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MCRD PARRIS ISLAND
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EMAIL REGARDING ANALYSIS OF TOTAL ORGANIC CARBON AND GRAIN SIZE FOR
SEDIMENT SAMPLES AT SITE 3 CAUSEWAY LANDFILL WITH ATTACHMENTS MCRD
PARRIS ISLAND SC
2/6/2008
U S EPA REGION IV

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Subject: Also - Model Review Re: TOC and Grain Size in Sediments AND SAP Req'ts
Date: Wednesday, February 06, 2008 5:02:12 PM
Attachments: [080205 My summary-Sed. Grain Size & TOC Analysis.doc](#)

Also, as discussed this am: EPA will also need to review and approve the model used going from abiotic media to fish concentrations, for use in estimating fish consumption risk.

I think that's all for now.

Lila

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02/06/2008 04:37 PM
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Subject
TOC and Grain Size in Sediments
AND SAP Req'ts

Hi Folks,

I asked Tom to provide the info he had previously provided regarding analysis of TOC and Grain Size for sediment samples. This should be used in the upcoming Sediment/SW sampling event in support of the Site 3 LUC RD.

I had previously stated that if the Navy/MCRD are following the previously agreed to SAP for Site 3 Sediment sampling we do not need to review and approve one. However, after speaking with Tom, it seems the Navy/MCRD did not do TOC and Grain Size in their sampling analysis. EPA

did in their sampling analysis. So I am retracting my statement based on this new (to me) info from Tom. I will need to see a SAP for this effort. It seems this should not be an issue since on the conference call this morning it was stated that not only will we get a SAP for review, but we will need to go thru the whole QAPP/DQO process for this effort as well.

We really need to take a look at our projected time frames in light of the time and effort this QAPP/DQO process and associated learning curve is going to take. Just a thought thinking Mark may need to adjust his document tracking system assumptions for us. Has this been done?

(See attached file: 080205 My summary-Sed. Grain Size & TOC Analysis.doc)

Thanks,
Lila

Conventional Sediment Grain Size and Total Organic Carbon Analysis

Based on the references listed below, there appears to be a consensus among Federal agencies (EPA, US Army Corps of Engineers, NOAA) regarding appropriate methods for determining sediment grain size and organic carbon. Most reports in the literature refer back to (and recommend) techniques in the 1986 Puget Sound Estuary Program (PSEP) guidance manual. Those techniques, briefly summarized below should be available at most commercial testing labs.

Summary of Sediment TOC Method

- Samples should be stored frozen and can be held for up to 6 months under that condition. Excessive temperatures should not be used to thaw samples. If unrepresentative material is observed and removed from the sample (e.g., root mat, leaves), it should be done so in the field under the supervision of the chief scientist and noted on the field log sheet. Because inorganic carbon (e.g., carbonates, bicarbonates, free CO₂) will interfere with total organic carbon determinations, samples should be treated with a strong acid to remove inorganic carbon before being analyzed. Following acid treatment, samples should be dried to a constant weight at low temperatures (60-70 degrees C) and stored in a desiccator until TOC analysis.

- Samples are subjected to high temperature combustion (approximately 950 degrees C) in an induction furnace (e.g., Leco WR-12, Dohrmann DC-50, Coleman CH analyser, Perkin Elmer 240 elemental analyser, Carlo-Erba 1106) equipped with an infrared detector (e.g., Horiba PIR-2000).

- Total organic carbon should be reported to the nearest 0.1 unit as a percentage of the dry weight of the unacidified sample.

Summary of Sediment Grain Size Method

- Samples should be stored at 4 degrees C, and can be held for up to 6 months before analysis. Samples must not be frozen, dried or freeze-dried prior to analysis, as these processes may change the particle size distribution.

- Samples are analyzed for particle sizes by the wet sieve/pipette method. The sample is initially wet-sieved to remove and measure sand and gravel. The remaining fraction (silt and clay) is suspended in water in an unflocculated state. This solution is sampled at specified times via pipette. Water in the pipetted sample is evaporated and the remaining solids weighed. This approach is based on the settling velocity of particles usually computed on the basis of Stokes' Law.

- The weight of each sediment fraction should be measured to the nearest 0.0001 g dry weight and results reported as percent gravel, sand, silt and clay.

References

PSEP (Puget Sound Estuary Program). 1986. Recommended Protocols for Measuring Conventional Sediment Variables in Puget Sound. U.S. Environmental Protection Agency Region 10, Office of Puget Sound, 1200 6th Avenue, Seattle, WA 98101 and The Puget Sound Water Quality Authority, P.O. Box 40900, Olympia, WA 98504-0900.

EPA. 2001. Methods for Collection, Storage and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual, EPA-823-B-01-002, October 2001, Office of Science & Technology, Office of Water, U.S. Environmental Protection Agency, Washington, DC

EPA and US Army Corps of Engineers. 1998. Evaluation Of Dredged Material Proposed For Discharge in Waters Of The U.S. - Testing Manual (Inland Testing Manual). EPA-823-B-98-004, Environmental Protection Agency, Office of Water, Office of Science and Technology, Washington, D.C. and Department of the Army, United States Army Corps of Engineers, Operations, Construction, and Readiness Division, Washington, D.C., February 1998.

NOAA (National Oceanic and Atmospheric Administration). 1998. Sampling and Analytical Methods of the National Status and Trends Program, Mussel Watch Project: 1993-1996 Update. US Department of Commerce, NOAA Technical Memorandum NOS ORCA 130, National Status and Trends Program for Marine Environmental Quality, N/ORCA2, SSMC4, 1305 East-West Highway, Silver Spring, MD 20910.