 52000 | 52200 | 44400 | 52300 |
| Selenium | 50 | 50 | U | U | U | U | U | U |
| Silver* | 100 | 100 | - | U | U | U | U | U |
| Sodium | NS | NS | 1180000 | 490000 | 401000 | 516000 | 290000 | 363000 J |
| Vanadium | NS | NS | 4 B | U | U | 0.689 B | U | 1 J |
| Thallium | 2 | 2 | U | U | U | U | 37.2 J | U |
| Zinc* | 5000 | 5000 | 6.5 B | U | U | 3.45 B | U | U |

Shaded concentrations exceed drinking water standard

U - not detected

J - estimated concentration

B (organics) - analyte was detected in method blank;

* Published Secondary Standard

NS - no standard available for this analyte

B (inorganics) - the reported result is above the MDL but below the CRDL

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Table 3. Positive Groundwater Monitoring Results for SWMU 3 - Causeway Landfill, MCRD Parris Island (Continued)

| WELL | FEDERAL MCL (µg/L) | SCDHEC MCL (µg/L) | PAI-03-MW-04SR | | | | | |
|----------------------------------|--------------------|-------------------|----------------|----------|---------|---------|---------|-----------|
| | | | RFI | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
| | | | 8/1/1998 | 2002 | 2003 | 2004 | May-06 | Oct-06 |
| TCL Volatiles (µg/L) | | | | | | | | |
| Acetone | NS | NS | 28 | 5.9 B | 4 J | 21 | U | U |
| Benzene | 5 | 5 | U | U | U | U | U | U |
| Carbon disulfide | NS | NS | U | U | U | U | U | U |
| Chlorobenzene | 100 | NS | U | U | U | U | U | U |
| Chloroform | NS | NS | 0.3 J | U | U | U | U | U |
| Ethylbenzene | 700 | 700 | U | U | U | U | U | U |
| Methylene chloride | 5 | 5 | 0.5 JB | U | U | 5.8 | U | U |
| Styrene | 100 | 100 | U | U | U | U | U | U |
| Toluene | 1000 | 1000 | 0.3 J | U | 1.1 | U | U | U |
| o-Xylene | 10000 | 10000 | U | U | U | U | U | U |
| Xylene (total) | 10000 | 10000 | U | U | U | U | U | U |
| TCL Semi-volatiles (µg/L) | | | | | | | | |
| 1,3-Dichlorobenzene | NS | NS | - | U | U | U | U | U |
| 1,4-Dichlorobenzene | 75 | 75 | U | U | U | U | U | U |
| 2-Chlorophenol | NS | NS | U | U | U | U | U | U |
| 2-Methylnaphthalene | NS | NS | U | U | U | U | U | U |
| 4-Methylphenol | NS | NS | U | U | U | U | U | U |
| Acenaphthene | NS | NS | - | U | 0.84 J | 1.3 | 0.39 J | 0.605 J |
| Acenaphthalene | NS | NS | U | U | U | U | U | U |
| Anthracene | NS | NS | U | U | U | U | U | 0.209 J |
| Benzoic Acid | NS | NS | U | U | U | U | U | U |
| bis(2-Ethylhexyl)phthalate | 6 | NS | 1 J | U | U | U | U | U |
| Diphenylamine | NS | NS | - | U | U | U | U | U |
| Fluorene | NS | NS | U | U | U | U | 0.2 J | U |
| n-Nitrosodiphenylamine | NS | NS | U | U | U | U | U | U |
| Napthalene | NS | NS | U | U | 0.15 JB | 0.44 J | U | U |
| Phenanthrene | NS | NS | - | U | 0.56 J | 0.6 J | 0.33 J | 0.529 J |
| Phenol | NS | NS | U | U | U | U | U | U |
| TCL Pesticides (µg/L) | | | | | | | | |
| 4,4'-DDD | NS | NS | U | U | U | U | U | U |
| 4,4'-DDE | NS | NS | U | U | U | U | U | U |
| alpha-BHC | NS | NS | U | U | U | U | U | U |
| delta-BHC | NS | NS | U | U | U | U | U | 0.00947 J |
| gamma-BHC (Lindane) | 0.2 | 0.02 | U | U | U | U | U | 0.0115 J |
| 4,4'-DDT | NS | NS | U | 0.033 JP | U | U | U | U |
| TCL PCBs (µg/L) | | | | | | | | |
| Aroclor-1221 | 0.5 | 0.5 | U | U | U | U | U | U |
| Aroclor-1242 | 0.5 | 0.5 | - | U | U | U | U | U |
| TAL Inorganics (µg/L) | | | | | | | | |
| Aluminum* | 200 | 200 | - | U | UN | 5190 | U | U |
| Antimony | 6 | 6 | - | U | 148 BN | U | U | U |
| Arsenic | 10 | 10 | - | U | U | 2.59 B | 142 J | U |
| Barium | 2000 | 2000 | - | 494 | 771 | 535 | 739 | 868 |
| Cadmium | 5 | 5 | - | 0.234 B | U | U | U | U |
| Calcium | NS | NS | - | 226000 | 238000 | 202000 | 261000 | 266000 |
| Chromium | 100 | 100 | - | U | U | U | U | 1.7 J |
| Cobalt | NS | NS | - | U | U | U | U | U |
| Copper | 1300 | 1000 | - | 1.46 B | U | U | U | U |
| Iron* | 300 | 300 | - | 761 | 2470 BN | 3090 | 4390 | 4750 |
| Lead | 15 | NS | - | 2.69 B | UN | U | U | U |
| Magnesium | NS | NS | - | 281000 | 454000 | 279000 | 451000 | 448000 |
| Manganese* | 50 | 50 | - | 144 | 249 B | 238 | 380 | 398 |
| Nickel | NS | NS | - | U | U | 1.97 B | U | U |
| Potassium | NS | NS | - | 109000 | 175000 | 111000 | 174000 | 189000 |
| Selenium | 50 | 50 | - | U | U | U | 137 J | U |
| Silver* | 100 | 100 | - | U | U | U | U | U |
| Sodium | NS | NS | - | 2410000 | 4730000 | 2540000 | 3940000 | 4530000 J |
| Vanadium | NS | NS | - | U | U | 2.25 B | U | 2.52 J |
| Thallium | 2 | 2 | - | U | U | U | U | U |
| Zinc* | 5000 | 5000 | - | U | U | U | U | U |

Shaded concentrations exceed drinking water standard

U - not detected

J - estimated concentration

B (organics) - analyte was detected in method blank;

* Published Secondary Standard

NS - no standard available for this analyte

B (inorganics) - the reported result is above the MDL but below the CRDL

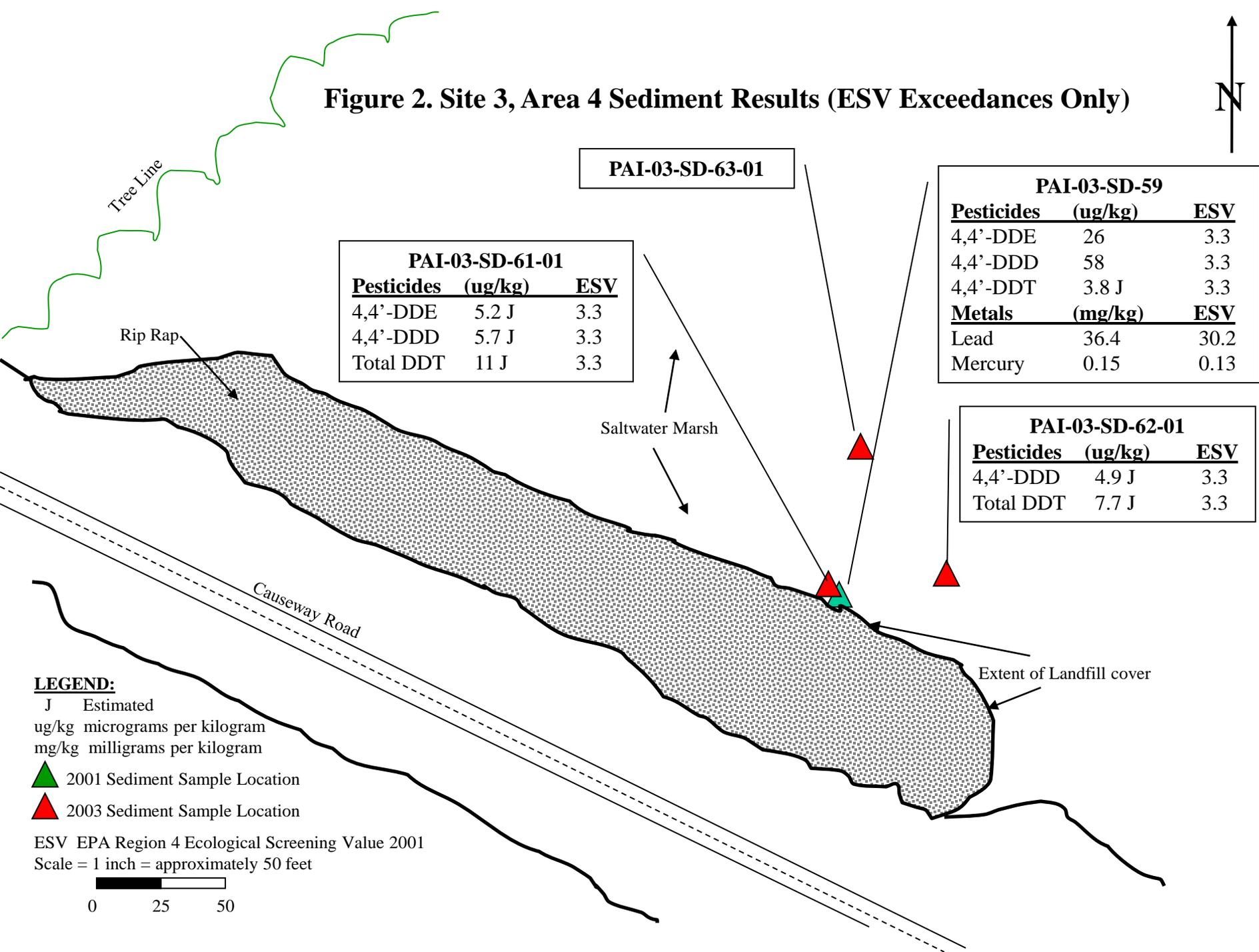
D - analyte(s) quantified in an analysis performed at a secondary dilution factor.

E - analyte exceeds the upper level of the calibration range of the instrument.

P - the pesticide/PCB target analyte is greater than 25% difference for the detected concentrations between the two GC columns.

N (inorganics) - the matrix or pre-digested spike sample recovery was not within the specified control limit.

Figure 2. Site 3, Area 4 Sediment Results (ESV Exceedances Only)



MCRD PARRIS ISLAND SEDIMENT SAMPLING DATA SUMMARY REPORT

The field sampling team mobilized to MCRD Parris Island, South Carolina on April 3, 2003 to collect sediment samples from Site 3, Area 4 and the Old Waste Water Treatment Plant (OWWTP) locations. The sediment sampling and analyses was performed in general accordance with the Letter work Plan (EPA, 2003) prepared for this scope of work. Deviations to the letter work plan include changes to the OWWTP sediment sampling locations as determined by the MCRD Parris Island Partnering Team and the method of the grain size analysis. Grain size analysis was performed by a Wet Sieve Gravimetric technique and not by the 1986 PSEP method as specified in the Letter Work Plan. The following paragraphs provide a brief summary of the sediment sampling activities, analyses and results at each site.

Site 3, Sediment Area 4

Three (3) samples were collected from Site 3, Sediment Area 4. The first sample designated PAI-03-SD-61-01 was co-located with sample PAI-03-SD-59. The second sample designated PAI-03-SD-62-01 was collected at a location approximately 47.8-ft due east of the first sample location. The third sample designated PAI-03-SD-63-01 was located approximately North 25-degrees East and 59-ft from the first sample location.

Sediment samples were collected at low tide utilizing a hand-held, box dredge. Water depth at the time of sampling ranged from 4-6-inches at each location. An organic layer was encountered at each location and averaged approximately 6-inches in thickness. A Sediment Sampling Summary is presented in Table 1.

Analytical test results indicate that samples PAI-03-SD-61-01 and PAI-03-SD-62-01 were in excess of EPA Region 4 Sediment Ecological Screening Values (ESVs) for the pesticides DDE, DDD and Total DDT residues. Sample PAI-03-SD-63-01, which is located approximately 59-ft northeast of the rip-rap bank, measured below sediment ESVs for DDE, DDD and Total DDT residues. Mercury, lead and arsenic analysis of the three sediment samples indicates no exceedances above applicable sediment ESVs. A Sediment Results Summary is presented in Table 2.

Old Waste Water Treatment Plant (OWWTP)

Three samples were collected from the Old Waste Water Treatment Plant (OWWTP) location. The first sample designated SAR-SD-01-01 was collected approximately 17-ft from the concrete junction box, at the base of the slope and into the marsh along the general trend of the old clay discharge pipe. The second sample designated SAR-SD-02-01 is located along the trend of the discharge pipe approximately 80.5-ft from the first sample location. The third sample was collected at what visually appeared to be the terminus of the discharge pipe approximately 161-ft from the first sample location.

Sediment samples were collected at low tide utilizing a hand-held, box dredge. Water depth was negligible at each location at the time of sampling. Additionally, organic material was not encountered at any sample location. A Sediment Sampling Summary is presented in Table 1.

Analytical test results indicate that sample SAR-SD-01-01 detected Phenanthrene, Fluoranthene, Pyrene, Benzo(a)Anthracene, Benzo-a-Pyrene, (plus Total PAHs), DDE, DDE, (plus Total DDT Residues), copper, lead and mercury above applicable sediment ESVs. Sample SAR-SD-02-01 detected arsenic, copper, lead and zinc above applicable sediment ESVs. Sample SAR-SD-03-01 that was collected the greatest distance from the shoreline and the OWWTP site measured below all applicable ESVs. The only exception is arsenic which measured concentrations over two times the arsenic ESV for sediment. A Sediment Results Summary is presented in Table 2.

**TABLE 1
SEDIMENT SAMPLING SUMMARY**

| Sample Location | Sample Designation | Sample Depth | Sample Analysis | | | | | |
|--------------------------------|--------------------|--------------|-----------------|------------------|----------------|------|------------|--------------------|
| | | | TCL | TAL ¹ | Pesticides | PCBs | Hg, Pb, As | Other ² |
| Site 3, Sediment Area 4 | | | | | | | | |
| PAI-03-SD-61 | PAI-03-SD-61-01 | 0 - 0.5' | | | X ³ | | X | X |
| PAI-03-SD-62 | PAI-03-SD-62-01 | 0 - 0.5' | | | X ³ | | X | X |
| PAI-03-SD-63 | PAI-03-SD-63-01 | 0 - 0.5' | | | X ³ | | X | X |
| OWWTP | | | | | | | | |
| SAR-SD-01 | SAR-SD-01-01 | 0 - 0.5' | X | X | X | X | | X |
| SAR-SD-02 | SAR-SD-02-01 | 0 - 0.5' | X | X | X | X | | X |
| SAR-SD-03 | SAR-SD-03-01 | 0 - 0.5' | X | X | X | X | | X |

Notes:

- (1) TAL inorganics including mercury and cyanide.
- (2) Conventional Sediment variables including TOC, grain size and moisture content.
- (3) DDX series only.

**TABLE 2
SEDIMENT RESULTS SUMMARY**

| Parameter | EPA Region 4 Sediment ESV | Site 3, Sediment Area 4 Sample Results | | | OWWTP Sample Results | | |
|---|------------------------------|--|-----------------|-----------------|----------------------|--------------|--------------|
| | | PAI-03-SD-61-01 | PAI-03-SD-62-01 | PAI-03-SD-63-01 | SAR-SD-01-01 | SAR-SD-02-01 | SAR-SD-03-01 |
| ORGANICS (ug/kg) | | | | | | | |
| Phenanthrene | 330 | NA | NA | NA | 640 | 170 | 37 J |
| Fluoranthene | 330 | NA | NA | NA | 1500 | 280 | 96 J |
| Pyrene | 330 | NA | NA | NA | 1000 | 230 | 80 J |
| Benzo(a)Anthracene | 330 | NA | NA | NA | 450 | 80 J | 37 J |
| Benzo-a-Pyrene | 330 | NA | NA | NA | 460 | 93 J | 60 J |
| Total PAHS | 1684 | NA | NA | NA | 5070 | 1069 | 350 |
| PESTICIDES (ug/kg) | | | | | | | |
| 4,4'-DDE | 3.3 | 5.2 J | 2.8 J | 2.5 J | 28 | 9.1 J | ND |
| 4,4'-DDD | 3.3 | 5.7 J | 4.9 J | ND | 58 | 5.4 J | ND |
| Total DDT Residues | 3.3 | 11 J | 7.7 J | 2.5 J | 100 J | 14.5 | ND |
| METALS (mg/kg) | | | | | | | |
| Antimony | 12 | NA | NA | NA | ND | ND | ND |
| Arsenic | 7.24 | 5.3 J | 5.3 J | 6.4 J | 1.1 J | 15 J | 16 J |
| Copper | 18.7 | NA | NA | NA | 39 | 22 | 15 |
| Lead | 30.2 | 13 J | 18 J | 22 J | 80 J | 36 J | 21 J |
| Mercury | 0.13 | ND | ND | ND | 1.6 | ND | ND |
| Zinc | 124 | NA | NA | NA | 86 J | 160 J | 83 J |
| PARTICLE SIZE DATA | | | | | | | |
| 8 mm % (> sand in size) | | 0.32 | 0.25 | 0.01 | 0.82 | 0.47 | 0.15 |
| Sand % | | 42.62 | 14.11 | 41.21 | 53.44 | 6.48 | 10.28 |
| Silt % | | 14.16 | 26.87 | 16.59 | 3.77 | 15.62 | 16.15 |
| Clay % | | 5.62 | 10.96 | 7.65 | 1.18 | 5.26 | 4.32 |
| % Moisture | | 37.28 | 47.80 | 34.53 | 40.79 | 72.17 | 69.10 |
| TOTAL ORGANIC CARBON (TOC) (mg/kg) | | | | | | | |
| | | 6700 | 11,000 | 15,000 | 35,000 | 72,000 | 33,000 |

Notes:

Shaded cells indicate sediment ESV exceedance

NA = Not Analyzed

ND = Not Detected

J - Identification of analyte is acceptable; reported value is an estimate