



1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

MEMORANDUM

To: Isaac Standen, Andy Kallus, Kevin MacLachlan, and Russ McMillan, Washington State Department of Ecology
Date: November 19, 2009

From: James Keithly and Clay Patmont, Anchor QEA L.L.C
Project: 080547-01.01

cc: Eric Gerking, Port of Everett
Scott Miller, SLR International

Re: Bay Wood Products Sediment Sampling and Analysis Plan Addendum

The purpose of this addendum is to modify the *Sediment Sampling and Analysis Plan for Remedial Investigation/Feasibility Study and Draft Cleanup Action Plan* (SAP, Anchor QEA 2009) at the Port of Everett Bay Wood Products Site in Everett, Washington. The SAP was previously approved by the Washington State Department of Ecology (Ecology). This addendum documents the following additions and changes:

- Collection of surficial sediments (0 to 10 centimeters [cm]) from five locations (BW-01, BW-04, BW-05, BW-07, and BW-11; Attachment 1) with:
 - Biological and chemical/wood waste testing of the surficial sediments from these five locations
 - Collection of two bioassay reference samples from Carr Inlet, one in an area of high fines (85 to 95%) and the other in an area of low fines (12 to 22%)
- Collection and chemical and wood waste analysis of five sediment cores at the same locations
- Schedule for completion of this work

Specific details regarding collection and analysis of these samples not presented in the SAP are presented below. The majority of the details concerning this work are described in the SAP.

SURFICIAL SEDIMENT COLLECTION, CHEMICAL AND BIOLOGICAL TESTING

Surficial sediment samples (0 to 10 cm) will be collected using a van Veen sampler from locations BW-01, BW-04, BW-05, BW-07, and BW-11. The procedures for collection and processing of these samples will be as described in the Ecology-approved SAP. Field testing for percent fines following Anchor QEA Standard Operating Procedure 6.1 (Attachment 2) will be performed to ensure that appropriate reference locations for bioassay testing are collected. Chemical tests performed on all surficial sediment samples will include extractable petroleum hydrocarbons (EPH), volatile petroleum hydrocarbons (VPH), total ammonia, total sulfide, total volatile solids (TVS), total organic carbon (TOC), grain size, and total solids. Sufficient sediment from each sample will be archived at -20°C to allow for further chemical analyses if warranted. Any further chemical testing will be discussed with Ecology in advance. Once results are received from the analytical laboratory (Analytical Resources, Inc., in Tukwila, Washington), chemical test results will be validated as described in the SAP.

Biological testing will be performed by Newfields Northwest following the procedures described in the SAP. Bioassay testing will be performed as follows:

- Larval development bioassay testing will use the sand dollar (*Dendraster excentricus*) or the blue mussel (*Mytilus galloprovincialis*) depending upon the seasonality of the species.
- Juvenile polychaete growth bioassay testing will be performed using *Neathes* sp.
- Amphipod mortality testing will use the *Ampelisca abdita* at locations with high fines (BW-01, BW-04, BW-05, and BW-11) and *Eohaustorius estaurius* at locations with low fines (BW-07).

Due to the wide range of fines anticipated in these samples, two reference locations from Carr Inlet will be sampled and subject to bioassay testing. It is anticipated that one location be from an area of low fines (12 to 22%) and the other from an area of high fines (85 to 95%), but this may be modified based upon the results of the percent fines measured using the field testing procedures provided in Attachment 2 during collection of the surficial sediments.

SEDIMENT CORE COLLECTION AND CHEMICAL TESTING

Sediment cores will be collected at locations BW-01, BW-04, BW-05, BW-07, and BW-11 using an impact coring device as described in the Ecology-approved SAP. Due to the

relatively high tidal elevation of these locations, divers will not be required to operate this device. The procedures for collection and processing of these samples will also be as described in the SAP. Cores will be driven until refusal or a maximum of 10 feet of penetration is achieved. Cores will be sectioned/processed based upon lithology as described in the SAP and up to four samples and one sample of native material (z-layer) will be collected. The upper two samples collected from each core will be submitted to ARI in Tukwila, Washington, for chemical testing. Samples collected, but not analyzed will be archived frozen at -20°C ARI and any decisions about analysis of archived samples will be made in collaboration with Ecology. Chemical tests performed on the selected sediment core samples will include TVS, total ammonia, total sulfide, porewater ammonia and sulfide, TOC, grain size, and total solids. Sufficient sediment will be archived at -20°C to allow for further chemical analyses if warranted. Any further chemical testing will be discussed with Ecology in advance. Once results are received from ARI, chemical test results will be validated as described in the SAP.

REPORTING AND PATH FORWARD

Once chemical and bioassay testing is completed and chemical test results are validated, Anchor QEA will upload the data to Ecology's Electronic Information Management (EIM) system, provide Ecology with a table of results, and prepare a report of the results for Ecology's review. The report will include the following elements:

- Site background
- Sample collection procedures
- Deviations from SAP, if any
- Summary and interpretation of chemical and biological test results

The report will also include reports from the chemical and bioassay laboratories and all field logs as an electronic (e.g., CD) attachment. Unless additional sampling and testing is required, this report will be included as part of the Bay Wood Products Uplands RI/FS Report. If additional investigation is determined to be necessary based upon a collaborative evaluation of these results, additional reports may be necessary.

SCHEDULE

An approximate schedule for collection, analysis, and reporting of this work is provided below. The dates provided should be considered as durations (e.g., it will take roughly 1

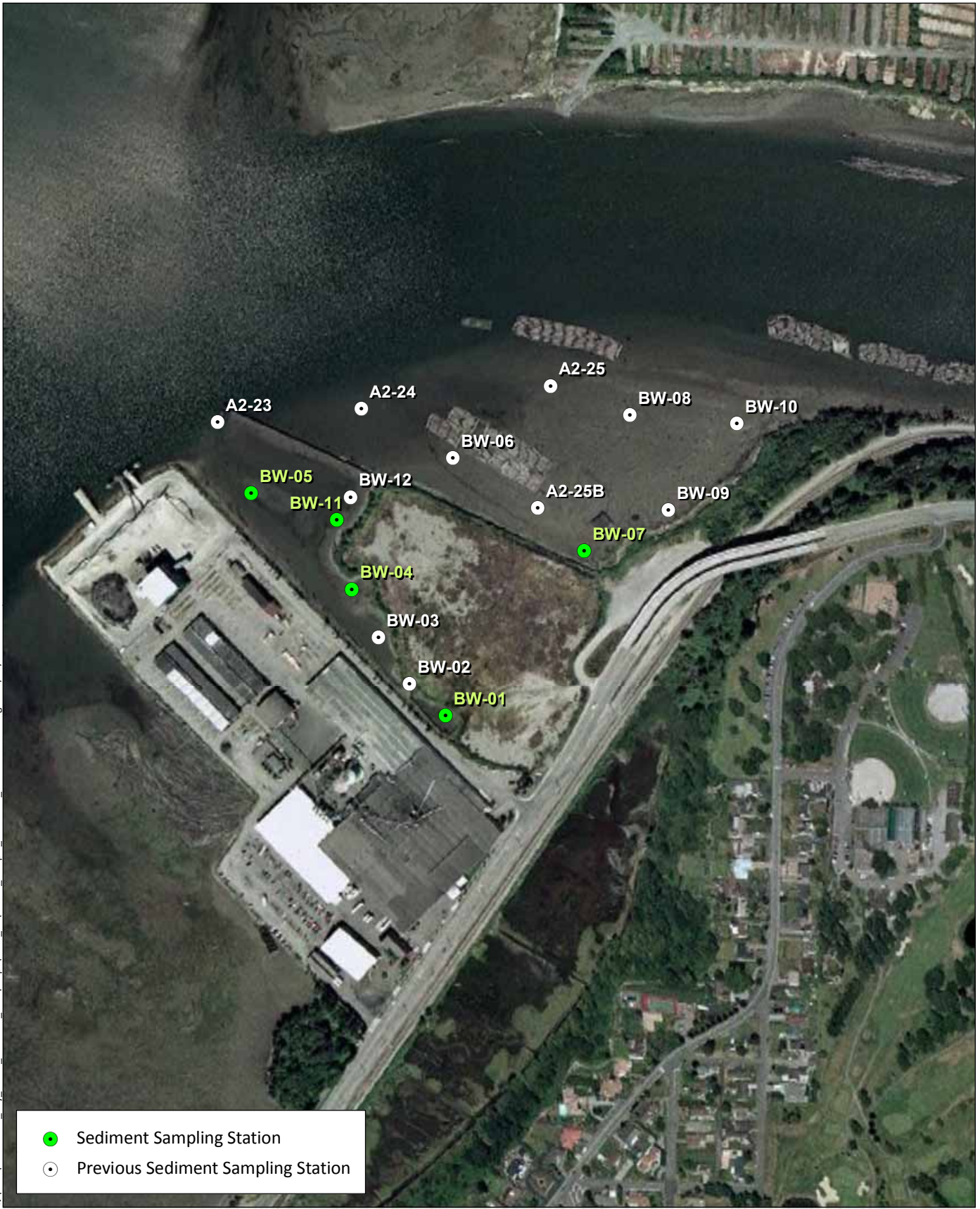
month to complete the bioassay and chemical testing after samples are collected). The approximate schedule is as follows:

- Sample collection: week of December 14, 2009
- Bioassay testing/chemical analyses: December 21, 2009 to January 21, 2010
- Chemical data validation: January 21 to February 14, 2010
- Draft report: February 14 to March 7, 2010
- Report submitted to Ecology for review: late March or early April 2010

REFERENCES

Anchor QEA, 2009. Appendix B. Sediment Sampling and Analysis Plan for Remedial Investigation/Feasibility Study and Draft Cleanup Action Plan. Bay Wood Products Site, Everett, Washington. Prepared for the Port of Everett and SLR International Corporation, West Linn, Oregon.

Q:\Jobs\080546-01_Bay_Wood_Products_POE\Maps\2009_07\Actual_Sample_Locations_8x11.mxd ckiblinger 11/04/2009 12:25 PM



Aerial Imagery © 2007 ESRI, i-cubed.

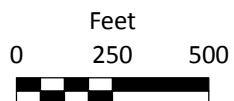


Figure 1
Sediment Sampling Stations

STANDARD OPERATING PROCEDURE

PERCENT FINES FIELD TESTING

Excerpted from "Recommended Guidelines for Sampling Marine Sediment, Water Column, and Tissue in Puget Sound." US EPA and Puget Sound Water Quality Action Team. April, 1997.

This procedure provides a gross field measurement of percent fines in a sediment sample. This field measurement is not intended to take the place of Particle Size Distribution analysis in the laboratory, but to aid in directing collection of bioassay samples and reference samples which can be dependent upon percent fines.

Equipment required to perform this field measurement includes:

- USA Standard Testing Sieve #230 (63 μm opening)
- 50-mL measuring cup
- 100-mL graduated cylinder
- small plastic funnel
- teaspoon
- squirt bottle filled with water
- safety glasses or goggles and chemical-resistant gloves (if contamination is suspected to be present).

Once a sediment sample has been collected, the following procedures should be carried out.

1. Thoroughly rinse the sieve and all other equipment and visually inspect to ensure that no sediment or other detritus is present.
2. Collect a sediment aliquot from the grab sampler in the 50-mL cup, ensuring that exactly 50 mL is collected by "shaving" excess sediment from the top of the cup and rinsing any sediment off the sides of the cup.
3. Transfer the sediment aliquot from the 50-mL cup to the sieve using the spoon. Thoroughly rinse the cup and the spoon into the sieve with water to ensure that the entire aliquot has been transferred.
4. Gently rinse the sieve with running water and observe the stream of water coming from the bottom of the sieve. During this step, the fines are being rinsed away. Rinse

- until the stream of water appears clear. This indicates that all *fines* have passed through the sieve. Gently rinse the remaining sediment to one side of the sieve.
5. Place the plastic funnel into the 100 mL graduated cylinder and position the lip of the sieve over the funnel. Using the squirt bottle, rinse the sediment into the graduated cylinder, directing the stream of water through the back of the sieve. Continue rinsing until all sediment has been transferred to the graduated cylinder. If needed, rinse any sediment that may have adhered to the funnel. The rinse water should not overflow the graduated cylinder. If it appears that the graduated cylinder will overflow before all sediment has been transferred, discard the sample and repeat the entire procedure.
 6. Allow the sediment to settle completely in the graduated cylinder and record the amount of sediment present. This measurement represents the *volume retained*. Also record any turbidity observed in the overlying water.

The *volume retained* (in mL), subtracted from the original 50-mL aliquot, provides the volume that passed through the sieve, or volume of fines in 50 mL of sample. Multiplying this remainder by two gives the *volume of fines* in 100 mL or *percent fines*. The formula can be stated as:

$$\text{Percent fines} = (50 \text{ mL} - \text{Volume Retained in mL}) \times 2$$