

**Response Action Contract
For Remedial Response, Enforcement Oversight, and Non-Time-Critical
Removal Activities at Sites of Release or Threatened Release of
Hazardous Substances in EPA Region VIII**

U.S. EPA Contract No. EP-W-05-049

**Field Oversight Report
For Project Area Identification Data Gaps Investigation,
Gasco Sediments Site, Portland, Oregon**

**Work Assignment No.: 336-VOEE-10EW
GASCO/Siltronics
EPA RPM: Sean Sheldrake
CDM Project Manager: Lance Peterson**

May 19, 2011

**Prepared for:
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue Suite 900
Seattle, Washington 98101**

**Prepared by:
CDM Federal Programs Corporation
555 17th Street, Suite 1100
Denver, Colorado 80202**

Contents

Section 1 Introduction

1.1	Project Background	1-2
1.2	Investigation Summary.....	1-2

Section 2 Objectives and Scope of Field Oversight

2.1	Governing Documents.....	2-1
2.2	Objectives of Field Oversight.....	2-1
2.3	Field Investigation Schedule	2-1
2.4	Oversight Personnel	2-1
2.5	Field Documentation.....	2-2
2.6	Photographic Documentation.....	2-2

Section 3 Observations

3.1	Summary of Work Performed	3-1
3.1.1	Transition Zone Water and Groundwater Sampling	3-1
3.1.2	Riverbank Soil Sampling	3-9
3.1.3	Sediment Cores.....	3-17
3.1.3.1	Sediment Core Collection	3-17
3.1.3.2	Sediment Core Processing	3-18
3.1.4	Sediment Surface Grabs.....	3-22
3.2	Health and Safety Program.....	3-25
3.2.1	Health and Safety Meetings.....	3-25
3.2.2	Use of Personal Protective Equipment.....	3-26
3.2.3	Slip, Trip, and Fall Hazards	3-26
3.2.4	Weather Hazards.....	3-27

Section 4 Deviations

4.1	Summary of Deviations and Field Change Requests	4-1
-----	-------------------------------------------------------	-----

Section 5 References.....

5-1

Tables

Table 3-1	Water Parameters Recorded by MFA during Purging at 25 Feet below Mudline at GP-30.....	3-3
Table 3-2	Water Parameters Recorded by MFA during Purging at 50 Feet below Mudline at GP-30.....	3-3
Table 3-3	Water Parameters Recorded by MFA during Purging at 8 Inches below Mudline at GP-203.....	3-4
Table 3-4	Water Parameters Recorded by MFA during Purging at 5 Feet below Mudline at GP-61.....	3-5
Table 3-5	Water Parameters Recorded by MFA during Purging at 1 Foot below Mudline at GP-204	3-5

Table 3-6	Water Parameters Recorded by MFA during Purging at 1 Foot below Mudline at GP-202	3-6
Table 3-7	Water Parameters Recorded by MFA during Purging at 1 Foot below Mudline at GP-65	3-7
Table 3-8	Water Quality Data during Purging at 3.7 Feet below Mudline at GP-653-7	
Table 3-9	Water Parameters Recorded by MFA during Purging at 1 Foot below Mudline at GP-38	3-8
Table 3-10	Riverbank Boring Details.....	3-17
Table 3-11	Sediment Core Details.....	3-22

Appendices

<i>Appendix A</i>	Field Notes
<i>Appendix B</i>	Field Oversight Photographs
<i>Appendix C</i>	Health and Safety Inspection Reports
<i>Appendix D</i>	Field Change Requests

Acronyms and Abbreviations

AED	automated external defibrillator
AIR	Area Identification Report
bgs	below ground surface
BHC	benzene hexachlorides
BNSF	Burlington Northern Santa Fe
BTEX	benzene, toluene, ethylbenzene, xylene
CDM	CDM Federal Programs Corporation
COC	chemical of concern
DCE	dichloroethylene
DDD	dichlorodiphenyldichloroethanes
DDE	dichlorodiphenyldichloroethylenes
DDT	dichlorodiphenyltrichloroethane
DEQ	Oregon Department of Environmental Quality
DO	dissolved oxygen
EPA	U.S. Environmental Protection Agency
FCR	field change request
GPS	global positioning system
HASP	health and safety plan
HC	hydrocarbon
HCN	hydrogen cyanide
LWR	lower Willamette River
MFA	Maul Foster & Alongi, Inc.
ORP	oxidation reduction potential
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyl
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
QAPP	Quality Assurance Project Plan
RM	river mile
Site	Gasco/Siltronic site
SOW	statement of work
TCE	trichloroethene
VOC	volatile organic compound
TZW	transition zone water

Section 1

Introduction

Under Work Assignment 336-VOEE-10EW from U.S. Environmental Protection Agency (EPA), under EPA Region 8, Remedial Action Contract 2 No. EP-W-05-049, CDM Federal Programs Corporation (CDM) was assigned to conduct oversight of field investigation activities at the Gasco/Siltronic site (Site) located in Portland, Oregon.

CDM provided technical field oversight of data gaps activities described in the Project Area Identification Report (AIR) and Data Gaps Quality Assurance Project Plan (QAPP) report (Anchor QEA 2010a). The data gaps field activities included the following:

- In-river transition zone water (TZW) and groundwater sampling
- Riverbank soil sampling
- Sediment core sampling
- Sediment surface grab sampling

TZW and groundwater sampling was conducted by Maul Foster & Alongi, Inc. (MFA) from September 13 through 22, 2010. During this work, CDM conducted oversight on the barge used to facilitate sampling to monitor health and safety compliance and provide an independent verification of representative TZW and groundwater samples collected by MFA.

Riverbank soil sampling was conducted by Anchor QEA from September 27 through October 15, 2010. During this work, CDM conducted oversight to monitor health and safety compliance and provide an independent verification of the soil characterization.

Sediment core sampling was conducted by Anchor QEA from October 4, 2010 through October 11, 2010. During this work, CDM conducted oversight on the boat collecting the sediment cores to monitor health and safety compliance and proper siting and sampling techniques. CDM also conducted oversight at the onshore processing area to provide an independent verification of the sediment characterization.

Sediment surface grabs were conducted by Anchor QEA from October 12 through 14, 2010. Due to anomalous freshwater midge bioassay results the sediment surface grab sampling was repeated on April 18 through 21, 2011. CDM conducted oversight on the boat used to collect the sediment surface grabs to monitor health and safety compliance, proper location and sampling techniques, and independent verification of sediment characterization.

This report summarizes the field oversight activities, photo documentation, and a discussion of deviations from the Project AIR and Data Gaps QAPP reports.

1.1 Project Background

The Site is located on the southwest bank of the lower Willamette River (LWR) generally between river miles (RMs) 6 and 7, immediately downstream of the Burlington Northern Santa Fe (BNSF) railroad bridge. The Site is located within Portland Harbor, which was designated a federal Superfund site by EPA in 2000 based on sediment contamination.

The statement of work (SOW) for the Site is contained in Appendix A to the September 9, 2009 Administrative Settlement Agreement and Order on Consent (Docket No. CERCLA 10-2009-0255) for the Site. The SOW identifies chemicals of concern (COCs) at the Site, which include:

- Benzene, toluene, ethylbenzene, xylenes (BTEX)
- Polynuclear aromatic hydrocarbons (PAHs), extended to include 2-methylnaphthalene, dibenzofuran, and carbazole
- Cyanide (including total cyanide in sediment and total, available, and free forms in water samples)
- Zinc
- Trichloroethene (TCE)
- Cis-1,2-dichloroethylene (cis-DCE)
- Trans-1,2-dichloroethylene (trans-DCE)
- 1,1-dichloroethylene (1,1-DCE)
- Vinyl chloride
- Polychlorinated biphenyls (PCBs)
- Dichlorodiphenyltrichloroethanes (DDTs)
- Dichlorodiphenyldichloroethanes (DDD)
- Dichlorodiphenyldichloroethylenes (DDEs)
- Diesel range hydrocarbons
- Residual range hydrocarbons
- Benzene hexachlorides (BHCs)
- Endrin ketone

1.2 Investigation Summary

The AIR was prepared by Anchor QEA on behalf of NW Natural in coordination with Siltronic Corporation to fulfill the requirements of Section 3.4 of the SOW (Anchor QEA 2010a). The objective of the AIR is to build upon the existing information summary in the Final Work Plan (Anchor QEA 2010b) to:

- Refine the Gasco Sediments Site area of interest presented in the Final Work Plan into an initial project area that is based on a risk framework consistent with the Portland Harbor site remedial investigation/feasibility study process.

- Identify data gaps relevant to further refinement of the project area, conducting the engineering evaluation/cost analysis, and completing the final remedy design.
- Describe field sampling, analytical, and quality assurance/quality control procedures for filling identified data gaps as presented in the Data Gaps QAPP (Appendix A to the AIR).

The following four major work tasks were performed to address the data gaps identified in the AIR:

1. In-river TZW and groundwater sampling
2. Riverbank soil sampling
3. Sediment core sampling
4. Sediment surface grab sampling

CDM personnel were present during a majority of these work tasks on behalf of EPA to provide oversight of health and safety and the technical aspects of the data gaps investigation. The number, type, identification designations, and purpose of the sampling conducted are summarized below.

TZW and Groundwater Samples: eight TZW samples (designated GP-200 through GP-207) and five groundwater samples (designated GP-30, GP-32, GP-38, GP-61 and GP-65) were collected off shore of the Site (specifically the Sitronic property) to evaluate the nature and extent of the TCE groundwater plume entering the Willamette River at Area 1 for the purpose of informing the remedial alternatives analysis and provide data necessary to estimate in-river attenuation rates for TCE and its degradation products.

Riverbank Borings: Twelve riverbank borings were drilled. They included nine top-of-riverbank borings (designated GST-01 through GST-6; GST-9, GST-11, and GST-13) and three slope of riverbank borings (designated GSM-07, GSM-08, and GSM-14). The riverbank borings were drilled to provide additional information on the horizontal and vertical extents of substantial product and obtain data on soil chemistry and geotechnical characteristics. Substantial product is defined in Section 3.6.2.1 of the SOW.

Sediment Cores: Twenty three sediment cores were collected to define the perimeter of sediment area in the Willamette River containing substantial product and for laboratory analyses for bulk chemistry. The sediment cores were designated DGS-03, DGS-06, DGS-07, DGS-08, DGS-10, DGS-11, DGS-13, DGS-18, DGS-19, DGS-20, DGS-22, DGS-23, DGS-24, DGS-25, DGS-26, DGS-28, DGS-30, DGS-31, DGS-32, DGS-36, DGS-37, DGS-44, and DGS-45.

Surface Sediment Grabs: Twenty surface sediment grab samples (designated DGS-01, DGS-02, DGS-04, DGS-05, DGS-06, DGS-8, DGS-9, DGS-12, DGS-13, DGS-16, DGS-17, DGS-20, DGS-21, DGS-25, DGS-26, DGS-30, DGS-31, DGS-33, DGS-34, and DGS-35) were collected in October 2010 for bulk chemistry analyses and benthic toxicity tests to refine the extent of benthic risk. In addition, three reference sediment samples were collected (designated REF-U2C-2, REF-U4Q-1, and REF-U4Q-2) at RM 15 and 17.

The resampling of the twenty surface sediment grabs that occurred in April 2011 used the same sample designations as used in 2010. Reference sediments were also obtained from three locations previously used for calculating the Portland Harbor Reference Envelope Values.

Section 2

Objectives and Scope of Field Oversight

2.1 Governing Documents

Activities at the Site were conducted by the potentially responsible parties in accordance with the following documents prepared and submitted by Anchor QEA for NW Natural:

- NW Natural, July 2010, *Final Project Area Identification Report and Data Gaps QAPP, Gasco Sediments Cleanup Action*; specifically Appendix A – Final Data Gaps QAPP which includes Attachment 1 – Final Field Sampling Plan, Attachment 2 – Final Anchor QEA Health and Safety Plan, and Attachment 3 – Maul, Foster & Alongi, Inc. Health and Safety Plan.
- NW Natural, September 2010 Gasco Sediments Cleanup Action Field Change Request Form Tables I – III with Scenario and Response columns (copy provided in Appendix D).

2.2 Objectives of Field Oversight

The primary objective of the field oversight was to observe field activities for compliance with the governing documents listed in Section 2.1. Through daily reporting of field observations made by CDM, the EPA Remedial Project Manager (RPM) was informed of the detailed status of the data gaps investigation work. Furthermore, oversight personnel provided the RPM with timely notification of issues that developed during the course of the investigation work, including possible deviations from the governing documents. This information was important because it assisted the RPM in making decisions regarding any necessary changes in the data collection effort.

2.3 Field Investigation Schedule

The TZW and groundwater sampling work of the data gaps project was conducted by MFA from September 13 through 22, 2010. The remainder of the data gaps investigation work was performed by Anchor QEA. Riverbank soil was sampled from September 27 through October 15, 2010. Sediment core collection and processing work began on October 4, 2010, and was conducted concurrently with the riverbank soil sampling through October 11, 2010. Sediment core sampling was followed with sediment surface grab sampling from October 12 through 14, 2010.

2.4 Oversight Personnel

Oversight was conducted by the following CDM personnel:

- Lance Peterson, project manager/field team support
- Scott Coffey, field team lead – Riverbank soil sampling and sediment core processing

- Jennifer Jones, field team lead – TZW and deep groundwater sampling, and sediment core collection
- Matthew Hewitt, field team support – sediment surface grab collection and processing
- Paul Opem, health and safety lead – TZW and deep groundwater sampling, riverbank soil sampling, and sediment core sampling / processing

2.5 Field Documentation

Information and notations were recorded as required in a field logbook in accordance with CDM Standard Operating Procedure 4-1; revision 6 Field Logbook Content and Control. Field documentation consisted of an accounting of activities at the Site, noting any problems or deviations from governing documents described in Section 2.1.

The field team leads maintained the field logbooks and submitted copies of the logbook on a regular basis to the CDM Project Manager for review, use in preparing field reports, and filing in the project files. Field notes are provided in Appendix A.

2.6 Photographic Documentation

Photographs were taken during field oversight in accordance with CDM Standard Operating Procedure 4-2; revision 7 Photographic Documentation of Field Activities. Photo-documentation by the CDM field oversight team included taking photos of field activities (especially where visual contamination was noted), field quality assurance/quality control procedures, health and safety compliance procedures, and any other activities determined necessary. Photographs taken during field oversight are provided by date in Appendix B.

Section 3

Observations

3.1 Summary of Work Performed

On September 10 and 22, 2010, before the mobilization for the MFA and Anchor QEA field activities, a field-planning meeting was conducted by the CDM project manager and attended by the CDM field staff. During the meeting, CDM field staff were provided information about the Site, health and safety issues, the objectives and scope of field activities, governing documents for the field work and required quality control measures, the roles and responsibilities of staff involved, equipment and training needs, communication requirements, and schedule. CDM field staff obtained the required field supplies, including personal protective equipment (PPE), and reviewed health and safety plans (HASPs) to determine health and safety protocols for performing site work. The daily descriptions provided below present a general overview of activities performed during the data gaps fieldwork with a focus on health and safety compliance, compliance with sampling and processing protocols, lithology, and noting field evidence of contamination (sheen, odors, elevated photoionization detector [PID] readings) and whether the evidence of contamination met the criteria for substantial product.

3.1.1 Transition Zone Water and Groundwater Sampling

The following field teams were on site during the Area 1 TZW and groundwater sampling which was performed during the periods September 13-17, 2010, and September 20-22, 2010. CDM field oversight was present with the exception of September 16 and 22.

- MFA, consultant for Siltronic Corporation
- CDM, field oversight
- Cascade Drilling, Inc., driller
- Diversified Marine, barge operator

September 13, 2010

A health and safety meeting was held and led by Cascade Drilling, Inc. personnel to discuss Area 1 TZW and groundwater sampling. Personnel from CDM, MFA, and Diversified Marine also attended the meeting. Items discussed included safety precautions for the drill rig; pinch points; slip, trip, and fall hazards; emergency shut-off; communication procedures; emergency evacuation procedures; PPE use; and automated external defibrillator (AED) location and use. At 10:50 a.m., the barge operator began moving the barge to the sampling location off shore of the Siltronic property. MFA personnel used a global positioning system (GPS) unit to locate the first sampling location: GP-207. The plan was to collect TZW from the location within the first 1 foot below mudline. The drillers lowered a casing to the mudline, which was determined by lowering the casing with an attached disk until it was supported on its own by resting on the mudline. MFA personnel used a YSI meter to measure

parameters of the river water that would be compared to the TZW. Parameters included temperature, dissolved oxygen (DO), pH, conductivity, and oxidation reduction potential (ORP). The drillers then installed a geoprobe water sampler inside the casing, lowering it down until it reached the bottom of the casing, and then lowering it an additional 1 foot into the mudline past the casing. They then used trip rods to expose 1 foot of the geoprobe water sampling screen (of a total screen length of 4 feet). Plastic tubing was then lowered to the depth of the screen and a pump was used to pull water up and run it through the YSI meter to view water parameters. A water sample was obtained from GS-207 after some difficulty measuring conductivity.

September 14, 2010

The CDM health and safety oversight representative was present for oversight. The primary purpose of the visit was to observe and document compliance with the project HASP while Data Gaps project work involving Area 1 transition TZW and groundwater sampling was conducted. The site safety meeting was led by Cascade Drilling and then augmented by Justin Pounds (MFA representative) with MFA's HASP, including work zones, PID use, COCs, storage of first aid kits, and AED location and use.

In general, work performed throughout September 14 involved successful TZW sampling at the following locations in chronological order:

- 8:00 a.m.: GP-206; located 47 feet from water surface to mudline
- 10:10 a.m.: GP-205; located at 50 feet from water surface to mudline
- 12:45 p.m.: GP-200; located at 50 feet from water surface to mudline

September 15, 2010

CDM visited the site to observe the Area 1 TZW and groundwater sampling. All personnel embarked on the tug and were transported to the barge which was docked off shore of the Gasco property. MFA personnel used a GPS unit to locate the GP-30 sampling location. The plan for the day was to collect "deep" groundwater samples at two depths: 25 feet and 50 feet below mudline. After the health and safety meeting, the barge was moved into position at GP-30 and drillers/MFA installed casing, purged, and collected samples at 25 and 50 feet.

The following water parameters were recorded by MFA during purging at 25 feet below mudline:

Table 3-1. Water Parameters Recorded by MFA during Purging at 25 Feet below Mudline at GP-30

Time	Gallons Purged	pH	Temperature (degrees Celsius)	Conductivity (μS/cm)	DO (mg/L)	ORP	Turbidity (NTU)	Fe (mg/L)
10:34 a.m.	1	6.87	18.5	655	0.53	-93.2	319.1	NM
10:50 a.m.	2	6.7	18.55	693	0.46	-98	118.1	NM
11:05 a.m.	3	6.68	18.45	743	0.28	-95.7	65.22	NM
11:22 a.m.	4	6.69	18.64	738	0.29	-93.2	64.33	NM
11:40 a.m.	5	6.68	18.64	727	0.28	-96.7	63.24	4.8

NM=not measured
 μS/cm=microsiemens per centimeter
 mg/L=milligrams per liter
 NTU=nephelometric turbidity units

The following water parameters were recorded by MFA during purging at 50 feet below mudline:

Table 3-2. Water Parameters Recorded by MFA during Purging at 50 Feet below Mudline at GP-30

Time	Gallons Purged	pH	Temperature (degrees Celsius)	Conductivity (μS/cm)	DO (mg/L)	ORP	Turbidity (NTU)	Fe (mg/L)
1:30 p.m.	1	6.76	19.33	671	0.38	-114.3	179.1	NM
1:47 p.m.	2.1	6.74	19.01	701	0.11	-121.2	71.57	NM
2:05 p.m.	3.1	6.75	19.32	715	0.07	-121.9	86.21	NM
2:25 p.m.	4.2	6.76	19.81	730	0.07	-122.1	145.3	NM
3:16 p.m.	6.3	6.73	19.9	741	0.1	-119	127	3.8

NM=not measured
 μS/cm=microsiemens per centimeter
 mg/L=milligrams per liter
 NTU=nephelometric turbidity units

At 3:30 p.m. drillers began removing casing and decontaminated removed geoprobe and casing. At 4:45 p.m. work was complete for the day and the barge was anchored at the GP-30 sampling location overnight.

September 16, 2010

CDM was not present for oversight. MFA collected groundwater samples from 2 feet and 24 feet below mudline at GP-32.

September 17, 2010

After a health and safety meeting, MFA personnel used a GPS unit to locate the GP-203 sampling location. The plan for the day was to collect a TZW sample at 1 foot below mudline at this location, and then move on to a second sampling location. Once the barge was in place at GP-203, the drillers and MFA personnel installed casing, purged, and collected a water sample.

The following water parameters were recorded by MFA during purging at 8 inches below mudline at GP-203:

Table 3-3. Water Parameters Recorded by MFA during Purging at 8 Inches below Mudline at GP-203

Time	Gallons Purged	pH	Temperature (degrees Celsius)	Conductivity (µS/cm)	DO (mg/L)	ORP	Turbidity (NTU)	Fe (mg/L)
11:00 a.m.	1	6.70	19.56	1900	0.51	-73.5	190.4	NM
11:20 a.m.	2	6.92	19.02	2009	0.45	-113.9	82.4	NM
11:35 a.m.	3	6.95	19.11	2023	0.22	-136.2	69.0	NM
11:50 a.m.	3.5	6.96	19.45	2049	0.18	-129.4	15.3	NM

NM=not measured. Fe is not measured in transition zone samples.

µS/cm=microsiemens per centimeter.

mg/L=milligrams per liter.

NTU=nephelometric turbidity units.

After decontaminating the geoprobe, the barge operators moved the barge to GP-61 using a GPS unit. Drillers and MFA personnel installed casing, purged, and collected a water sample.

The following water parameters were recorded by MFA during purging at 5 feet below mudline at GP-61:

Table 3-4. Water Parameters Recorded by MFA during Purging at 5 Feet below Mudline at GP-61

Time	Gallons Purged	pH	Temperature (degrees Celsius)	Conductivity (µS/cm)	DO (mg/L)	ORP	Turbidity (NTU)	Fe (mg/L)
1:43 p.m.	1	6.79	19.53	675	0.35	-97.0	238.0	NM
2:00 p.m.	2	6.76	18.98	671	0.25	-99.5	244.6	NM
2:14 p.m.	3	6.76	19.44	672	0.24	-100.6	233.2	NM
2:36 p.m.	4	6.72	19.35	685	0.18	-100.2	197.1	5.90

NM=not measured

µS/cm=microsiemens per centimeter

mg/L=milligrams per liter

NTU=nephelometric turbidity units

At 3:10 p.m, barge operators lifted the spuds and moved the barge to anchor it off shore of the Siltronic property as was done the night before and all personnel were transported by tugboat back to Cathedral Park.

September 18-19, 2010

Weekend; no work activity.

September 20, 2010

After conducting the daily health and safety meeting, MFA personnel used a GPS unit to locate the barge over the GP-204 sampling location. The MFA representative explained that the plan for the day was to collect a TZW sample at 1 foot below mudline at the three remaining TZW locations (GP-201, GP-202, and GP-204).

Once the barge was in place at GP-204, drillers and MFA personnel installed casing, purged, and collected a sample.

The following water parameters were recorded by MFA during purging at 1 foot below mudline at GP-204:

Table 3-5. Water Parameters Recorded by MFA during Purging at 1 Foot below Mudline at GP-204

Time	Gallons purged	pH	Temperature (degrees Celsius)	Conductivity ($\mu\text{S}/\text{cm}$)	DO (mg/L)	ORP	Turbidity (NTU)	Fe (mg/L)
10:17 a.m.	1.0	6.75	17.89	1715	0.47	-91.4	29.99	NM
10:25 a.m.	2.0	6.79	18.07	1739	0.27	-111.1	19.56	NM
10:35 a.m.	3.0	6.81	18.36	1745	0.23	-117.1	19.98	NM
10:40 a.m.	3.5	6.80	18.40	1744	0.22	-118.1	14.59	NM

NM = not measured. Fe is not measured in transition zone samples.

$\mu\text{S}/\text{cm}$ =microsiemens per centimeter

mg/L=milligrams per liter

NTU=nephelometric turbidity units

At 11:00 a.m. the drillers pulled up the geoprobe and casing and decontaminated the equipment. The barge operators then moved the barge over the GP-202 location using the GPS unit. Drillers and MFA personnel then installed casing, purged, and collected samples.

The following water parameters were recorded by MFA during purging at 1 foot below mudline at GP-202:

Table 3-6. Water Parameters Recorded by MFA during Purging at 1 Foot below Mudline at GP-202

Time	Gallons purged	pH	Temperature (degrees Celsius)	Conductivity (μS/cm)	DO (mg/L)	ORP	Turbidity (NTU)	Fe (mg/L)
12:30 p.m.	1.0	6.71	18.98	1757	1.22	-95.7	62.65	NM
12:46 p.m.	2.0	6.70	19.21	1794	0.54	-99.7	52.86	NM
1:00 p.m.	3.0	6.70	19.06	1821	0.37	-98.5	37.95	NM
1:15 p.m.	4.0	6.71	19.16	1824	0.26	-104.2	31.16	NM

NM = not measured. Fe is not measured in transition zone samples.

μS/cm=microsiemens per centimeter

mg/L=milligrams per liter

NTU=nephelometric turbidity units

At 2:20 p.m., the CDM representative left the site, but later confirmed with MFA that GP-201 was also successfully sampled.

September 21, 2010

After conducting a safety meeting for all personnel, the barge was relocated to the area of GP-65. The MFA representative stated that the plan for the day was to mobilize to the GP-65 site to take two groundwater samples, one at a depth of 1 foot below mudline and another at 3 feet below mudline. The barge will then be repositioned to GP-38 to collect one groundwater sample at 1 foot below mudline.

At 8:55 a.m. drillers and MFA personnel installed casing, purged, and collected samples at GP-65. The recorded parameters during the purging of GP-65 at 1 foot below mudline were as follows:

Table 3-7. Water Parameters Recorded by MFA during Purging at 1 Foot below Mudline at GP-65

Time	Purge volume (gal)	pH	Temp (Celsius)	Conductivity (μS/cm)	DO (mg/L)	ORP	Turbidity (NTU)
9:52 a.m.	1.0	7.01	18.00	724	0.39	-100.8	140.4
10:04 a.m.	2.0	7.02	17.98	719	0.38	-118.4	18.38
10:16 a.m.	3.0	6.99	18.20	721	0.20	-122.4	14.01
10:30 a.m.	4.0	7.06	18.34	721	0.16	-124.3	14.41

gal=gallons

μS/cm=microsiemens per centimeter

mg/L=milligrams per liter

NTU=nephelometric turbidity units

Water quality data taken during the purging of GP-65 at 3.7 feet below the mudline were as follows:

Table 3-8. Water Quality Data during Purging at 3.7 Feet below Mudline at GP-65

Time	Purge volume (gal)	pH	Temp (Celsius)	Conductivity (μS/cm)	DO (mg/L)	ORP	Turbidity (NTU)
1:30 p.m.	1.0	6.91	18.93	651	0.49	-85	120.3
1:45 p.m.	2.0	6.92	18.82	664	0.18	-110.4	67.92
2:00 p.m.	3.0	6.88	19.01	670	0.16	-118.5	52.34
2:15 p.m.	4.0	7.00	19.27	675	0.13	-119.9	50.54

gal=gallons

μS/cm=microsiemens per centimeter

mg/L=milligrams per liter

NTU=nephelometric turbidity units

The barge was mobilized downstream to GP-38 using the GPS unit and at 3:58 p.m. the drillers and MFA personnel installed casing, purged, and collected samples at GP-38. The following parameters were recorded while purging GP-38 at 1 foot below mudline:

Table 3-9. Water Parameters Recorded by MFA during Purging at 1 Foot below Mudline at GP-38

Time	Purge volume (gal)	pH	Temp (Celsius)	Specific cond. (μS/cm)	DO (mg/L)	ORP	Turbidity (NTU)
5:20 p.m.	1.0	6.99	17.88	576	0.72	-51.9	13.09
5:33 p.m.	2.0	7.06	18.23	593	0.28	-88.5	6.19
5:46 p.m.	3.0	7.05	18.18	587	0.18	-96.5	6.46
6:00 p.m.	4.0	7.02	18.11	585	0.17	-100.2	5.96

gal=gallons

μS/cm=microsiemens per centimeter

mg/L=milligrams per liter

NTU=nephelometric turbidity units

At 6:30 p.m., the CDM representative left the site and later confirmed with MFA that the TZW sample location GP-201 started Monday afternoon September 20 was completed the same day.

September 22, 2010

CDM was not present for field oversight, but confirmed that GP-207 was sited approximately 3.5 feet from the initial location and successfully re-sampled on September 22.

3.1.2 Riverbank Soil Sampling

Riverbank soil sampling work required 3 weeks to complete. The following field teams were on site during the reported periods – September 27-28, October 1, 4-8, 11-12, and 15, 2010.

- Anchor QEA, NW Natural consultant
- CDM, field oversight
- Cascade Drilling, Inc., driller for top-of-riverbank borings
- Stratus Corporation, driller for mid-slope riverbank borings

CDM health and safety lead, field team lead, and field team support staff visited the site to conduct drilling oversight on all of the days noted above with the exception of September 28, 2010.

September 27, 2010

The anticipated scope for the day was to drill two slope of riverbank boring locations: GSM-07 and GSM-08. Environmental chemistry data were to be obtained from the upper 5 feet and lower 5 feet of the borings.

After a kick-off meeting that included a thorough health and safety discussion, drillers and Anchor QEA personnel started drilling operations at GSM-07. The geologic log for GSM-07 follows:

0 to 8.3 feet:	Dark brown moist, gravelly silt, low plasticity site, trace plant debris, fine to coarse angular gravel becomes saturated somewhere between 5 and 7.5 feet
8.3 to 11.5 feet:	Dark grey to black, wet, low plasticity silt, fine sand, spotty sheen from 8.3 to 8.5 feet, sand layer 8.7 to 8.9 feet
11.5 to 15 feet:	no recovery
15 to 17.6 feet:	Black, loose, wet, fine-grained sand, poorly graded, strong hydrocarbon (HC)-like odor, spotty sheen, lampblack from 16.3 to 16.5 feet
17.6 to 20 feet:	Black, very soft, wet, silt, highly plastic, chunks of lampblack throughout, sheen, oily from 19.0 to 19.2 feet (sand layer)

Volatile organic compound (VOC) headspace readings from soil samples using PID ranged from 0 to 0.2 parts per million (ppm); all readings for hydrogen cyanide were 0 ppm.

The driller set up to grout GSM-07 and the activities for the day were terminated at approximately 7:00 p.m. Based on a conversation with the Anchor QEA staff it was determined that observations of nonaqueous phase liquid (black oil) in the 10-to-15-foot core constituted substantial product.

September 28, 2010

CDM was not on site, but obtained the following information from Anchor QEA.

Grouting of boring GSM-07 was completed in the morning and drilling/sampling proceeded at GSM-08. Boring GSM-08 reached the target depth of 15 feet below ground surface (bgs). Chemistry cores were obtained from the upper and lower 5 feet. Standard penetration test samplers were driven at 0 and 10 feet to obtain blow counts; a Shelby tube sample was obtained at 7.5 to 10 feet bgs. Soils in GSM-08 were generally silty with some sand and rocks; the boring became sandy near the bottom. Substantial product was deemed to be present from 10 to 11 feet (consisted primarily of product droplets). Extra sample was obtained from the "discrete zone of product" (10 to 11 feet bgs interval) per field change request (FCR) #1. PID headspaces in soil ranged from 0 to 5 ppm with the highest number recorded in the 10-12 feet bgs depth interval. No hydrogen cyanide (HCN) was detected in the headspace samples. Grouting of boring GSM-08 was completed with organoclay/bentonite grout slurry placed from the boring bottom (15 feet bgs to 5 feet bgs); the upper 5 feet were filled with granular bentonite.

No health and safety issues were reported; all breathing zone monitoring was 0 ppm on the flame ionization detector. The AED was present at the work site.

September 29-30, 2010

No drilling work was conducted on site. The direct push contractor (Stratus Corporation) decontaminated drilling tools on Wednesday, September 29, 2010, and mobilized off site.

October 1, 2010

After a morning kick-off/safety meeting at the Anchor QEA job trailer, the drilling subcontractor drilled and sampled at the top-of-riverbank GST-01 location. At 1:00 p.m. drilling was initiated at GST-01. After drilling and sampling for 2 hours, a hydraulic system leak occurred on the drill rig, which stopped drilling activity for the day.

The geologic log obtained for GST-01 to 15 feet follows:

0 to 4.5 feet:	Dark brown, gravelly silt and sand; medium gravel
4.5 to 5 feet:	Gray silty gravel, medium-large with some 4-inch rock spalls
5 to 5.9 feet:	Black, loose, dry sandy gravel, sooty lampblack
5.9 to 6.7 feet:	Yellowish brown, loose, dry fine-medium poorly graded sand
6.7 to 10.9 feet:	Yellow brown, with bands of blue-green gravelly, sandy silt, low plasticity, fine sand, angular coarse gravel, thin bluish laminations (6.7 to 7.0 feet).

- 10.9 to 13.6 feet: Light brown with gray and rust brown patches, slightly cohesive, slightly moist, medium dense sand with silt; fine-grained, poorly graded
- 13.6 to 15 feet: Dark gray, fine sand, moist

Drilling and sampling at GST-01 was planned to resume at 15 feet bgs Monday, October 4, 2010, after drill rig repairs were made.

October 2-3, 2010

Weekend; no work activity.

October 4, 2010

After a health and safety meeting, the drill rig had been modified to eliminate hydraulic leaks that were occurring on Friday, October 1, 2010, and drilling and sampling resumed at 15 feet bgs. Information from Anchor QEA's geologic log for the 15 to 20 feet, 20 to 25 feet and 25 to 30 feet core samples is as follows:

- 15.1 to 16.3 feet: Black dense, fine-grained, poorly sorted sand, hydrogen sulfide-like odor, moist at 16 feet, mottled black and dark gray (alluvium contact at 15.1 feet bgs)
- 16.3 to 17.0 feet: Dark gray, firm, low plasticity, sandy silt, trace rootlets, slight hydrogen sulfide-like odor, fine sand, moist (alluvium)
- 17.0 to 20.0 feet: Black, wet loose sand with silt, fine-grained, hydrogen sulfide odor (alluvium)
- 20.0 to 22.5 feet: No recovery
- 22.5 to 23.4 feet: Dark gray silt with oxidized mottling, soft, moist, moderately plastic, with fine sand (alluvium)
- 23.4 to 23.5 feet: Sand layer (alluvium)
- 23.5 to 26.1 feet: Dark gray silt with oxidized mottling, soft, moist, moderately plastic, with fine sand (alluvium)
- 26.1 to 26.4 feet: Sand layer (alluvium)
- 26.7 to 29.5 feet: Gray silty sand, fine - medium, loose, wet (alluvium)
- 29.5 to 30.0 feet: Dark grayish brown, very soft, wet, silt, low plasticity, with fine sand (alluvium)

At 11:00 a.m. drillers had abandoned GST-01 borehole and moved to the GST-02 location. At 1:00 p.m., drilling and sampling proceeded at GST-02. Sonic core samples were obtained at 5-foot intervals to 30-foot total depth. Chemistry samples were obtained in the 0-to-5-foot and 25-to-30-foot cores. A Shelby tube sample was attempted from 11.5 to 14 feet and was aborted because of refusal as a result of cobbles. The fill and alluvium contact was estimated at 25.2 feet and total boring depth of 30 feet was reached at 4:05 p.m. The geologic log for GST-02 follows:

- 0 to 17 feet: Dark brown, dry, stiff gravelly silt, coarse to cobble size gravel, low plasticity silt, subrounded to round, some brick material (fill)
- 17 to 21 feet: 100 percent lampblack material, dry, brittle, friable

21 to 21.3 feet:	Granular yellow-brown gravel
21.3 to 22 feet:	Dark purplish-red bricklike material
22 to 23 feet:	Dark gray sand layer, fine to medium sand
23 to 25.2 feet:	Dark gray-brown wood chips, loose (fill)
25.2 to 28.2 feet:	Dark gray-brown sandy silt, wet, trace oxidation, mottling, fine sand, slightly cohesive, soft, intermittent thin sand layers (alluvium)
28.2 to 30 feet:	Dark gray-brown silty sand, wet, loose, slightly cohesive, fine sand

No substantial product was observed in GST-02 and at 4:15 p.m. the drillers abandoned the 30-foot borehole.

October 5, 2010

After a health and safety meeting, drilling and sampling proceeded at GST-03. No PID levels were recorded above background levels in the breathing zone. HCN readings ranged from 0 to 8ppm in the headspace samples with 8 ppm recorded in the 20- to 22.5-foot interval. VOC headspace readings ranged from 0.1 to 5.5 ppm with 5.5 ppm recorded in the 20-22.5-foot interval and no substantial product was noted in GST-03. The geologic log for GST-03 follows:

0 to 3.4 feet:	Brown, dry, loose silt with gravel, non-plastic silt, coarse angular gravel with many roots/rootlets (fill)
3.4 to 23.9 feet:	Black, loose, dry crumbly, friable lampblack with gravel and rubble, trace brick, concrete debris, fine to cobble-size gravel; lampblack comprises 60 percent of sample (fill)
23.9 to 25.0 feet:	Black stained wood chips, heavily weathered with fine to medium sand (fill)
24.5 to 25.0 feet:	Thin layer of green sand
25.0 feet:	(Contact between fill and alluvium)
25.0 to 30.0 feet:	Dark grayish-brown silt, soft, moist, moderate plasticity, trace rootlets, slight HC-like odor (alluvium)

At 2:00 p.m. the GST-03 boring was backfilled, equipment was decontaminated, and the drillers moved to GST-05. Drilling and sampling proceeded at GST-05 to a depth of 10 feet. Based on a review of core samples collected from 0 to 5 feet, and 5 to 10 feet, no contamination qualifying as substantial product was present.

October 6, 2010

After a site health and safety meeting, drilling and sampling resumed at GST-05. A Shelby tube sample from 10-12.5 feet was unsuccessful. No PID levels were recorded above background levels in the breathing zone. HCN readings ranged from 0 to 1ppm (background levels) in the headspace samples. VOC headspace readings ranged from 0.1 to 0.3 ppm with 0.3 ppm recorded in the 2.5-to-5-foot and 5-to-7.5-foot intervals. No substantial product was noted in GST-05. The geologic log for GST-05 follows:

0 to 1.1 feet:	Dark gray, loose, dry, poorly graded angular coarse gravel (fill)
1.1 to 7.8 feet:	Dark brown-gray, dry, low plasticity, gravelly silt, stiff, coarse to cobble-size, angular to rounded gravel (fill)
7.8 to 14.9 feet:	Gray-brown, dark, moist, moderate plasticity gravelly silt, fine to coarse gravel, trace red brick pieces (fill)
14.9 to 15.8 feet:	Dark gray, loose, wet, fine- to medium-grained sand, fine gravel, trace silt, slight HC-like odor (alluvium)
15.8 to 20.0 feet:	Dark gray-brown silt, soft, wet, high plasticity with thin intermittent fine sand layers, slight HC-like odor (alluvium)

At 11:15 a.m. drilling and sampling began at GST-04. HCN/VOC headspace readings from GST-04 ranged as follows: HCN: 0 to 29 ppm with 29 ppm recorded in the 20-to-21-foot sample; VOC: 0.0 to 11.6 ppm with 11.6 recorded in the 15-to-17.5-foot interval. The geologic log for GST-04 follows:

0 to 18.5 feet:	Dark brown, dry, stiff, low plasticity gravelly silt; fine-cobble gravel, angular to subrounded, trace brick pieces and black lampblack-like material (fill)
18.5 to 20.0 feet:	Dark gray to black, loose, dry, silty sand, moderate HC-like odor, powdered yellow brick-like material at 19.5 feet (fill)
20.0 to 25.0 feet:	Dark gray, dry, loose, fine- to medium-grained poorly graded sand with trace wood pieces (anthropogenic) (fill)
25.0 to 30.0 feet:	Dark gray-brown, very soft, wet, highly plastic silt, trace fine sand, many rootlets (alluvium)

The total boring depth at GST-04 was 30.0 feet, no HCN or VOC levels exceeding background in the breathing zones at any time and no substantial product was observed. At 3:00 p.m. the backfill of GST-04 was complete and for the rest of the work day the drillers decontaminated equipment and mobilized to a staging area near GST-06.

October 7, 2010

After the drilling crew and Anchor QEA staff each led a separate discussion on health and safety following each of their health and safety plans drilling and sampling preceded at GST-06.

Sonic core samples were collected at 5-foot intervals starting from the surface to total boring depth of 30 feet. A Shelby tube sample from 12 to 14.5 feet pushed into the entire interval; however, a large brick at the bottom of the tube blocked 80 percent of the tube, so only 0.5 feet of sample were recovered. PID levels ranged from 0.0 to 0.4 ppm for VOCs in the breathing zone; the highest breathing zone readings occurred after substantial product was encountered at the bottom of the boring from 25 to 30 feet. GST-06 appeared to meet substantial product criteria between 18 to 20 feet and 22.1 to 30.0 feet. The geologic log for GST-06 follows:

0 to 10 feet:	Dark brown, stiff, dry, low plasticity, gravelly silt, coarse to cobble-size gravel, concrete chunks at 1.5 to 2.5 feet, trace red brick pieces and woodchips (fill)
10.0 to 22.1 feet:	Stiff, moist, gravelly silt, slight plasticity silt, fine-coarse gravel, trace red brick pieces (fill)
22.1 to 25.4 feet:	Dark, gray-brown to black, medium dense, moist, silty sand, non-plastic silt, fine sand, abundant wood pieces, light sheen on sample at 23 feet, HC-like odor (fill)
25.4 to 25.8 feet:	Black, stiff, moist, highly plastic silt, strong HC odor (fill)
25.8 to 26.7 feet:	Black, fine to medium sand with silt, blebs of saturated oil (fill)
26.7 to 27.5 feet:	Silt layer oily (fill)
27.5 to 27.9 feet:	Lampblack block
27.9 to 29.3 feet:	Black oily sand and silt (fill), heavy HC-like odor
29.3 to 30.0 feet:	Dark gray brown with black petroleum banding, highly plastic, soft, moist silt, strong HC-like odor (alluvium)

At 1:30 p.m. GST-06 was backfilled and drillers decontaminated drilling equipment and mobilized to GST-09.

October 8, 2010

After the drilling crew and Anchor QEA staff each led a separate discussion on health and safety following their health and safety plans, drilling and sampling began at GST-09. From 8:00 to 11:55 a.m. sonic core samples were collected at 5-foot intervals starting from the surface to total boring depth of 30 feet bgs. A Shelby tube sample from 20.0 to 22.5 feet bgs pushed into the entire interval and successfully recovered 100 percent. Breathing zone PID levels were 0 ppm for HCN and ranged from 0.0 to 0.3 ppm for VOCs in the breathing zone; the highest breathing zone readings (0.3 ppm) occurred where substantial product was encountered in the middle of the boring from 15 to 25 feet bgs. The geologic log for GST-09 follows:

0 to 15.4 feet:	Dark brown, stiff, dry, crumbly, gravelly silt, non plastic, fine to cobble-size gravel, roots at surface, trace brick and concrete pieces (fill)
15.4 to 18.0 feet:	Black, loose, fine to medium, poorly graded sand, sticky, strong HC-like odor, semi-solid product throughout, oily (fill)
18.0 to 19.0 feet:	Lampblack and wood chips (fill)
19.0 - 20.0 feet:	Dark olive gray, moist, moderately plastic, soft silt with sand, fine- to medium-grained, moderate HC-like odor (alluvium)
20.0 to 21.5 feet:	Dark gray-brown, oxidized, very soft, wet, poorly graded fine sand, slight HC-odor (alluvium)
21.5 to 30.0 feet:	Dark gray oxidized, very soft, wet, low plasticity sandy silt with intermittent thin sand layers, soupy, slight HC odor (alluvium)

At 1:00 p.m. GST-09 was backfilled and drillers decontaminate equipment and mobilized off site.

October 9-10, 2010

Weekend; no riverbank soil sampling activity.

October 11, 2010

After a health and safety meeting, drilling and sampling proceeded at GST-11 on the Siltronic property at the top of the river bank. From 9:30 a.m. to 3:40 p.m. hand auger and sonic core samples were collected at 5-foot intervals starting from the surface to total boring depth of 45 feet. Breathing zone PID levels remained at background levels throughout the drilling and sampling period. GST-11 did not show any visible sign of contamination. Some intervals (as noted in the log below) had an HC-like odor. The geologic log for GST-11 follows:

0 to 21.5 feet:	Dark brown, dry, very loose, well-graded medium to coarse sand, trace fine gravel (fill)
21.5 to 27.1 feet:	Black, medium dense, wet, silty sand with gravel, fine to medium sand, fine to coarse gravel, low plasticity silt, slight HC-like odor, trace wood pieces, metal, broken glass (fill)
27.1 to 30.8 feet:	Dark brown-gray, loose, wet, well-graded, fine to coarse sand with gravel, well-rounded fine to coarse gravel (fill)
30.8 to 33.5 feet:	Dark brown-gray with rust-colored mottling, firm, wet, low plasticity sandy silt, trace HC-like odor (alluvium)
33.5 to 35.7 feet:	Brown, loose, very wet, fine-grained, poorly graded sand with silt, no odor (alluvium)
35.7 to 43.3 feet:	Dark gray loose, wet, poorly graded fine-grained sand with silt (alluvium)
43.3 - 44.5 feet:	Dark gray-brown, moist, firm, highly plastic silt, trace fine sand (alluvium)
44.5 - 45 feet:	Dark brown-gray, wet, loose, poorly graded fine sand with silt (alluvium)

At 4:45 p.m. GST-11 was backfilled and drillers secured the drill rig/support equipment and left Siltronic property.

October 12, 2010

After Cascade drilling crew and Anchor QEA checked into the Siltronics facility and conducted their health and safety meeting, drilling and sampling proceeded at GST-13. From 9:00 a.m. to 2:30 p.m. hand auger and sonic core samples were collected at 5-foot intervals starting from the surface to total boring depth of 45 feet bgs. Breathing zone PID levels remained at background levels throughout the drilling and sampling period. GST-13 did not show any visible sign of contamination. One interval (as noted in the log below) had an HC-like odor. The geologic log for GST-13 follows:

0.0 to 1.9 feet:	Brown, dry, loose, silt with organic material, many roots/rootlets, low plasticity (topsoil/fill)
1.9 to 25.3 feet:	Dark brown, loose, well-graded sand with gravel, trace rootlets (fill)
25.3 to 30.1 feet:	Dark gray, wet, loose, well-graded, medium to coarse sand, slight HC-like odor, trace gravel (fill)

30.1 to 36.5 feet:	Dark gray, oxidized, wet, firm moderate to high plasticity, silt, trace fine sand (alluvium)
33.5 to 35.7 feet:	Brown, loose, very wet, fine-grained, poorly graded sand with silt, no odor (alluvium)
35.7 to 40.0 feet:	Dark gray-brown, wet, firm, moderate to high plasticity, sandy silt, with fine sand layers (alluvium)
40.0 to 45.0 feet:	Gray-brown silt with intermittent sand layers, wet, high plasticity (alluvium)

At 4:45 p.m. GST-13 was backfilled and the drillers secured the drill rig/support equipment and departed the Siltronic property.

October 13-14, 2010

Weekend; no riverbank soil sampling activity.

October 15, 2010

After the Anchor QEA crew conducted a health and safety review, work personnel board the landing craft and mobilized to the mid-bank site of GSM-14, located along the shore of the Siltronic property approximately 200 feet north of GST-13. Rip-rap along the bank was carefully removed with the excavator to make room for the geoprobe drill rig and safety zones were established. Drilling and sampling proceeded at GSM-14 at 10:45 a.m. From 10:45 a.m. to 1:20 p.m. geoprobe core samples were collected at 5-foot intervals starting from the surface to total boring depth of 17.5 feet. Breathing zone PID levels remained at background levels throughout the drilling and sampling period. GSM-14 did not show any visible sign of contamination. The geologic log for GSM-14 follows:

0.0 to 1.4 feet:	Dark brown, loose, wet, silty sandy gravel, fine-cobble size, angular gravel, fine to coarse sand (fill)
1.4 to 2.6 feet:	Rock - rip-rap (fill)
2.6 to 6.7 feet	Dark brown, wet, loose, medium to coarse, well-graded sand, trace silt (fill)
6.7 to 13.8 feet:	Dark grayish brown, wet, firm, highly plastic silt with sand, fine sand (alluvium)
13.8 to 17.0 feet:	Dark gray silty sand with intermittent layers of silt (alluvium)
17.0 to 17.5 feet:	Dark gray-brown silt, firm, wet, high plasticity silt (alluvium)

At 2:00 p.m. GSM-14 was backfilled and drillers secured the drill rig/support equipment onto landing craft and mobilized back to Cathedral Park.

Table 3-10 summarizes riverbank boring descriptions and if there were intervals where substantial product was noted.

Table 3-10. Riverbank Boring Details

Riverbank Soil Boring Details			
Boring	Date Drilled	Total Depth (feet)	Intervals that Appear to Meet Substantial Product Criteria
GSM-07	9-27-2010	20	Yes
GSM-08	9-28-2010	15	Yes
GST-01	10-1-2010/10-4-2010	30	No
GST-02	10-4-2010	30	No
GST-03	10-5-2010	30	No
GST-04	10-6-2010	30	No
GST-05	10-5-2010/10-6-2010	20	No
GST-06	10-7-2010	30	Yes
GST-09	10-8-2010	30	Yes
GST-11	10-11-2010	45	No
GST-13	10-12-2010	45	No
GSM-14	10-15-2010	17.5	No

3.1.3 Sediment Cores

Sediment core collection and processing work took approximately 8 days to complete. The following field teams were on site during the month of October to conduct this work.

- Anchor QEA, NW Natural consultant
- CDM, field oversight
- Marine Sampling Services, boat operation and sampling

CDM's field team leads monitored the offshore core collection and onshore core processing on October 4 through 9, 2010, and October 11 through 12, 2010, to conduct oversight on the core sampling and processing.

3.1.3.1 Sediment Core Collection

October 4, 2010

CDM was present for oversight from 12:50 p.m. to 5:05 p.m. on Monday, October 4, 2010. After a health and safety meeting, the work crew boarded the sampling boat and its operator moved to sampling location DGS-30. The boat operator used an onboard GPS to locate the boat at the appropriate coordinates for DGS-30. The GPS unit is attached to the top center of the A-frame sampling structure, so when the sample is collected, another GPS reading is collected to get as close as possible to the actual sampling location. The vibracore sample was collected, brought back to the dock, and examined. Only 9.5 feet of sediment were recovered with the 20-foot push (47.5 percent recovery). According to the field sampling plan, 75 percent recovery was

needed. It was decided that they would attempt to collect another sample at the same location. Anchor personnel and boat operators began loading a new vibracore tube on the sampling unit.

At 4:15 p.m., the CDM field team lead phoned Lance Peterson, CDM project manager, to inform him that there was no AED on board. Mr. Peterson stated that this meant work had to stop until an AED was procured. Mr. Peterson informed Mr. Gillingham of Anchor QEA of this over the phone. Mr. Gillingham left the boat to discuss with Anchor QEA staff at the Gasco site. At 4:40 p.m., Mr. Gillingham returned to the boat and informed personnel that they would not be able to procure an AED today, so work would stop.

October 5, 2010

After a thorough health and safety meeting and confirmation that an AED was on board the sampling vessel, sampling personnel, and the CDM representative boarded the boat. The plan for the day was to collect sediment cores at 20 feet below mudline at as many of the planned locations as possible. The offshore crew collected cores at DGS-13, DGS-30, DGS-03, and DGS-11.

October 6, 2010

CDM oversight of the sediment coring activities on Wednesday October 6, 2010, consisted of inspection of sediment cores at the core processing station and a health and safety oversight visit on the coring vessel. The offshore crew collected cores at DGS-8 and DGS-19.

October 7, 2010

No CDM personnel were on the sampling vessel on October 7, but observation of the core processing on shore occurred.

October 8-9, 2010

CDM was present for oversight from 12:50 p.m. to 4:50 p.m. on Friday, October 8, 2010. The purpose of the Friday oversight visit was to observe sediment core sampling and processing. The offshore crew collected cores at DGS-23, DGS-18, and DGS-44. The offshore crew also collected sediment cores DGS-26, DGS-37, DGS-31, and DGS-32 on Saturday, October 9, 2010; CDM was not present at the Gasco site on Saturday.

3.1.3.2 Sediment Core Processing

October 5, 2010

In the afternoon on Tuesday, October 5, 2010, the sediment processing core crew conducted an additional/separate kick-off meeting to discuss the scope of sediment core sample collection for laboratory analysis, logging procedures, and health and safety issues – including exclusion zone protocols, potential trip hazards, and hearing hazards during saw cutting.

Cores processed on Tuesday were DGS-13 and DGS-03. A petroleum odor was noted in the 0-12-foot interval of DGS-03; however, there was no visible sign of substantial

product in either DGS-13 or DGS-03, which eliminated contingency sediment core samples (DGS-02, DGS-12, and DGS-14) per the field sampling plan.

October 6, 2010

At 10:00 a.m., the sediment core processing crew had just opened the DGS-30 core; 13.9 feet of recovery (72 percent) on third attempt sample. In general the top 0.5 feet of the core consisted of silt with wood fibers and below 0.5 feet to bottom of the core was generally dark gray medium sand with trace silt. There was no evidence of substantial product. PID readings (VOC) along the entire core were 0.0 ppm. This eliminated the need for contingency cores DGS-29 and DGS-33.

For the DGS-11 core, 17.8 feet were recovered with the first attempt (89 percent), generally dark gray silty sand, sand, and silt layers to 8.5 feet; medium sand below 8.5 feet; and substantial product was noted in the upper 8.5 feet within the sand layers.

At 3:45 p.m. the sediment core processing crew began processing DGS-19. They recovered 14.7 feet (73 percent), PID in the breathing zone along the entire core was 0.0 ppm. DGS-19 had saturated product within the sand layers meeting substantial product criteria in the following intervals:

- | | |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 0 to 1 foot | High sheen, oily wet, oozing product, strong naphthalene (appears to meet substantial product criteria) |
| 2 to 3.2 feet | Dark gray silt with product-stained sand lenses greater than 2 inches (appears to meet substantial product criteria) |
| 4.6 to 8.2 feet | Gray medium sand, some small (dime- to penny-size sheen spots, saturated product areas (possible substantial product) |
| 9.7 to 11 feet | Gray medium sand, some small (dime-size sheen spots) with a band of product from 3 to 4 inches thick (appears to meet substantial product criteria) |

Below 11feet bgs there was no visual sign of product.

October 7, 2010

At 9:30 a.m. sediment crew processed DGS-08. This core was from the third attempt and had only 9.3 feet of recovered core sample (46 percent). Evidence that appeared to meet substantial product in the core was found between 4.4 to 4.6 feet where a 2-inch layer of saturated product within brown medium sand had pooled above a brown silt layer. The rest of the core above and below this interval showed no evidence of contamination (odor, sheen, or product).

At 10:30 a.m. sediment crew processed DGS-28. This core was from the third attempt and had only 9.3 feet of recovered core sample (46 percent). There was no evidence of contamination in the core and it generally consisted of dark brown medium sand with silt.

At 11:43 a.m. sediment crew processed DGS-25. This core was from the third attempt and had only 14.5 feet of recovered core sample (73 percent). There was no evidence of contamination in the core and it generally consisted of brown silt to, brown sand.

At 2:05 p.m. sediment crew processed DGS-10. This core was from the third attempt and had 12.5 feet of recovered core sample (63 percent). There was some scattered sheen (dime-size spots) in the upper 2 feet of core that did not appear to meet substantial product criteria; below 2 feet to 12.5 feet, the core consisted of medium sand with no evidence of contamination.

At 3:40 p.m. sediment crew processed DGS-06. This sample was from a second attempt and had 16.6 feet of recovered core sample (83 percent). There was no visible sheen or product along the entire core, which generally consisted of dark brown-olive silt layers with medium sand. There was a slight HC-like odor at the top of the core.

October 8, 2010

Cores processed on Friday, October 8, 2010, were DGS-20 (at 9:55 a.m.), DGS-23 (at 12:05 p.m.), and DGS-18 (at 4:00 p.m.). General lithologies encountered in the cores are as follows:

- DGS-20: Dark brown medium sand with some silt, silt layer from 1.8 to 2 feet
- DGS-23: Brown medium sand with silt, slight HC-like odor in upper 1 foot
- DGS-18: Dark gray brown medium sand with silt; 0- to 4.5-foot interval appears to meet substantial product criteria.

October 10, 2010

No sediment core sampling/processing activity

October 11, 2010

Cores processed on Monday, October 11, 2010, were DGS-44 (at 8:30 a.m.), DGS-37 (at 10:20 a.m.), DGS-26 (at 1:00 p.m.), and DGS-31 (at 4:20 p.m.). A summary of recovery percentage and whether or not intervals in the cores met substantial product criteria are summarized below. DGS-32 was processed at the end of the day on Monday and the results for this core were to be presented in the field summary report for Tuesday October 12th.

- DGS - 44: Dark gray medium-grained sand with trace silt; no visible sign of contamination.
- DGS - 37: Dark gray silt with some fine sand, areas of black bands with wood fragments; bands are ¼- to 1-inch wide.
- DGS - 26: Dark gray medium sand with some silt; product staining/sheen-iridescence from 1 to 4.8 feet - appears to meet substantial product criteria; no visible sign of contamination below 4.8 feet.
- DGS - 31: Dark gray medium sand; 0 to 1.3 feet HC odor and sheen, 1.3 to 1.9 feet saturated medium sand, nonaqueous phase liquid - appears to meet substantial product criteria; no visible sign of contamination below 1.9 feet.

Anchor QEA completed the sediment core scope of work on Monday, October 11. The sampling vessel was converted to Van Veen Grab collection Tuesday morning, October 12 to start the grab sampling scope of work.

October 12, 2010

Cores processed on Tuesday, October 12, 2010, were DGS-45 (at 9:15 a.m.), DGS-24 (at 11:00 a.m.), DGS-36 (at 12:00 p.m.), DGS-22 (at 2:30 p.m.), and DGS-07 (at 4:05 p.m.).

- DGS - 32: Dark gray sandy silt with small wood chunks to 6.5 feet; appears to meet substantial product criteria at the 3.3- to 3.7-foot interval, areas above 3.3 feet have light-to-moderate sheen, but they are layered and less than 2 inches thick. Another interval, at 10.4 to 10.6 feet, has a moderate sheen and HC odor, but does not meet substantial product criteria.
- DGS - 44: Brown medium sand with some silt; no visible sign of contamination along entire core.
- DGS - 24: Brown sandy silt with wood sand layers; bands of sand saturated with product from 6.7 to 7.6 feet, 7.8 to 9.4 feet, and 10.0 to 10.7 feet – these intervals appear to meet substantial product criteria.
- DGS - 36: Dark gray silt with very small less than 2-inch seams of sheen with wood in sand layers at 2.4 feet and 6 to 6.7 feet – does not appear to meet substantial product criteria.
- DGS - 22: Dark brown silt with a single band at 1.9- to 2.1-foot interval that appears to meet substantial product criteria; no visible sign of substantial product below 2.1 feet except for small thin layers less than 1 inch of sheen.
- DGS-07: Dark olive brown silt with fine sand; several bands of black stained, product-laden intervals of sheen and oily staining – 2.2 to 2.7 feet, 3.0 to 3.7 feet, 3.8 to 4.2 feet, 4.8 to 5.3 feet, 5.6 to 6.3 feet, 6.5 to 6.6 feet, 7 to 7.2 feet, 7.9 to 8.0 feet, 8.3 to 8.5 feet, 8.7 to 9.1 feet, 9.7 to 10.0 feet, 10.5 to 10.9 feet, 11.6 to 11.8 feet, and 12.7 to 13.2 feet. These intervals appear to meet substantial product criteria.

Table 3-11 summarizes sample core descriptions, recovery percentages, and if there were intervals where substantial product was noted.

Table 3-11. Sediment Core Details

Sediment Core Processing Details				
Sediment Core	Recovery Reported by Collection Crew	Percent Recovery	Total Length of Core to Process	Intervals that Appear to Meet Substantial Product Criteria
DGS-13	17.5	88	16.9	No
DGS-11	17.7	89	17.1	Yes
DGS-19	15.5	78	14.9	Yes
DGS-03	15.4	77	14.8	No
DGS-30	14.1	71	13.5	No
DGS-08	9.8	49	9.2	Yes
DGS-28	9.3	47	8.7	No
DGS-25	15.3	77	14.5	No
DGS-10	13.4	67	12.5	No
DGS-06	17	85	16.4	No
DGS-20	14.5	73	13.9	No
DGS-23	15.2	76	14.6	No
DGS-18	10	50	9.6	Yes
DGS-44	9.7	49	9.1	No
DGS-37	19.5	98	19	No
DGS-26	11.8	59	11.3	Yes
DGS-31	15.8	79	15.1	Yes
DGS-32	14.2	100	13.6	Yes
DGS-45	11.8	84	10.4	No
DGS-24	12.2	87	11.3	Yes
DGS-36	10.8	77	10	No
DGS-22	13.8	99	13.3	Yes
DGS-07	14.0	100	13.4	Yes

3.1.4 Sediment Surface Grabs

- The following field teams were on site during the offshore sediment surface grab sampling and processing. Anchor QEA, NW Natural/Gasco consultant
- CDM, field oversight
- Marine Sampling Services, boat operation and sampling

The initial sampling was performed during the period October 12-14, 2010. CDM field oversight was present on October 12 and 14, 2010. Due to anomalous freshwater midge bioassay results the sediment surface grab sampling was repeated on April 18 through 21, 2011. CDM field oversight was present on April 18 and 19, 2011.

October 12, 2010

CDM was present for oversight from 8:10 a.m. to 5:05 p.m. on Tuesday, October 12, 2010. The purpose of the visit was to observe the start of the surficial sediment grab

sampling. The surface sediment samples were collected using a hydraulic-driven Van Veen grab sampling device with a 1-foot depth. After conducting a health and safety meeting for all personnel, the offshore crew proceeded to collect surface grabs at DGS-30, DGS-33, DGS-34, DGS-35, DGS-31, and DGS-25.

Sample characteristics of DGS-30 were logged by Anchor QEA as follows:

- 0 to 2 inches: Wet, very soft brown sandy silt, no odor, no sheen observed, trace wood debris on surface.
- 2 to 5 inches: Wet, loose dark gray sand, medium to fine multicolored grains, no odor, no sheen.
- 5 to 7 inches: Wet soft sandy silt, brown, no odor, no sheen.
- 7 to 8 inches: Same as 2 to 5 inches.
- 8 to 12 inches: Wet loose woody debris, black, slight HC-like odor, no sheen.

Sample characteristics for DGS 33 were logged by Anchor as follows:

- 0 to 2 inches: Very soft sandy silt, no odor, no sheen.
- 2 to 11.5 inches: Wet loose medium to fine sand with a few embedded pockets of brown silt, no odor, no sheen, percent fines were measured to be 48 percent.

Sample characteristics for DGS-34 were logged by Anchor as follows:

- 0 to 2 inches: Very soft, very wet sandy silt, no odor, no sheen, brown color.
- 2 to 12 inches: Soft wet silty sand, fine to medium grain brown in color. Interbedded layers of soft brown silt, no odor, no sheen. Percent fines measured to be 73 percent.

Sample characteristics for DGS-35 were logged by Anchor as follows:

- 0 to 2 inches: Very wet, very soft brown silty sand, slight HC odor with no sheen, moderate woody debris.
- 2 to 9 inches: Damp soft silty clay, gray color, slight HC-like odor, no sheen. Occasional clam shells observed.

Sample characteristics for DGS-31 were logged by Anchor as follows:

- 0 to 3 inches: Very wet, very soft, brown slightly sandy silt, trace sheen, no odor.
- 3 to 12 inches: Wet, soft, brown sandy silt with interbedded pockets of dark gray sand, medium to fine grain. No odor, no sheen. Percent fines measured to be 77 percent.

Sample characteristics for DGS-25 were logged by Anchor as follows:

- 0 to 2 inches: Very soft, very wet brown slightly sand silt, no odor, no sheen.
- 2 to 5 inches: Wet, loose dark gray slightly silty sand, multicolored grains, no odor, no sheen.
- 5 to 9 inches: Gradual transition from silt to soft wet brown sandy silt, no odor, no sheen.
- 9 to 10 inches: Same as 2 to 5 inches, percent fines measured to be 40 percent.

October 13, 2010

Anchor and Marine Sampling Services continued surface sediment grab sampling on Wednesday, October 13, 2010, when samples DGS-12, DGS-13, DGS-16, DGS-17, DGS-20, DGS-21, and DGS-26 were obtained. CDM was not present for oversight on October 13th.

October 14, 2010

CDM was present for oversight from 07:35 a.m. to 12:30 p.m. on Thursday, October 12, 2010. The purpose of the visit was to observe the completion of the surficial sediment grab sampling. After conducting a health and safety meeting for all personnel, the offshore crew proceeded to collect surface grabs at DGS-01, DGS-02, DGS-05, and DGS-06.

Sample characteristics for DGS-01 were logged by Anchor as follows:

- 0 to 12 inches: Not possible to obtain core from within the van Veen grab sampling device because of substantial woody debris. Homogenized grab very wet, very soft and very woody. Brown silt, not odor, grab appears to be homogenous throughout. Wood is decomposed. Percent fines measured to be 67 percent.

Sample characteristics for DGS-02 were logged by Anchor as follows:

- 0 to 6 inches: Very wet, very soft brown silt, no odor, trace sheen on top of grab.
- 6 to 12 inches: Same as above except wet and soft, trace wood debris and organic fibers. Percent fines measured to be 70 percent.

Sample characteristics for DGS-05 were logged by Anchor as follows:

- 0 to 2.5 inches: Wet, very soft brown silt, trace HC odor, moderate sheen, golf ball found in silt layer.
- 2.5 to 4 inches: Wet, soft, dark silty sand, medium to fine grain. Moderate HC odor, no sheen.
- 4 to 10.7 inches: Wet, loose, medium to fine grain dark grey sand, multicolored grains. Moderate HC odor, moderate florets. Trace wood debris. Percent fines measured to be 43 percent.

Sample characteristics for DGS-06 were logged by Anchor as follows:

0 to 3 inches: Very wet, very soft, slightly sandy silt. No odor or sheen.
3 to 9 inches: Same as above except wet and soft.
9 to 11.8 inches: Same as above except slightly stiff. Percent fines measured to be 73 percent.

April 18, 2011

CDM was present for oversight from 08:00 a.m. to 12:15 p.m. on Monday April 18, 2011. The purpose of the visit was to observe the start of the second surficial sediment grab sampling event. The surface sediment samples were collected using a hydraulic-driven Van Veen grab sampling device with a 1-foot depth. After conducting a health and safety meeting for all personnel, the offshore crew proceeded to collect surface grabs at DGS-08, DGS-09, and DGS-05.

Sample characteristics for DGS-08 were logged by Anchor as follows:

0 to 6 inches: Wet, soft slightly sandy brown silt, no odor or sheen; at 3.5 inches grades to wet, loose gray and brown silty sand, no odor or sheen.
6 to 7 inches : Pocket of wet, soft brown silt, no odor or sheen.
7 to 11.5 inches: Same as above

Sample characteristics for DGS-09 were logged by Anchor as follows:

0 to 1 inch: Wet, soft brown sandy silt.
1 to 2 inches: Band of loose, wet gray sand. Dime-sized floret of rainbow sheen on outside.
2 to 11 inches: Wet, soft brown slightly sandy silt. Interspersed pockets of sand throughout. Slight HC odor. Percent fines measured to be 59 percent.

Sample characteristics for DGS-05 were logged by Anchor as follows:

0 to 1 inch: Wet, soft, slightly sandy silt.
1 to 11 inches: Moist, loose sand, fine to medium grained, dark gray. Occasional decomposed wood debris and fibers throughout. Percent fines measured to be 73 percent.

April 19, 2011

CDM was present for oversight from 08:00 a.m. to 11:05 a.m. on Tuesday, April 19, 2011. The purpose of the visit was to observe continued surficial sediment grab sampling. After conducting a health and safety meeting for all personnel, the offshore crew proceeded to collect surface grabs at DGS-20, DGS-25, and DGS-30.

Sample characteristics for DGS-20 were logged by Anchor as follows:

0 to 1 inch:	Soft, wet, brown fine sandy silt.
1 to 3 inches:	Loose, wet, gray, medium-fine sand.
3 to 6.5 inches:	Interbedded layers of sand and medium-fine sandy silt
6.5 to 9 inches:	Loose, moist, gray medium-fine sand. Sand grains are multicolored. No sheen or odor throughout. Percent fines measured to be 19 percent.

Sample characteristics for DGS-25 were logged by Anchor as follows:

0 to 1 inch:	Loose, wet gray medium-fine sand.
6 to 3 inches:	Soft, wet gray slightly fine sand.
3 to 11 inches:	Loose, wet gray medium-fine sand. No sheen or odor throughout. Percent fines measured to be 19 percent.

Sample characteristics for DGS-30 were logged by Anchor as follows:

0 to 3 inches:	Very fine (<1 cm) brown silt layer on top.
3 to 4 inches:	Loose, wet, light gray slightly silty, slightly clayey fine sand.
4 to 6 inches:	Loose, wet black wood and wood fibers. Wood is decomposed.
6 to 11 inches:	Loose, wet gray medium-fine sand. 2-inch diameter pocket of soft wet light gray sandy silt at 7-inches. No sheen or odor throughout. Percent fines measured to be 12 percent.

3.2 Health and Safety Program

Oversight of health and safety during implementation of the data gaps investigation was carried out by a CDM employee with a Certified Safety Professional certification during the initial days of the offshore TZW and deep groundwater sampling, the riverbank soil sampling, and the sediment core sampling/processing. Additional health and safety observations were made by CDM field staff conducting oversight throughout all phases of the field work. This section provides a summary of health and safety observations.

During comprehensive health and safety assessments conducted by CDM health and safety lead on September 14, 2010, October 1, 2010, and October 6, 2010, field operations for the data gaps investigation had some issues that were identified. After the issues were addressed, the work activities were found to be in compliance with the requirements as defined in the project HASPs and Federal Occupational Safety and Health Administration standards (see Appendix C).

3.2.1 Health and Safety Meetings

A detailed health and safety meeting was held at the Gasco site on September 13, September 27, October 4, and October 12, 2010, before the start of each of the four

phases of the data gaps project field work (in-river TZW and groundwater sampling, riverbank soil sampling, sediment core sampling, and sediment surface grab sampling). Because of the absence of a separate AED in the sediment core collection boat and subsequent EPA “stop work” directive, an additional health and safety meeting detailing the directed comment on AED location and use was conducted on October 5, 2010.

In addition, MFA, Anchor QEA, Stratus Corporation, and Cascade Drilling led health and safety briefings each morning during the four phases of the data gaps project field work to reiterate health and safety concerns, AED location, and to provide any new information.

3.2.2 Use of Personal Protective Equipment

In accordance with the Anchor QEA and MFA HASPs, proper PPE for both the data gaps investigation fieldwork was modified Level D, requiring Tyvek (or rain gear made of heavy material with long sleeves and long pants), hard hat, safety glasses, nitrile gloves and heavy work gloves (when handling heavy drilling equipment), steel-toed boots, and hearing protection when needed. In addition, a personal floatation device) was required to be worn at all times on or over water.

Used PPE was properly disposed of within the exclusion zone as investigation derived waste. Leather gloves used throughout the field work were also disposed of at the end of the investigation or earlier if excessively soiled.

Overall, CDM saw no substantive deficiencies in PPE use; several minor items were pointed out during the work performance period as follows:

September 15, 2010

The CDM representative discussed with the MFA representative, the need to mention the biohazard associated with the Willamette River water in each morning’s health and safety meeting. All personnel should be made aware of the potential presence of fecal coliform in the water and the hazard of ingesting the water, getting it on or near mouth, etc. MFA agreed to do so, and also agreed to discuss any health and safety items specific to MFA’s HASP following the Cascade Drilling health and safety briefing.

October 4, 2010

At the start of sediment core collection, no AED was present on board the boat. CDM informed Anchor QEA that work could not resume until an AED was procured. No other health and safety issues were noted. All personnel in the exclusion zone during sampling were wearing gloves and other required PPE.

October 7, 2010

All health and safety monitoring by Anchor QEA at the drill site areas showed background/ambient levels on PID (VOC and HCN) for breathing zones, with the exception of the drill site at the end of drilling/sampling GST-06; however, the elevated levels did not exceed 0.4 ppm, which were below trigger levels.

3.2.3 Slip, Trip, and Fall Hazards

During the first week of riverbank soil boring/sampling work, the CDM health and safety lead noted hazards associated with approaching and drilling next to the steep riverbank containing rough terrain such as loose and slippery rocks and debris. The driller was allowed to assess the hazard and step back from the staked location if it was too close to the bank for safe working conditions. Other specific hazards noted during the data gaps investigation were as follows:

September 14, 2010

The CDM representative noted a fall hazard at the front of the barge and requested additional caution tape across the front of the barge to warn workers of the fall hazard.

3.2.4 Weather Hazards

No significant weather hazards were present during the data gaps investigation, primarily because of the work being performed during good weather in September and October, 2010. However, minor changes to the field program were implemented because of weather related conditions as described below.

September 27, 2010

Because of elevated temperature, precautions were taken to avoid heat stress during the day including taking breaks/drinking fluids. The drilling crew did not wear Tyvek because of the heat; however, the drilling technique did not result in soil coming in contact with drillers clothing. All health and safety monitoring by Anchor QEA in drillers' breathing zone and sample preparation area were 0 ppm on PID (VOC and HCN).

Section 4

Deviations

4.1 Summary of Deviations and Field Change Requests

During oversight of the data gaps investigation field activities, CDM noted some apparent issues/deviations to the field sampling plan (Attachment 1 to the Data Gaps QAPP). The issues/deviations that arose during the data gaps investigation were discussed in the field/over the phone as appropriate between MFA, Anchor QEA, CDM, EPA, and Oregon Department of Environmental Quality (DEQ) and the items that were deemed significant were documented in an FCR for EPA's review and approval. Specific EPA-approved FCRs are provided in Appendix D. The following briefly summarizes issues/deviations and FCRs issued and approved during the data gaps fieldwork.

September 10, 2010

Before the start of the data gaps investigation, a set of FCRs was presented to EPA and DEQ for review and approval. These came in a three-page, two-column format, with sections labeled I through III (see Appendix D). Section I covered FCRs related to sediment core collection and processing, Section II was for soil boring collection and processing and Section III was for Area 1 TZW and groundwater sample collection, processing, and handling procedures. Each section had a scenario and response column. These FCRs were approved by EPA and DEQ and were referred to during the site work.

September 13, 2010

The absence of a plunger disk on the geoprobe sampler (as specified in the field sampling plan) was noted and corrected for future sampling locations. However, based on a review of work plan items and field operations conducted by MFA on the first day of fieldwork (Monday, September 13, 2010), CDM investigated some additional items that deviated from the field sampling plan and existing FCRs. This information included the following:

1. Justification and effectiveness of using an outside disk with a diameter of 1 foot, which is half the approximate disk diameter specified in the work plan (2 feet), and missing the 4-inch vertical extensions to reduce entrainment of surface water during the sampling of the shallow TZW.
2. Not using a weighted line to measure the distance from the surface to mudline.
3. Not recording the river stage during the investigation.
4. Not collecting groundwater elevations before collecting the groundwater samples to be evaluated with river stage elevations for evaluating vertical gradients beneath the river (it was noted at the time that this may only be necessary for deep groundwater samples; CDM was to confirm).
5. Not collecting turbidity as part of the field parameter readings.

September 15, 2010

Corrections to the deviations noted on September 13 were addressed after discussions with James Peale of MFA and the MFA field crew:

1. Justification and effectiveness of using an outside disk with a diameter of 1 foot, which is half the approximate disk diameter specified in the work plan (2 feet), and missing the 4-inch vertical extensions to reduce entrainment of surface water during the sampling of the shallow TZW.

Response: The barge moon pool diameter prohibits the use of a disk larger than 1 foot in diameter. The lead driller was asked by MFA to fabricate a 4-inch vertical extension for the 1-foot disk per work plan specifications as soon as possible.

2. Not using a weighted line to measure the distance from the surface to mudline.

Response: CDM representative observed a weighted line being used by MFA on Wednesday, September 15, 2010, to measure depth to mudline.

3. Not recording the river stage during the investigation.

Response: River stage data were not used during field work but would be obtained later from a database before calculations of elevation (see #4).

4. Not collecting groundwater elevations before collecting the groundwater samples to be evaluated with river stage elevations for evaluating vertical gradients beneath the river.

Response: This is only necessary for the deep groundwater samples. The first deep groundwater sampling was conducted on Wednesday, September 15, 2010, and the CDM representative observed depth of groundwater being measured inside the geoprobe sampler immediately following sampling. River stage data will be used later to evaluate vertical gradients.

5. Not collecting turbidity as part of the field parameter readings.

Response: The CDM representative confirmed with MFA that turbidity measurements were recorded Monday, September 13 and Tuesday, September 14 and observed turbidity being measured for the deep groundwater samples on Wednesday September 15.

September 17, 2010

Groundwater elevations were measured only once (not multiple times as stated in the field sampling plan) and were obtained after collecting the groundwater samples (not before as the plan states). Per MFA, all future sampling will conform to the field sampling plan requirements.

Also, the boring at GP-61 was not grouted. MFA assured CDM that remaining borings deeper than 1 foot below the mudline will be abandoned per the field sampling plan.

September 21, 2010

After completion of GP-65 the CDM representative asked the MFA representative if the drillers had filled the two 3-foot penetrations below the mudline at GP-65 with bentonite grout per the field sampling plan. The MFA representative stated that they had not and after reviewing the plan agreed that this was a deviation and said MFA would discuss internally how to address this. CDM spoke with Madi Novak at MFA on Thursday, September 23, 2010, and was informed that MFA was preparing an FCR form for submittal to EPA. The FCR form was submitted on September 24, 2010.

September 28, 2010

Anchor QEA submitted an FCR form (#001) to collect additional samples beyond those proposed in the Project AIR and Data Gaps QAPP at target in-water coring and riverbank stations to support internal NW Natural data evaluations.

October 7, 2010

Anchor QEA submitted an FCR form (#002) to change toxicity characteristic leaching procedure/dredging elutriate test analysis from Station DGS-13, which did not show the presence of substantial product and/or elevated chemical mobility, to DGS-11, which showed the presence of substantial product and elevated potential for chemical mobility.

October 8, 2010

Anchor QEA submitted an FCR form (#003) to eliminate dredging elutriate testing at Stations DGS-06 and DGS-23 and alternatively conduct the testing on DGS-18. Justification for this change was that the proposed sample stations did not show the presence of substantial product and/or elevated chemical mobility, while DGS-18 sample core did. In addition, toxicity characteristic leaching procedure and sequential batch leaching test analysis of DGS-18 sediments was requested because of the nature of the material encountered.

October 11, 2010

Anchor QEA submitted an FCR form (#004) to allow for the collection of 14-foot cores rather than the 20-foot cores specified in the field sampling plan because of a lack of water depth.

October 11, 2010

Anchor QEA submitted an FCR form (#005) to collect two additional contingency cores. One core, identified as Station DGS-44, was collected approximately 60 feet into the Willamette River channel from Station DGS-08. The other core, identified as Station DGS-45, was collected approximately 75 feet into the Willamette River channel from Station DGS-31.

Section 5

References

CDM. 2007. Standard Operating Procedures 4-1, Revision 6 and 4-2, Revision 7 for Field Logbook Content and Control and Photo Documentation Prepared for U.S. EPA. March.

Anchor QEA. 2010a, Final Project Area Identification Report and Data Gaps QAPP Gasco Sediments Cleanup Action. Prepared for NW Natural, under Docket No. CERCLA 10-2009-0255. Portland, Oregon. July.

Anchor QEA. 2010b, Final Work Plan: Gasco Sediments Cleanup Action. Prepared for NW Natural, under Docket No. CERCLA 10-2009-0255. Portland, Oregon. January.

Appendix A

Field Notes

CDM



"Rite in the Rain"

ALL-WEATHER

ENVIRONMENTAL

No. 550F

GASCO

Portland Harbor

Location _____

Date _____

Project / Client _____

Location

Gasco - Portland

Date

9/27/10

5

Project / Client

Data ~~Gasco~~ ^{REP} Gasco Soil
and Sediment Sampling

0645 - Lance Peterson (REP)

on site - check in at
guard shack. No Anchor QEA
personnel on site yet0655 - Stratus Corp crew on site
Scott, Marcus (driller), Jessie,
and Lars0655 - Anchor QEA crew on site
Doug Hoffman, Tim Stone, Martha
Wilson, John Renda0700 - Assemble at Anchor's job
trailer, drillers and Anchor
proceed with health and safety
discussion and planned scope
for dayPlanned scope: 1-20' and 1-15'
boring, will obtain chemistry
data from upper 5' and lower 5'
per Tim Stone upper 5' representative
of what will be left in place under
a RD and lower 5' is what will
be left in place in a dredge
project. First boring: GSM-07

Lance Peterson 9/27/10

6

Location Gasco - Portland Date 9/27/10Project / Client Datta Gyps Soil and Sediment Sampling

Sage disc. (cont.)

will use organo clay under water
 talk if product is ~~not~~^{present} present.

H&S discussion:

- Go over introductions
 - Stop work is encouraged
 - Emergency shut off will be demonstrated
 - work zones
 - Traffic → site personal present
 - H&S personal will be on site this week
 - Equip. → pinch points
 - Backup alarm
 - Slope concern / Organo clay cover notes
 - buddy system
 - Decon / pressure washer, will use face shield & decon in site pond
 - PFD → need if present within 10' of water
 - utility locate completed for all explorations
- Rame Patel 9/27/10

7

Location Gasco - Portland Date 9/27/10Project / Client Datta Gyps Soil and Sediment Sampling

H&S discussion (cont.)

- chemicals present (gasoline, hyd oil, hexane - if needed for decon)
 - Emergency route to hospital route
 - First aid kit & fire extinguisher on trucks at drill site
 - buddy system
 - LRAES of authority, John Renda is SSO & RC on 9/27/10
 - Site Security / TWIC
 - Site speed limit 10 mph
 - PPE / Lifting
 - COC → VOCs & PAHs
 - IDW / Label down
 - John Renda goes over AED requirements in EPT directed comment / AED will be at each drill site
- 0815 - H&S discussion completed, drillers proceed to set up equipment
 Order crew mobilizes for sampling

Rame Patel 9/27/10

Location Gasco-Portland Date 9/27/10

Project / Client Data Caps Soil and Sediment Sampling

0900 - Proceed to GSM-07 Land surface elev. = 13.3'
 site, Drillers still in set up process

0940 - Photo #1 → GSM-07
 drill site from top of bank
 Tim Stone off site for day

0952 - Photo #2 - walking track up down hillside to access GSM-07 location

1000 - Drillers proceed to set up at GSM-07

Weather: sunny, warm, high of ~80°F

1115 - Photo #3 - A&D kit present at GSM-07 drill site

1125 - Anchor complete set up of sampling table/jar prep
 Drillers performing decoupling on SPT sampler

1135 - ~~Drill~~ Driller explains kill switch location on drill rig, fire extinguisher & eye wash is also on rig
 Jano Rels 9/27/10

Location Gasco-Portland Date 9/27/10

Project / Client Data Caps Soil and Sediment Sampling

1145 - Drillers drive surface SPT sample at GSM-07
 blow counts: 1:1:4

Photo #4: overview of GSM-07 drill site

Photo #5: driving surface SPT sample at GSM-07

Photo #6: recovery from 0-5' interval

12:06 - Driller proceeds to overdrill to 5' w/ auger

12:31 - Drillers ~~drill~~ push 30" Shelby tube from 5 to 7.5'

Photo #7: Taping plastic sheeting on bottom of Shelby tube

Photo #8: overview of GSM-07 drilling site

1240: Driller over drills w/ auger to 7.5' in preparation for SPT sample

Jano Rels 9/27/10

Location Gasco Portland Date 9/27/10
 Project / Client Data Gaps Soil and
 Sediment Sampling

1315: SPT sample 7.5' - 9'
 collected, blow counts
 2:1:1

Photo #9 & #10: overview of
 GSM-07 drill site from
 riverbank

1346: Driller overdrills to
 8' due to problem w/
 length of auger not
 allowing push pulse
 sample to enter auger

1350: Driller break for lunch

1435: Driller prep to begin
 work at GSM-07

1445: No recovery on 8'-10' core
 sample

1512 - SPT sample from 10' - 11.5'
 Blow counts 1:0:1

1545 - Drillers recover 10' - 15'
 core barrel - no recovery
 Anchor ~~at~~ discussed
 recovery issue w/ driller

James R. [Signature] 9/27/10

Location Gasco Portland Date 9/27/10
 Project / Client Data Gaps Soil and
 Sediment Sampling

GSM-07 Log:

0-8.3: Dk. brown moist
 gravelly silt, low plasticity
 silt, trace fine debris
 f-c angular gravel

8.3-11.5 Dk grey to black,
 wet, low plasticity silt
 fine sand, spotty sheen
 from 8.3-8.5 (rubbery texture)

Sand layer 8.7-8.9

Becomes saturated somewhat
 between Sand 7.5' bgs

No recovery 11.5-15.0

15-17.6 - Black, loose, wet fine
 grained sand, poorly graded,
 strong K-C like odor, spotty
 sheen, Langbeek from
 16.3-16.5 ft

17.6-20 - Black, very soft, wet
 silt, highly plastic,
 chunks of Langbeek throughout,
 sheen only from 19.0' - 19.2'
 (sandy layer)

James R. [Signature] 9/27/10

12.

Location Gasco Portland Date 9/27/10
 Project / Client Soil and Sediment Sampling
Data Gaps

1600 - Drillers collect 15-16.5'
 SPT sample, blow counts
~~0-10 (sunk under~~
~~70 sum rate) 1:1:1~~

1605 - John Renda (Anchor) says
 standard Geoprobe Macrocore
 (2" OD) w/ acetate sleeves
 will be used on Tuesday
 9/28/10, will move over several
 feet and core next to
 9/27/10 boring in order to
 improve recovery

1650 - Drillers obtain 16.5-20'
 core sample, good recovery
 Drilling product noted
 in 18-22' interval, shales
 noted throughout core,
 "lampblack" noted in shoe
 and throughout core in
 lesser amounts
 Substrated product begins
 from 19.0 - 19.2 (Smelly
 zone, noticeable city odor)
 Anchor notes "rubbery feature" in core
 James Renda 9/27/10

13

Location Gasco Portland Date 9/27/10
 Project / Client Data Gaps Soil and
Sediment Sampling

Photo #11 - 16.5-20' core
 opened

Photo #12 - oil soaked into
 paper towel from
 18-20' zone per QSM-07

Photo #13 - Anchor & ED crew
 jacking samples from
 16.5-20' interval
 (all soil except for VUCS
 was compressed)

H₂S monitoring w/ PID
 (VUCS) & HCN all 0 ppm
 on 9/27/10

Per sample Headspace:

HCN = 0 ppm

PID range: 0 - 0.2 ppm

1700 - Drillers off site to
 obtain grouting material 3

1730 - Drillers back on site proceed
 to set up to grout

James Renda 9/27/10

Location Gasco Portland Date 9/27/10

Project / Client Data Gaps Soil and Sediment Sampling

1740 - LEP proceeds to Anchor trailer to pack up for day

Note: due to good recovery on LG. 5' intervals, Anchor will not be using machine sampler - adjacent to GSM-07 on Tuesday 9/28/10

1805 - LEP off site for day

Note: Rip rap / Large rocks at GSM-07 location were moved by the drilling contractor (prior to 9/28/10) onto plastic sheeting adjacent to GSM-07 drilling location, the rip rap/rock ~~is~~ is clean with very little adhered soil.

Lane (Signature) 9/27/10

Location Gasco Portland Date 10/1/10

Project / Client Data Gaps Soil and Sediment Sampling

0745 Scott Coffey arrive @ Guard Shack, meet Doug Laska who escorts me to site John Rienda & Matt Wilson on site

0805 Cascade Drillers arrive on site; Paul OPEM (com) on site

0810 Cascade Drillers
 Jeff Jones Driller
 Caleb Charter Helper
 Mark Bowman Helper

0810-0820 Cascade Runs through their H&S ^{Plan} ~~meeting~~

0820-0840 Anchor Runs through their H&S Plan; special mention on AED use & location and River Biohazard

0840-0850 Anchor Runs through Sampling Driller Scope & method

Scott Coffey (Signature) 10/1/10

12. 16

Location Gasco Portland Date 10-1-10
 Project / Client Data Gaps Soil and Sediment Sampling

0700 Drillers setting up
 @ GST-01

0745 Photo 1 - photo overview of
 Top of Bank area looking
 Down River @ edge of GASCO
 property where drillers will
 set up @ GST-01

1000 Photo 2 - closeup of GST-01
 Staging / Drill Site
 SKies Overcast; mid ^{6:45} 60s
 clearing by 11am

1130 Drill Crew/Rig 988 set up
 over GST-01
 Break for lunch

1200 Return to site
 Prepare Casing to start
 Drilling

1230 Photo #3 - photo of Sonic Rig
 Set up over hole
 AEC 10-1-10

Location Gasco Portland Date 10-1-10 17
 Project / Client Data Gaps Soil and Sediment Sampling

1235 Photo #4 - photo of Decon
 area, exclusion zone & Decon
 Botwash zone

1300 Begin Drilling. Start w/
 SPT Blow Counts 215/6 @
 surface

1306 Casing advanced 5ft
 Doug Laffoon monitoring Air Space
 w/ PID

1315 Rock ^{@ 5ft} became wedged between
 Split-spoon ~~Shelby~~ ^{ICE} tube & casing - advancing
 the ~~Sampler~~ ^{Sampler} down past 5ft
 Compromising sample below 5ft
 Drillers stepping over (Downstream)
 w/ meter Redrill Top 5ft w/ 6-inch casing

1400 ^{Drill location} Moved over Advanced casing
 core 0-5 ft - collect Photo #5
 Sample 0-4.5ft ^{Drill} Brown Silty Sand w/ ^{med} gravel
 4.5-5ft ^{Some large Rock spalls} Gray Silty Gravel (med-large)

1418 spt ^{Count} 6/5/4 @ 5ft

AEC

10-1-10

Location Gasco, Portland Date 10-1-10Project / Client Data Gaps Soil and SedimentSampling

1420 Advance 4-inch casing 5-10ft

1430 Photo #6 collecting Sonic

Core Sample (5-10ft)

photo #7
sample photo

5.3'-5.9' Black, loose, dry Sandy Gravel
sooty lampblack [FILL]

5.9'-6.7' Yellowish brown, loose, clay film
poorly graded sand sp

6.7'-10.9' Yellow Brown w/ bits of Blue-green gravelly sandy
silt, low plasticity fine sand, angular coarse gravel
thin black laminae
7/8/9 6.7-7.0 ft

1445 Spt @ 10

1500 Collect ^{Core} Sample @ 10-15 ft

10.9-13.6 light brown w/ gray and
rust brown patches, slightly cohesive, slightly
moist med dense sand w/ silt; fine grained
poorly graded

13.6-13.9 ft Dark Green, moist, fine
sand layer [FILL]

1520 Hydraulic Hose Overflow
reservoir leaking - Stopping
work to repair problem

Driller indicates this happens
when drill rate is slow, pressure
builds up [Photo #8] showing Absorbent pads
to mop up oil

1520-1600 Pick up Equipment / Secure area
and leave Job site

AEC 10-1-10

Location Gasco, Portland Date 10-4-10Project / Client Data Gaps Soil and SedimentSampling

0840 Scott Coffey arrives @ Guard Shack
meet John Renda who escorts me to GJT-01

Drillers have fixed hydraulic oil leak
collecting Spt @ 15' (12-20-22), Tried a Shelby
Tube sample @ 15' and encountered refusal (H2S)

Drillers + Anchor ^{conducted} Health & Safety
meeting from 0800-0830, covered
AED use & location & River Biohazard

0900 Collect 15-20ft Sonic Core

photo #1 15-20 ft sample photo Dark Gray Silt w/
some clay and fine sand
med plasticity, very moist, H2S odor

0920 collect 20-22.5 ft Shelby Tube
Sample - matt believes (due to leakage)
tube is only partially filled; measured
tube 3 under ^{filled} by 0.8 ft

0935 [photo #2] of Shelby Tube sample 20-22.5'

matt log:
15.1-16.3 Black dense, fine grained, poorly graded
Sand H2S odor moist @ 16 ft mottled
black and dark gray [Alluvium]

16.3-17.0 Dark gray firm, low plasticity sandy silt
trace rootlets, slight H2S odor fine sand
moist

17.0-18.0 Black, wet, loose Sand w/ silt fine grained
H2S odor

AEC 10-4-10

12.

20

Location Gasco, Portland Date 10-4-10Project / Client Data Gaps Soil & Sediment SamplingWeather: Cast low 50s, cloudy, dry0950 Collect SPT sample @ 22.5ft 2-2-2
22.5-24ft0955 Collect Sonic sample 20-25ft ^{core barrel}
flipper stack ^{open} No Recovery! Drillers will run core
back into hole to recover what was lost1010 Resample ~ 1.5ft recovered
photo #3 photo of ^{20-25ft} sample composite1020 Collect SPT sample @ 25ft-26.5
(1; 2-3) Photo #41040 Collect Sonic core 25-30ft
Drk Brown Silt w/ fine sand photo #5No Product found in boring
will abandon w/ Bentonite chips
Hydra brand Hydra chips 3/8 50lbs
sacks1100 5.5 x 50lb bags of Bentonite chips
added w/ water to hydrate & plug
hole1100 Drillers take down equipment, &
mob rig to GST-02 siteASC 10-4-10

21

Location Gasco, Portland Date 10-4-10Project / Client Data Gaps Soil & Sediment Samplingcont Matt. Wilson's log:
22.5-23.4 Drk Gray Silt w/ rust
colored mottling Soft, moist moderately
plastic, w fine sand (Alluvium)

23.4-23.5 Sand layer

26.1-26.4 " "

26.7 to 29.5 Gray silty Sand fine med
loose wet29.5-30 Drk Grayish brown, very soft, wet
TD Silt low plast. w/ fine sandHCN readings 0-4 ppm @ 13.6-13.9
PID sample bag readings 0-0.1 ppm1130 photo #6 photo of planned/staked
GST-02 location

1130 Scott Coffey off site to get lunch

1200 Return to site; escort back
to Job Trailer; Anchor & Cascade
Break for lunch1245 Marine ^{Sampling} Services onsiteParking Van Veen Grabs sampler
photo #7 - Marine Sampling Services Boat
in the water ASC CDM

Location Gasco, Portland Date 10-4-10Project / Client Data Gaps Soil & SedimentSampling

1300 Drillers Set up / collecting

SPT Sample 0-15 (1-3-8)

[Photo # 8] - Overview of GST-02 Drill Site, showing exclusion zone

1310-1323 Drilling 0-5 ft; slow progress
hard drilling

1325 Collect 0-5 ft core

[Photo # 9] of 0-5 ft core sample

1335 collect 5-6.5 ft SPT
(4-22-25)1340 Advance casing / core 5-10 ft
collect sample[Photo # 10] 5-7 ft SAA
7-10 ft Black stained ^{sed} naphthalene odor
Not wet or oozing oil

1410 collect SPT 10-14.5 (17-12-7)

Bottom 14.5 ft sample shows cohesive soils
will attempt a Shelby Tube sample

1430 Shelby tube refused.

1435 Sonic core ~~0-5 ft~~ 10-15 ft

No Recovery

1450 Collect 15-16.5 ft SPT sample
(7-6-5)

AEC 10-4-10

Location Gasco, Portland Date 10-4-10Project / Client Data Gaps Soil & SedimentSampling

GST-02 Log (Mull Wilson)

0-25.2

Drk. Brown, dry stiff gravelly silt
coarse to cobble size gravel, low plast
silt, subround to round, some brick
& rip rap rubble (Fill)

e 3.5 ft very hard and compacted

e 6.3 ft color chang to black strong naphthalene
like odor; trace metal debris

[No Recovery 12.5-15 ft]

e 15.5 ft yellow/brown sand mixed in w/
gravelly silte 17 ft 100% lamblack from 17- ft
dry, brittle, friable

17-26.1

e 21 ft granular yellow-brown gravel

21.3 ft - 21.5 ft dark purplish-red brick-like material

22 ft - 23 ft Sand layer

23 - 25.2 ft wood chips, loose mois
HC like odor

fill

Alluvium 25.2-28.2 ft

Drk gray brown sandy silt,
wet, trace rust, mottling, fine sand
slightly cohesive, soft, intermittent
thin layers (Alluvium)28.2-30 ft Drk grayish brown silty sand
wet, loose, slightly cohesive, fine
sand

AEC 10-4-10

Location Gasco, Portland Date 10-4-10
 Project / Client Data Gaps Soil & Sediment
Sampling

1500 collect core sample 15-20ft
 Blk silty sand - lamp black w/coarse
~~to~~ cobbles size gravel

Photo #11

1520 collect SPT sample @ 20ft
 (25-44-35)

1535 collect core sample 20-25ft
 photo #12

1550 collect SPT sample @ 25ft
 (4-2-5)

1605 collect sonic core 25-30ft
 Drk Gray Silt w/fine sand

1615 No substantial product observed
 Drillers proceed to abandon hole

w/ 3/8" Bent. Chips
 1700 ^{Booping} hole abandoned w/ 5.5 bags
 of Bent. chips

Drillers & SEC leaving site
 met briefly w/ Jennifer Jones
 Sediment crew / MSS down
 for the day due to the lack of
 an on board AED

AEC 10-4-10

Location Gasco, Portland Date 10-5-10
 Project / Client Data Gaps Soil & Sediment
Sampling

0645 ^{Scott Coffey} Arrives Guard Shack
 0655 meet Doug Laffoon who arrives
 on site / escorts me to job
 trailer

0700 Drillers & Anchor crew John R & Matt W.
 on site

0700-0720 Conduct H&S meeting
 Go over AED location - ^{Special Note}
 River Biohazard - ^{at PAMM}
^{Building} location

Anchor	[Mike Crystal]	Boat crew	
Sediment			[David Gillingham]
core			[Delaney Peterson]
Staff	[Jay Denay]	core processing	
	[Nathan J. Korsy]		
	[Kara]		

0730-0800 - Sediment crew conducts
 H&S meeting at Job Trailer, Scott
 Coffey ^{presents} directed comments on
 AED location & use; Notifies work crew
 they are under a stop work order
 and need EPA approval before work resumes

0815 Receive word from Lance P. (com) that work
 is authorized to resume
 AEC 10-5-10

Location Gasco, Portland Date 10-5-10Project / Client Data Gaps Soil & Sediment Sampling

0820 John Renda, Matt Wilson and Scott Coffey walk to the FMM Building and inspect location of AED

0830 Drillers completing setup of Drill Rig/Equipment @ GST-03 HCN/VOC Readings from GST-01 & GST-02

	GST-02		GST-01	
	HCN	VOC	HCN	VOC
0-2.5'	1	2.5	0	0.0
2.5-5'	0	0.1	0	0.0
5-7.5'	1	1.3	0	0.2
7.5-10'	2	3.8	0	0.1
10-12.5'	1	1.0	0	0.2
12.5-15'	No Recovery		0	0.1
15-17.5'	1	1.4	0	0.0
17.5-20'	1	0.9	0	0.3
20-22.5'	1	0.7	6	0.1
22.5-25'	2	0.7	Shelby	
25-27.5'	1	0.8	1	0.1
27.5-30'	0	0.0	0	0.2
			0	0.1

0848 Drilling Begins w/ SPT Sample @ GST-03 @ 11.5' (2-4-9)

Photo 1 - Overview of GST-03 site location/exclusion zones
AEC 10-5-10Location Gasco, Portland Date 10-5-10Project / Client Data Gaps Soil & Sediment Sampling

0853 Run/collect 0-5 core sample

0900 Collect sonic core sample 0-5

Photo #2 core sample 0-5

Weather clear, light to moderate wind upper 50's warming to low 60's

0905 Collect SPT Sample @ 5 ft

5-6.5' (~~3-5-5~~) AEC

0915 collect core sample @ 5-10 ft

Poor recovery - Brick Blocking core @ 6 ft - Photo #3 of 5-6 ft sample

0925 collect SPT sample @ 10 ft

10-11.5' (3-6-7)

0930 Run/collect 10-15 ft core sample

Poor Recovery 10-10.5 ft due to large rock blocking core and pushing down

0945 Decision to abandon current GST-03 location and move to new location

~1 meter due to lack of recovery from 6-10 and 10.5 to 15 ft

1015 Stop by sediment core processing area photo #4 Discuss substantial product determination criteria w/ Kang

DGS-13 Sediment core have not been transported yet but soon will be pushed 20 ft - 17.5' recovered 88%
AEC 10-5-10

1035 Leave sediment process area - work group will call when they set open first core

AEC 10-5-10

Location Gasco, Portland Date 10-5-10Project / Client Data Gaps Soil & SedimentSampling

1040 @ GST-03 collecting ^{Core} Sample @ 5-10 ft
 limited Recovery ~ 1 ft Same as previous location sample

1050 collect core sample 10-15 ft; limited Recovery ~ 1 ft; Brick jammed into soil core shoe

Drillers will run/sample SPT @ 15 ft

1115 Drillers ready for SPT, but will take a lunch break

1200-1215 Stay at sediment core process area to observe cutting of core

Anchor Process Crew & Ryan Barth conduct a scope of work & additional safety meeting before start of first core

sample processing Photo #5 of ^{core processing area}

1220 Photo #6 cutting into DGS-13 core ^{showing safety barriers delineation}
 Having tower problems running saw/computer

1235-1300 10'-11.5' SPT (3-6-7)

collect SPT & cores 15'-16.5' " (7-8-9)

20-21.5' SPT (6-13-14)

25-26.5' SPT (2-8-4)

ACE 10-5-10

Location Gasco, Portland Date 10-5-10Project / Client Data Gaps Soil & SedimentGST-03 (mitt w. log)

0-3.4 ft Brown, dry, loose Silt w/ gravel nonplastic silt, coarse angular gravel many roots and rootlets

3.4-23.9 Black, loose, dry crumbly friable lampblack with gravel and rubble, trace brick, concrete debris, gravel is fine to cobble size; lamp black comprises 60% of sample, slight Naph odor

@ 10-18 ft large cobble size chunks of brick coated lampblack

WT @ 18 ft - wet brittle crumbly brick and lampblack chunk of asphalt, Naph like odor, sheen test - blocky/platy sheen - light ← 2-inch layers

@ 20 ft brick and lamp black, same as above

23.9-25.0 BIK stained wood chips; heavily weathered w/ sand ^{fine steel}

@ 24.5-25.0 Small patch of green sand (Fill)

25.0 contact between ^{Fill} Alluvium & TD D-K grayish brown, soft moist moderate plasticity silt, trace rootlets slight HC-like odor (Alluvium)

ACE

Location Gasco Portland Date 10-5-10
 Project / Client Data Gaps Soil & Sediment
Sampling

1310 Photo #7 Doug h. checking
 Drill site breathing zone

1315 Photo #8 core sample
 22-25 & 25-30
 lamp black & ^{shiny} wood chips dk Gray Silt

1320 Decision that No Significant
 product has been encountered
 @ GST-03. Some stained lampblack
 wood fill, but no sheen or mobile
 product. Drillers will begin
 to backfill Boring w/ Bent chips

1325 Return to sediment core area
 currently processing DGS-13
 just started logging Photos #9-10
 Core 0-2.6 dk Gray Sandy Silt

Photo #9 view → 2.6-7.7 Dk Gray fine med Sand w/ silt

Photo #9 view → 7.7-7.8 Dk Gray Silt layer

↘ 7.8-12.4 Dk Gray fine-med Sand w/ silt

12.4-13.1 " Gray Silt

13.1-15.9 " " fine Sand w/ silt grading

15.9-17.0 " " fine to med sand
 to coarser

No sign of substantial product
 this eliminates contingencies DGS-12 & DGS-14

EC 10-5-10

Location Gasco, Portland Date 10-5-10
 Project / Client Data Gaps Soil & Sediment
Sampling

1400 Return to GST-03
 Drillers have backfilled Boring
 taken down equipment & starting
 to mob to GST-05, GST-04
 will need to wait until gate access
 is provided

GST-03	PID ^{High} Readings	Headspace ^{from} PVC
0-2.5	1	0.1
2.5-5	1	1.9
5-7.5	2	2.3
7.5-10	NA	NA
10-12.5	1	0.3
12.5-15	NA	NA
15-17.5	2	1.4
17.5-20	4	5.0
20-22.5	8	5.5
22.5-25	2	1.2
25-27.5	1	0.5
27.5-30	1	0.3

1515 Drillers continue set-up @ GST-05
 Sediment core crew finish sample collection
 for lab analysis miss part offshore conducting

1520 Photo #11 - photo of Sediment Core Sampling

EC 10-5-10

Location Gasco, Portland Date 10-5-10
 Project / Client Data Gaps Soil and Sediment
 Sampling

1535 Begin Drilling GST-05
 1 Collect SPT (M-14-16)
 1540 Begin collecting 0-5 sonic
 Core Slow drilling
 Good Recovery photo #12

Dark Brown Gravelly Sand w/ silt Fill

1605 Collect SPT 5-^{6.5ft}~~10ft~~
 (30-13-10)

1610 Collecting Sonic core 5-10ft
 leave site to check on sediment core
 progress - Just getting ready to
 open DGS-03 ^{sediment} core

1615 Back @ GST-05
~~at~~ Recovered 5-7ft core

1620 Run/collect Shelby tube sample
 from 10-12.5

1630 Back @ sediment process area; Begin

photo #13 opening sample core @ DGS-03
 Reviewed Core No Sign of ^{substantial} ~~significant~~ ~~rec~~
 product; photo #14 - open sample core, processing
 sample

1640 John Renda informs me Shelby tube
 @ GST-05 was not successful (hit a buckor
 Rock-refusal; calling it a day.

AEC/CDM 10-5-10

Location Gasco, Portland Date 10-5-10
 Project / Client Data Gaps Soil & Sediment
 Sampling

GST-05 (per meter log)

0-1.1 Dark Gray, loose, dry poorly graded angular
 coarse gravel (Fill)

1.1-7.8 Dark brown-gray, dry low plast gravelly
 silt, stiff coarse to cobble size angular to
 rounded gravel

7.8-14.9 Gray Dark moist, moderate plast
 Brown Gravelly silt, f.c. gravel
 Trace Red brick pieces (Fill)

@ 10.4 large piece of red brick
 cobble sized & concrete

@ 14.3' wet

14.9 to 15.8 ft Dark gray, loose, wet fm graded
 Sand, fine gravel trace fines
 slight HC odor (Alluvium)

15.8 to 20.0 ft Dark gray-brown, soft, wet, high
 plasticity, with thin intermittent fine sand
 layers, slight HC odor (Alluvium)

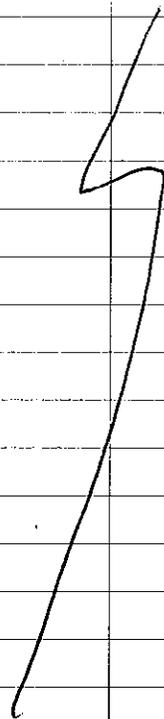
AEC/CDM 10-5-10

34

Location Gasco, Portland Date 10-5-10Project / Client Data Gaps Soil & Sediment
Sampling

1445 DGS-03 Dk Gray Silty Sand
Recovered 15.3ft of core

1700 Check in w/ Lance
Leave site



(JEC)
10-5-10

Location Gasco, Portland Date 10-6-10 35Project / Client Data Gaps Soil & Sediment
Sampling

0645 ^{SEC} Arrive @ guard shack

0650 Matt Wilson arrives and escorts me to job trailer

0655 Matt begins calibrating PID

0658 Cascade Drillers arrive

0700-0720 Matt & Doug lead H&S meeting
Special mention of AED locations
- fall hazard w/ rig working so close to bank & River Bio hazard

0720 Drillers leave job trailer to ^{SEC} begin warm up rig / ready equipment to resume drilling GST-05

0740 Begin Collecting SPT @ Dff
10-11.5 (33-17-23)
photo # 1 overview of GST-05 work site

0745 Offshore sediment core collection on-site walking down to boat, call Paul open to check his location and notify boat crew is on site

0800 Process crew not on site yet

JEC 10-6-10

36

Location Gasco, Portland Date 10-6-10
 Project / Client Data Gaps Soil & Sediment
Sampling

0800 Sonic core 10-15 ft
 collected photo #2 - top of
 core sample 10-13.7 ft
 Silty Gravel w/ sand - large ^{broken} cobbles angular

0815 Collect spt @ 15-16.5 ft (6-4-4)

0825 Receive call from Paul OPEM who
 was on Boat w/ sediment collection crew
 conducting H&S meeting; John Renda
 arrives on site

0830 15-20' Sonic core sample
 collected photo #3

0855 TD @ 20'
 PID readings in Breathing Zone = 0 ppm
 Drillers Backfill w/ 3/8" Bent chips
 Break down equipment & prepare to
 mob to GST-04

0920 Sediment ^{Process} Crew preparing to
 Process Sample DGS-30
 * DGS-03 processed yesterday eliminated
 contingent DGS-02; Top of Bank Drill Crew
 Waiting for fence removal @ GST-04 f
 Decon equipment

JEC 10-6-10

37

Location Gasco, Portland Date 10-6-10
 Project / Client Data Gaps Soil & Sediment
Sampling

HCN / VOC readings @ GST-05

	HCN	VOC
0-2.5	1	0.1
2.5-5	1	0.3
5-7.5	1	0.3
7.5-10	1	0.2
10-12.5	1	0.2
12.5-15	0	0.0
15-17.5	1	0.2
17.5-20	0	0.0

1000 Sediment Core DGS-30 opened
 13.9' 72% recovery 3rd attempt sample
 26 inches @ Top showing Silt w/ wood fibers
photos #4 & 5 - 0.5-13.9' Dark gray
 med sand w/ trace silt

No evidence of substantial product
 PID along entire core = 0.0 ppm
 Eliminates DGS- & DGS-
 contingency cores

1040 Drillers positioning Rig onto
 GST-04 photo #6 ^{near 23 wells}
 laying Plastic sheeting down ^{in foreground}
 JEC 10-6-10

Location Gasco, Portland Date 10-6-10Project / Client Data Gaps Soil & SedimentSampling1115 photo #7 Safety zones established
collected 0-1.5 ft SPT @ GST-04

(4.4-9)

1120 collect GST-04 0-5 ft core
sample photo #81125 collect SPT sample 5-6.5 ft
(7.6-32)1140 collect Sonic core 5-10 ft photo #9
photo of recovered sample = black
lampblack type material1145 Attempt Shelby Tube sample
10-12.5 ft - successful - pushed
~20-inches1150 Leave GST-04 site to check
on opening of next sediment
core DGS-11 89% 1st attempt12:00 Drk Gray silty sand, some
90% silt layers to 8.5 ft; med sand
below 8.5 ft substantial product
Intervals 1.5-2.2 ^{sheen} substantial productphoto #10 2.2-2.4 silt ~~substantial product~~ No product
< 2.4-3.3' substantial productphoto #11-12 3.3-3.6 silt No product
3.6-8.5 Bands of Sheen, strong
odor. Substantial
product

AEC 10-6-10

Location Gasco, Portland Date 10-6-10Project / Client Data Gaps Soil & SedimentSamplinglog GST-04 (Meff Wilson log)

0 to 12.5 Drk Brown dry stiff low plast
gravelly silt; fine-cobble gravel
angular to rounded, trace brick pieces
and black-lampblack-like material

- 4ft hard & compacted acc
- 5ft color change to mixed black, red
& brown
- 7.5ft color change to Black, slight
HC odor
- 10ft slightly moist
- 10-12 ft Shelby Tube sample
- 12.8 ft large chunk of concrete

18.5 to 20 ft Dark Gray to black, loose, dry silty sand
modest HC-like odor (FILL)
powdered yellow brick-like material @ 19.5 ft

20 to 25 Drk gray, dry loose f-m grained
poorly graded SAND (FILL)
w/ wood pieces (anthropogenic)
trace

25 to ~~30~~
TD Dark gray-brown, very soft, wet
highly plastic SILT, trace fine
sand, many rootlets (Aluminum)

AEC 10-6-10

Location Gasco, Portland Date 10-6-10Project / Client Data Gaps Soil & Sediment Sampling

1220 Return to GST-04; ^{collected} SPT sample @ 10-11.5 (19-39-8) and collected sonic core 10-15 ft; Drillers will clean out hole & break for lunch

1315 Return from lunch
Collect SPT @ 15-16.5 ft
(4-8-9)

1325 Collect sonic core 15-20 ft
photo #13

1343 collect SPT sample @ 20-21.5 ft
(7-5-5)

1350 collect sonic core 20-25 ft
DK Gray Sand

1411 collect SPT at 25-26.5 ft ^{AEC}
(0-0-0) - weight of rods ^{drop}
pushed sampler 1.5 ft - very soft

1420 collect sonic core 25-30 ft
photo #14 - ^{MS} Boat collecting sediment core

No Substantial product observed

1440 Drillers prepare to backfill w/ Bentonite chips 3/8"

AEC 10-6-10

Location Gasco, Portland Date 10-6-10 41Project / Client Data Gaps Soil & Sediment Sampling

1445 leave site to check on Sediment core processing crew taking a break; DGS-19 is finished very hot working in Tyvek and some crew were getting nauseous from vapors - a few decided to put on respirators despite PID voc levels in Breathing Zone were < 0.3 ppm Photo #15 ^{GST-06} site flagged

1500 GST-04 backfilled, moving to GST-06

1545 Sediment crew processing DGS-19
Review of core 14.7 ft of Recovery PID = 0.0 in Breathing zone

photo #16 0-1 ft High Sheen, oily wet oozy product (substantial P)

1-2 ft DK Gray Silt

2-3 ft " " " w/ product stained sand lenses

3.2-4.1 ft Product stained / saturated

4.1-4.6 ft ^{AEC} w/ wood fibers product

photo #17 4.6-8.2 ft ^{AEC} Gray med Sand sheen, saturated Spotty

8.2-9.7 ft ^{AEC} Gray

photo #18 9.7-11 ft more ^{product} saturated medium sand

11 → 14.7 No visual product

AEC 10-6-10

Location GasCo, Portland Date 10-6-10

Project / Client Data Gaps Soil & Sediment

Sampling

GST-04 Headspace Readings

	HCN	VOC
0-2.5	2	0.0
2.5-5	2	2.9
5-7.5	2	0.2
7.5-10	2	0.2
10-12.5	NA	Shelby Tube Sample NA
12.5-15	0	0.0
15-17.5	3	11.6
17.5-20 ^{SEC}	3	2.7
20-22 ^{SEC}	29	2.4
22-25 ^{SEC}	11	0.6
25-27.5	3	0.3
27.5-30	3	0.2

1630 Drillers moved over to GST-06 location; still need to complete setup and some repairs needed to the jaws & hydraulics - Driller doesn't expect this to take more than ~1hr

1700 SEC escorted by John Renda offsite

SEC 10-6-10

Location Gasco, Portland Date 10-7-10

Project / Client Data Gaps Soil & Sediment

Sampling

0645 Arrive e guard shack;
 0700 meet Matt Wilson who escorts me to the job trailer
 0710 John Renda/Doug Laffoon on site
 0715 Drillers arrive on site. (Caleb)
 0720-0800 Conduct H&S meetings; Cascade leads their health and safety & Doug Laffoon (Anchor) follows up w/ additional H&S points; AED location & River Biohazard; New Helper (Eric) replaces Mark ^{SEC} Bowman; Driller's mechanic makes ^{small} maintenance/repairs to hydraulics and jaws

0830 Check on Sediment process crew ^{New} Anchor Staff (Amy) Review substantial Product areas 2.0 ft

DGS-19 Core 159

0.9 small blebs Not substantial P
 2.5 " " " "
 3.0 " " " "

3.3-4.1 Product pooling

4.4-8.2 Bleb layers meeting S.P. criteria
 7-8 blebs saturation > 2 inches

10.2-10.9 Band meeting S.P. criteria

SEC 10-7-10

Location Gasco, Portland Date 10-7-10
 Project / Client Data Gaps Soil & Sediment
 Sampling

0850 Begin Drilling/Sampling
GST-06 w/ SPT sample @
0-1.5 ft (2-10-28)

0855 Collect Sonic Core 0-5ft
 photo #1 - Overview of GST-06 work area
 exclusion zone / Decan zone

GST-06
 0920 Sonic Core - good recovery
 0-5ft photo #2

0925 SPT @ 5-6.5ft (35-16-18)

0930 - check on Sediment Core Processing
 currently processing DGS-08
 Recovery 9.3ft at third attempt <50%

• Substantial P. found @ 4.4-4.6
 2-inch layer of saturated product
 in Brown med Sand just above silt
 layer; core above & below no product
 sheen/evidence found

0945 Return to GST-06 site
 collected sonic core 5-10ft

0950 collect SPT sample @ 10ft (59-4)

SEC 10-7-10

Location Gasco, Portland Date 10-7-10
 Project / Client Data Gaps Soil & Sediment
 Sampling

GST-06 Log (per Matt Wilson
 Anchor)

0 to 10 Drk brown stiff, dry, low plast
 gravelly silt, subrounded to rounded
 coarse to cobble size gravel, concrete
 chunks @ 1.5 to 2.5ft, trace red brick
 pieces and wood chips
 @ 3.5ft large cobble size chunk of concrete
 @ 4ft " " " " "
 hard drilling @ 4ft
 @ 6.5-9ft dry concrete chunks

10 to 23.1 Stiff, moist, slight plast silt, fine-coarse
 gravel, trace red brick pieces
 Gravelly silt (Fill)
 @ 15.5-16.5 concrete, black material (lamp black)
 dry, small flecks of blue plastic
 @ 17-18ft concrete
 @ 18ft wet HC-like odor, stained black
 Sheen test - light blacky sheen large
 @ 20-23.1 Black stained wood chunks/fibers

22.1 to 25.4 Dark gray-brown to black, m dense, moist
 silty sand, nonplastic silt, fine sand
 abundant wood pieces, light sheen on
 sample @ 23ft HC-like odor (Fill)

25.4 to 25.8 Black, stiff moist, highly plastic silt, strong HC odor
 25.8 to 26.7 Black-fine sand w/ silt, blebs saturated w/ oil (Fill)
 26.7 to 27.5 Silt layer - oily (Fill)
 27.5 to 27.9 Lamp black, black
 27.9-28.3 Black oily sand and silt mixed (Fill)
 28.3 to 30.0 Dark grey brown w/ black binding highly plastic, stiff
 moist silt, strong HC-like odor (Alluvium)

10-7-10

photo #1

44 46

Location Gasco, Portland Date 10-7-10Project / Client Data Gaps Soil & Sediment Sampling

1000 Collect ^{sonic} core from 10-12 ft
 1005 Collect Shelby Tube sample from
 (photo #3) 12-14.5 ft - Brick ^{at bottom} plugged 2.0 ft
 of recovery leaving only 0.5 ft
 Weather cool, dry Cloudy - mid 50s

1023 Collect SPT @ 15' (14-15-50/6)

1030 check on sediment processing
DGS-28 recovery 9.3 ft after
 third attempt Homogeneous Brown
 (photo #4) med sand w/ silt [no evidence
 of substantial P.]

1040 Return to GST-06; core collected
 at 15-20 ft

(photo #5) * Black ^{product stained} sand & gravel 18-20 ft
 Appears ^{may} meet substantial product criteria
~~SEC~~ ~~SEC~~ ~~SEC~~ ~~SEC~~ ~~SEC~~ ~~SEC~~ ~~SEC~~ ~~SEC~~ ~~SEC~~ ~~SEC~~

1045 Collect SPT sample 20-21.5 ft
 (19-50/2)

1050 Collect Sonic core 20-25 ft
 (photo #6) Black ^{stained wood chunks & fibers, strong}
 H₂O odor, moist

SEC 10-7-10

Location Gasco, Portland Date 10-7-10 47Project / Client Data Gaps Soil & Sediment Sampling

1135 Collect Sonic core @ 25-30 ft
 Product Saturated - meets substantial
 P. criteria

(photo #7) Photo of sediment core collection offshore

1143 check on Sediment process crew
 just opened DGS-25 12.5 ft
 recovered 1st attempt

Brown silt 00-0.5; ~~0.5 to 12.5 ft~~
 med sand
 (photo #8) ~~Photo of sediment core collection offshore~~
 No evidence of product or sheen
 contamination

1150 Return to GST-06;
 (photo #9) of 25-30 ft core
 meets substantial product criteria

1200 Drillers Break for lunch, Scott
 Coffey leaves site for lunch

1230 Scott Coffey returns to site
 Drillers begin to Grout Hole @ GST-06
 w/ organoclay Bentonite blend 9.9 lbs/gal
 Breathing Zone PIC Readings HCN O ppm VOC 0.0 to 0.1
 1335 Bent. organoclay slurry added to 10 ft
 bgs; Finish upper 10 ft w/ hydrated 3/8"
 bentonite chips 4.5 bags

1345 Drillers breaking down equipment
 Decan equipment & prepare for moving Rig
 to GST-09

SEC 10-7-10

Location Gasco, Portland Date 10-7-10Project / Client Data Gaps Soil & Sediment Sampling

1345 PID Headspace Readings for GST-06

	HCN	VOC
0-2.5	0	0.7
2.5-5	0	23.5
5-7.5	2	0.2
7.5-10	0	0.3
10-12.5	0	0.4
12.5-15	3	10.3
15-17.5	3	5.8
17.5-20	0	7.0
20-22.5	0	1.7
22.5-25	2	9.3
25-27.5	5	107.0
27.5-30	4	330

1405 Sediment process crew is cutting open DGS-10 which is an ^{contingent} archive sample ^{which sample recovery} 12.5 ft of ^{0.0-0.1 3rd attempt} recovery. General Description - Drk Gray-Brown silt w/ wood fibers & sheen < 2 inches 0-2 ft Drk Gray-brown sand w dime size sheen spots very limited number Below 2 ft - clean sand; No evidence of Substantial product

AEC 10-7-10

Location Gasco, Portland Date 10-7-10Project / Client Data Gaps Soil & Sediment Sampling

1430 Drillers moving off GST-06 Hole backfilled; moving to GST-09

* photo #9 - offshore sediment sampling boat collecting sediment core

photo #10 - sediment sampling boat dumping ^{preparing to} rejected core. ^{SEC}

1540 Opened DGS-06 recovery @ 16.6 ft sample core and attempt No visible sign of ^{contamination} ~~product~~ along entire core. Drk Brown-olive silt layers w/ med sand, slight H Cedar at the top.

photo #11 0-11 ft of core

1600 SEC # Drillers leaving site

AEC 10/7/10

* Same description & photo # as previous page

Location Gasco, Portland Date 10-8-10
 Project / Client Data Gaps Soil & Sediment
Sampling

- 0645 ^{SEC} Arrive on site
 0700 Drillers & Anchor Crew on site
 0700-0720 Conduct H&S meeting; Discuss
 nearest AED location & River biohazard among
 other safety awareness topics in both
 Cascade's & Anchor's plan
 0730 Drillers ^{too} setting up equipment
 @ GST-09
 0850 Begin Drilling GST-09
 w/ SPT sample 0-1.5 ft
 (10-8-10)
 0800 Collect core 0-5 ft
 photo #1 overview of GST-09 site
 w/ safety zones delineated
 photo #2 sample core 0-5 ft
 photo #3 photo of sediment core box
 collecting offshore sed core sample
 0820 Collect split spoon SPT 5-6.5 ft
 (12-8-5) 5-inches of Recovery in SPT
^{Rock + Rubble}
 0829 Sonic Core collected 5-10 ft
 No Recovery
 0900 Collect SPT 10-15 ft (50/4")
 Rock (Rip-Rap)
 AEC 10-8-10

Location Gasco, Portland Date 10-8-10
 Project / Client Data Gaps Soil & Sediment
Sampling
 GST-09 log (per Matt Wison)

- 15.4 AEC
 0 to 6.6 Dark Brown, stiff, dry, crumbly, gravelly
 Silt, non plastic, fine to cobble size
 gravel, sub angular to angular, roots at surface
 trace brick and concrete pieces (FILL)
 @ 2.2 - 2.7 ft hand concrete
 @ 2.7 ft abundant coarse to cobble size gravel & concrete
 chunks
 @ 5 ft rusted metal door hinge
 - core blockage, large chunk of concrete in
 bit of sampler
 @ 10 ft wood frags
 @ 10-10.9 ft vesicular basalt chunk (rip rap)
 @ 12 ft moist AEC
 @ 15 ft very damp stiff, damp
 15.4 @ 15.4 ft Black, strong HC-like odor
 6.6 to 18 Black loose, fine-med grained, poorly
 graded SAND, sticky strong HC-like odor
 * substantial
 product semi-solid product throughout, oily
 18 to 19 ft lampblack and wood chips (FILL)
 19 to 20 Dark olive gray, moist, moderately plastic, soft
 Silt w/ sand, moderately HC-like odor
 fine sand (Alluvium)
 20-21.5 Dark gray-brown oxidized, very soft, wet, low
 plastic sandy Silt w/ intermittent thin sand
 layers, soupy, slight HC-odor poorly graded
 fine sand, slight HC-odor
 21.5 to 30 TD Dark gray oxidized, w/ soft, wet plast.
 low
 soupy, Silt, w/ intermittent thin
 sand layers soupy, slight HC-odor

AEC 10-8-10

Location Gasco, Portland Date 10-8-10Project / Client Data Gaps Soil & Sediment Sampling

0910 Collect Sonic core 10-15 ft

photo #4 - offshore sediment boat collecting core sample; crew using absorbant sock to mop up sheen

0925 Collect SPT 15-16.5 ft (12-12-16)

0930 collect core 15-20 ft

photo #5 Product saturated sand w/silt/gravel 0.3 in the Breathing zone core appears to meet substantial P. criteria

0935 check sediment core processing

D65-20 Dark Brown med Sandw/some silt; Layer of silt = 1.8-2.0 ft
13.7 ft sample core recovered

Note: Deltas between boat crew logged recovery & core sample are the result of 1 ft removed at bottom for sample catcher & voids near the top of the core tube

D65-20 had a void ^{from} 10.3 to 11.1 ft sand; possibly separated and dropped downphoto #6 but process crew will log core as is. No visible sign of contamination

1015 Return to GST-09; Successful Shelby Tube collected - full recovery 20-22.5 ft

SEC 10-8-10

Location Gasco, Portland Date 10-8-10Project / Client Data Gaps Soil & Sediment Sampling

GST-09 headspace readings

	HCN	Vol
0-2.5	0	0.0
2.5-5	0	0.0
5-7.5	0	0.0
7.5-10	NA	core blockage NA
10-12.5	0	0.0
12.5-15	0	0.1
15-17.5	0	90.0
17.5-20	0	55.0
20-22.5	NA	shelby Tube NA
22.5-25.2	0	4.6 HEC
25.0-27.0	0	0.0 0-0.0

1105 SPT sample collected 22.5-24 (3-2-3)

1115 collect core sample 22.5-25

1145 SPT sample collected 25-26.5 (3-4-5)

1155 collect core sample 25-30 ft

1205 Return to sed core processing
currently processing D65-23

mass Recovery 15.2'

Total core length to Process 144'

2nd Attempt slight HC odor at top 1 ft other wise no evidence of contamination

HEC 10-8-10

Location Gasco Portland Date 10-8-10
 Project / Client Data Gaps Soil and Sediment
Sampling

1210 Drillers mixing ^{organic clay/Bent-} grout 10lbs/gal mix
~~SEC~~ Abandon/Grout GST-09

1235 Drillers complete Grouting/
 hole abandonment & Begin
 Breaking down rig/mobing
 offsite, Decon equipment

1300 Return to Sediment Core
 Processing area Record
 Core recovery summaries (see adjacent
 page) while crew take lunch
 break

1345 Leave site; Ask Sediment
 process crew to keep me
 informed of any processing
 performed in the afternoon of
 weekend

1645 Received email from Nathan (Anchor)
 lead ^{core} process staff
DGS-18 was processed and
 impacted (substantial product) from
 0 to ~4.5 ft

SEC 10-8-10

Location Gasco Portland Date 10-8-10
 Project / Client Data Gaps Soil and Sediment
Sampling

Product	Sediment Core Recovery Summary		Total length of Core to Process
	(ft)	%	
N DGS-13	17.5	88	16.9
Y DGS-11	17.7	89	17.1
Y DGS-19	15.5	78	14.9
N DGS-03	15.4	77	14.8
N* DGS-30	14.1*	72*	13.5
Y DGS-08	9.8	59% ⁴⁹	9.2
N DGS-28	9.3	47	8.7
N DGS-25	15.3	77	14.5
N DGS-10	13.4	71	12.5
N DGS-06	17.0	85	16.4
N DGS-20	14.5	74	13.9
N DGS-23	15.2	76	14.6
(* Note Numbers modified from 12.6 65)			
Y DGS-18	10	53%	9.6

SEC 10-8-10

Location Gasco, Portland Date 10-11-10
 Project / Client Data Gaps Soil and Sediment
Sampling

0700-1010 Travel to GASCO, Portland
 1010 Arrive @ Gasco Guard Station - check-in

Earlier Today ~ 0830
 Opened DGS-44: Dk Gray med
 Grained Sand w/ Trace Silt
 No ~~evidence~~ ^{visible sign} of contamination
 3rd attempt 9.1 ft
 9.7 ft - 9.1 ft

1020 Processing DGS-37: Dk
 Gray Silt w/ fine sand ^{some} Some
 areas of Black Bands, some
 have wood frags - Bands are
 1/4 to 1-inch

1st attempt Recovery 19.5' - 98% - 19.0' ^{came to process}

No evidence of contamination

1045 leave processing site for Siltomics
 property

1055 check-in @ guard gate: Driller
 Began hand augering @
 GST-11 @ 0930

1130 Complete Security check-in
 process

1144 Collect SPT @ 10-11.5 (11-11-12)

1150 collect some core 10-15; Bore
 fine-med Sand w/ gravel

1200 photo #2 overview of Drill site
 GST-11

ACC 10-11-10

Location Gasco, Portland Date 10-11-10
 Project / Client Data Gaps Soil and Sediment
Sampling

GST-11 (per Matt Wilson log)

0 to 21.5 Dark brown, dry, very loose, well graded
 med to coarse Sand, Trace fine gravel (Fill)
 @ 2 ft cobble size gravel piece
 @ 10 ft medium dense
 @ 12-12.5 ft slightly cohesive, dense, ^{silt}
 @ 14.5 ft slightly cohesive, trace ^{silt}
 dense
 @ 14.5-15.2 ft slightly cohesive, silty sand layer
 dense
 @ 20-21.1 dry, hard, dense silty, fine sand
 @ 21.1-21.5 wet mottled dark red & black med coarse
 sand
 @ 21.5 - Basalt chunk, slight HC-like odor

21.5 to 27.1 Black med dense, wet silty Sand w/
 gravel, f.m sand, f.c gravel, low plast.
 silt, slight HC-like odor (Fill), trace wood
 pieces, metal, broken glass

@ 26.4-27.1 compacted, dense, slightly cohesive

27.1 to 30.8 Dk Brown gray, loose, wet well graded, f.c
 Sand w/ gravel, well rounded fine-course
 gravel (Fill)

30.8 to 33.5 Dk brownish gray w/ rust colored mottling, firm
 wet, low plast. Sandy Silt, trace HC-like odor
 (Alluvium)

33.5 to 35.7 Brown, loose, very wet, fine grained, poorly
 graded SAND, w/ silt, no odor
 @ 35.6-35.7 - Silt Layer

35.7 to 43.3 Dark Gray loose, wet, poorly graded fine
 grained SAND w/ silt

43.3 to 44.5 Dark gray-brown, moist, firm, highly plastic SILT
 Trace fine sand
 44.5 to 45 TD Dark brown, loose, poorly graded fine sand
 w/ silt

10-11-10

Location Gasco, Portland Date 10-11-10
 Project / Client Data Gaps Soil & Sediment
Sampling

- 1215 collect SPT @ 15-16 ft (16-15-12)
- 1225 collect core 15-20 ft very dense - slow drilling - heating up core
 # Sample
- 1240 collect SPT @ 20-21.5 ft (3-15-27)
- 1255 collecting core 20-25 ft
 process crew calls and notifies me DGS-26 is open & they are beginning to process the core
- 1307 photo #3 - ^{GST-11} 23-25 ft portion of sample very dark brown silt w/ fine sand trace gravel
- 1338 Review DGS-26: Dnk Gray med Sand w/ some silt product staining/sheen irrediment
photo #4 silver color from 1-4.8 ft
 Attempt 3 11.8 598 11.3
 → considered ^{meeting} substantial product criteria; No visible sign of contamination below 4.8 ft
- 1410 Return to GST-11; currently collecting Shelby Tube
 ke 10-11-10

Location Gasco, Portland Date 10-11-10
 Project / Client Data Gaps Soil & Sediment
Sampling

- 1415 Shelby Tube Successful - full push & complete recovery ~~30-32.5~~
~~32~~ - 34.5 ft
 when processing site:
- 1330 SPT 25-26.5 (11-26-17)
- 1354 SPT 30-31.5 (7-4-4)
- 1430 collecting core ~~30-35~~ 35 ft
- 1440 collect SPT ~~35-36.5~~ (0-0-0)
 very soft
- 1450 collect 35-40 ft core
photo #5 sample on table
- 1505 Jay - Sediment processing crew called just opened DGS-31
 some small intervals appear to meet substantial product criteria.
- 1515 collect SPT @ 40-41.5 (3-4-1)
- 1540 collect sonic core 40-45 ft
 Brown silt w/ sand; No visible sign of contamination
- 1545 Leave Sitratics site to check sediment core DGS-31
- 1610 - 15.8' recovered - 798 - 15.1' to process
 no visible sign of contamination; appears to meet S.P. criteria
 0 to 1.3 ft HC odor & sheen;
 1.3-1.9 saturated med sand, NAPL, 1.9 → 15.1' ^{Below} Dnk Gray med sand.
 No sign of contamination
 ke 10-11-10

Location Gasco, Portland Date 10-11-10
 Project / Client Data Gaps Soil & Sediment
Sampling

Summary of GST-11 headspace

Depth	HCN	VOC	
0-2.5	100	0.0	
2.5-5	20	0.0	
5-7.5	190	0.0	
7.5-10	0	0.0	
10-12.5	0	0.0	
12.5-15	0	0.0	
15-17.5	3	0.2	
17.5-20	8	0.0	
20-22.5	10	0.4	
22.5-25	2	1.0	
25-27.5	17	2.0	
27.5-30	33	0.5	
30-32.5	46	0.7	
32.5-35	2	0.2	
35-37.5	2	0.1	
37.5-39	0	0.1	
40-42.5	2	0.0	42.5-45 † 0.0

1620 Sediment Crew cutting open

DGS-32 ^{recovery} 14.2' 84% 13.6'
 Drillers @ GST-11 Backfill Boring
 and pick-up equipment;

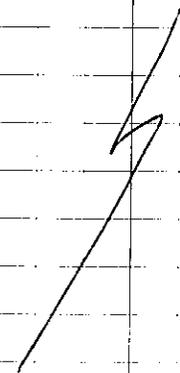
AEC 10-11-10

Location Gasco, Portland Date 10-11-10
 Project / Client Data Gaps Soil & Sediment
Sampling

1625 photo #6 DGS-32 Sediment
 Core photo 10-11 ft seam ~~at 10.4~~
 with moderate HCN odor
 Sheen 10.4 - 10.6 - Does not meet S.P. criteria
 Appears to meet saturated product interval 3.3 - 3.7A
 Other areas from 0-3.3 ft have light
 to moderate sheen but it ~~is~~ layered and
 less than 2-inches thick! dk Gray Sandy
 silt w/ small wood chunks to 6.5 ft

1645 Drillers off site @ 5:11 PM / CS
 will finish breaking down
 equipment / Decom @ GST-11
 site and mob to GST-13

1700 Scott Coffey, Drillers, Anchor Soil Crew
 offsite



AEC 10-11-10

62

Location Gasco, Portland Date 10-12-10
 Project / Client Data Gaps Soil & Sediment
Sampling

0650 Arrive @ Silttronics site
 Check into security / obtain badge

0700 Drillers arrive on site; Cascade
 and Anchor conduct H&S meeting

0730 meet Tony Silva (MRA representative)
 Drillers begin to mob to GST-13

0850 Drillers still setting up; leave site
 to check on core processing

0915 currently processing DGS-45
 11.8 recovered - 8.4 ft = 10.4' to process
 Brown med Sand; ^{no silt} No visible

Sign of contamination along entire
 core Told by crew DGS-45 was an extra core
 to verify absence of contamination

0930 Leave core processing site &
 return to GST-13

0900 Drillers started hand auger
 to 10 ft @ GST-13

0940 Reached 10 ft w/ Handauger
~~10 ft~~ Brown med Sand w/ silt

SEC 10-12-10

63

Location Gasco, Portland Date 10-12-10
 Project / Client Data Gaps Soil & Sediment
Sampling

Photo 1 - Overview photo of GST-13
 Drill Site

Photo 2 - Overview photo of GST-13
 Drill Site w/ ^{mss} Boat offshore collecting
 surface ^{sediment} grabs

Photo 3 - close up of offshore mss
 Boat collecting sediment surface
 grab - off silttronics shore

1005 Nathan calls to let me know
 they just opened DGS-24

1010 Collect ^{GST-13} SPT @ 10-11.5 ft
 (13-19-20)

1020 collect core 10-15 ft

1036 collect SPT 15-16.5 ft (8-16-12)

1043 collect core 15-20 ft

photo 4 - mss boat offshore collecting
 surface grab

photo 5 - 15-20 ft core on table, steaming
 due to ^{heat} friction from drilling action

SEC 10-12-10

Location Gasco, Portland Date 10-12-10Project / Client Data Gaps Soil & Sediment Sampling1100 called Nathan @ core processing
He summarized what they found in

DGS-24 12.2' ^{recovery} 87% 11.3' ^{core to process}
 Brown Sandy silt. Bands of Sand saturated w/ product
 w/ waxy clay Sand layers from 6.7' to 7.6', 7.8' to 7.9' and 10.0' to 10.7' ^{Diagonal to}
 these bands appear to meet substantial P. criteria

1107 collect SPT @ 20-21.5 ft
(10-16-20)

1115 collect 20-25 ft core

GST-13 Headspace summary

	HCN	VOC
0-2.5	0	0.0
2.5-5	0	0.0
5-7.5	0	0.0
7.5-10	0	0.0
10-12.5	4	0.1
12.5-15	1	0.0
15-17.5	1	0.1
17.5-20	2	0.1
20-22.5	2	0.1
22.5-25	2	0.2
25-27.5	32	1.9
27.5-30	10	0.4
30-32.5	7	0.2
32.5-35	3	0.1
35-37.5	1	0.1
37.5-40	2	0.1
40-42.5	1	0.1
42.5-45.0	1	0.1

DEC 10-12-10

Location Gasco, Portland Date 10-12-10Project / Client Data Gaps Soil & Sediment Sampling**GST-13** (per Matt Urban Log)0 to 1.9 Brown, dry loose Silt w/ organic material, many roots
and rootlets, low plasticity. (top soil) (FILL)1.9 to 2.3 Dark Brown, dry, loose, well graded, fine to coarse
Sand w/ gravel, f-c well rounded gravel, trace
rootlets (FILL)

e 13.2-13.7 ft dense, compacted layer

e 13.7 ft Slightly silty

e 14.5-15.6 ft Dense, compacted layer

e 15.6 ft moist

e 16.5 ft - 20.6 slightly silty, slightly compacted

e 20-20.6 ft Dry

e 20.6 ft very moist

e 21.7-22.1 ft mixed Dark gray-brown Sand

e 23.0 to 23.5 Dark gray Sand

e 25.0 to 25.3 slightly silty, compacted layer

25.3 to 30.1 Dark gray, wet, loose, well graded, med-
coarse Sand, slight HC odor, trace
well rounded gravel (FILL)30.1 to 36.5 Dark gray w/ rust colored mottling, wet, firm,
moderate to high plast, SILT, trace fine Sand
(Alluvium)

e 35.3-35.4 Sand layer fine

e 36.0-36.2 Sand layer "

e 36.3-36.5 Sand layer "

36.5 to 40 Dark brown, wet, firm, moderate to high
plasticity, Sandy SILT, fine Sand layers40 to 45 Gray-Brown SILT w/ intermittent sand layers, wet,
42-45 fine silty sand layers high plast.

AEC 100

Location Gasco Portland Date 10-12-10
 Project / Client Data Gaps Soil & Sediment
Sampling

1138 Collect SPT @ 25-26.5 ft
 (10-7-5)

1147 collect core 25-30 ft

Color change from Brown to black

1200 Leave GST-13 site to check

processing of DGS-36
 recovered 10.8 82% 10.0 core to
 refusal @ 13.2 ft process

Dark gray silt w/ very small < 2 inch
 seams of sheen w/ wood in sand layers
 6-6.7 and 2.4 - Does not meet substantial
 product definition

1315 Return to GST-13

photo 6 Just collected a Shelby Tube
 32.5 - 35 ft full recovery

12:45 collected SPT @ 30-31.5 ft (1-4-B)

1325 collect core "clean-out"
 32.5 - 35 ft

1330 collect SPT @ 35-36.5 ft (2-2-3)

photo 7 close-up overview of MSS
 Boat collecting surface grabs

1345 Collect Sonic Core 35-40 ft

1400 Collect SPT @ 40-41.5 (3-5-6)

AEC 10-12-10

Location Gasco Portland Date 10-12-10
 Project / Client Data Gaps Soil & Sediment
Sampling

1410 Collect Sonic Core @ 40-45 ft

1415 DK Gray Silt Sandy Silt

photo 8 processing 40-45 ft core
 @ GST-13

1430 T.D @ 45 ft; no visible sign
 of contamination in boring samples
 Leave site to check on

DGS-22 processing

Drillers will backfill GST-13
 w/ Bentonite chips

[13.8 - 99% - 13.3' to process]

1445 DGS-22 Dark brown silt

w one band ~~2~~ 2 inches that

photo 9 1.9 - 2.1 ft interval ^{AEC} looks like
 it appears to meet substantial product.
 Nothing impacted beyond ^{except} small thin layers
 < 1-inch of sheen

1605 Open DGS-07 Dark ^{olive} brown silt w/ sand; several

Bands of Black Stained product
 laden intervals - sheen and oily bubbles

photo 10

photo 11

photo 12

photo 13

photo 14

photo 15

photo 16

photo 17

photo 18

2.2 - 2.7; 3.0 - 3.7; 3.8 - 4.2; 4.8 - 5.3

5.6 - 6.3; 6.5 - 6.6; 7 - 7.2; 7.9 - 8.0

8.8 - 8.5; 8.7 - 9.1; 9.7 - 10.0; 10.5 - 10.9

11.6 - 11.8; 12.5 - 13.2
 AEC 10-12-10

Location Gasco, Portland Date 10-12-10Project / Client Data Gaps Soil & Sediment
Sampling1615 DGS-07 processing
recovery 14' 100% 134 core to process1700 SEC leaving site while
sediment crew finish processing
samples for DGS-07

SEC 10-12-10

Location Gasco, Portland Date 10-15-10Project / Client Data Gaps Soil & Sediment
Sampling0645 Scott Coffey arrive @ Cathedral Park
Stratus Corporation (Drilling Contractor)

0700 Matt Wilson arrives for Anchor PEA

0715 John R. & Doug L. arrive

0720-0800 Drillers, Anchor Load Equip.
photo #1 onto ^{Landing Craft} barge - operated by Diversified marine0800-0830 Conduct Health & Safety meeting
Scott (Driller) 4 helpersGo over PFD, man overboard calls, AED
use & location, River Biohazard0830-0900 Depart Cathedral Park
& Boat to beach site @ toe of
Riverbank on Sironics property0900-1030 Arrive @ Beach, unload
equipment & set up over baring
location; using Excavator to
photo #2 remove rip-rap ^{to access Geoprobe} areasphoto #3 Taken from beach - Equipment offloading/Excavator
removing rip-rap area for Drill sitephoto #4 GSM-14 site safety zone
demarcations

SEC 10-15-10

Location Gasco, Portland Date 10-15-10Project / Client Data Gaps Soil & SedimentSampling1040 Begin SPT ^{0-1.5} (1-7-8)
Drilling GSM-14

1045 Collect core ~3.1 ft of recovery

1100 Drillers encounter large Rock
w/ Auger and unable to advance
auger; move over (north) ~3ft1115 Drill rig moved over; able to push
auger down; collect SPT ~~e 1.5-6.5~~
(~~4-3-6~~) (3-6-3)

1130 Collect core 5-10 ft full recovery

1215 collect Shelby Tube 10-12.5 ft

1230 Full recovery of Shelby Tube sample

1245 collect SPT ~~10-11.5 ft~~ ^{12.5-14 ft} (1-1-1)

1250 collect core 12.5-17.5 ft

photo 5 Drk Gray silt w/ ^{fine} sand1320 TD @ 17.5 ft; Drillers begin
to backfill/abandon hole w/
Bent chipsphoto 6 photo of work site w/ landing craft
Bent1400 GSM-14 Backfilled w/ Bent chips
Breakdown site equipment1430-1500 Leave site for Cathedral Park to
offload photo 7 - St. John's Bridge

AEC 10-13-10

Location Gasco, Portland Date 10-15-10Project / Client Data Gaps Soil & SedimentSampling

GSM-14

0 to 1.4 Drk Brown, loose, wet, Silty-Sandy Gravel,
fine-cobble size, angular gravel, fine-course
Sand (Fill)

1.4 to 2.6 ft - Rock - Rip Rap (Fill)

2.6 to 6.7 ft Drk Brown, wet, loose, med-course well graded
SAND, trace silte 5 ft color change to drk brown and drk gray
mixed

e 5-6.7 ft trace fine gravel

6.7 to 13.8 Dark grayish brown, wet, firm highly plastic SILT
w/ sand, fine sand (Alluvium)

e 7.3-7.5 med sand layer

e 9.4-9.5 med " "

13.8-17.0 Drk gray Silty Sand

e 13.8-14.1 fine sand

14.1-14.3 silt

14.3-14.9 fine sand wet, soupy

14.9-15.4 silt

15.4-15.8 Silty fine sand

15.8-16.2 silt

16.2-17.0 silty fine sand

17.0 to 17.5 Drk gray ^{brown} silt, firm wet, high plast
TD SILT

AEC 10-15-10

CDM



"Rite in the Rain"
ALL-WEATHER
ENVIRONMENTAL
No. 550F

*Siltronic /
Gasco
Portland Harbor*

"Rite in the Rain"
ALL-WEATHER WRITING PAPER



ALL-WEATHER
ENVIRONMENTAL FIELD BOOK

Name CDM

Address 319 SW Washington St. Suite 900
Portland, OR 97204

Phone _____

Project Portland Harbor
Siltation/Gasco
Portland, OR

This book is printed on "Rite in the Rain" All-Weather Writing Paper - A unique paper created to shed water and enhance the written image. It is widely used throughout the world for recording critical field data in all kinds of weather. For best results, use a pencil or an all-weather pen.

Specifications for this book:

Page Pattern		Cover Options	
Left Page	Right Page	Polydura Cover	Fabrikoid Cover
Columnar	1/4" Grid	Item No. 550	Item No. 550F

© 1996 J. L. DARLING CORP.

CONTENTS

PAGE	REFERENCE	DATE
1-3	Table of Contents	
4-10	Oversight of TZW and Groundwater Sampling	9/13/10
12-21	Oversight of TZW and Groundwater Sampling	9/15/10
22-29	Oversight of Area 1 TZW + Groundwater Sampling	9/17/10
30-35	Oversight of Area 1 TZW and Groundwater Sampling	9/20/10
36-44	Oversight of Area 1 TZW and Groundwater Sampling	9/21/10
45-51	Oversight of Data Gaps Invest - Sediment Cores	10/4/10
52-62	Oversight of Data Gaps Invest - Sediment Cores	10/5/10
63-68	Oversight of Data Gaps Invest - Sediment Cores	10/8/10
69-75	Oversight of Data Gaps Invest - Sediment Cores	10/12/10
76-80	Oversight of Data Gaps Invest, Sed. Grabs	10/14/10
81-86	Oversight of Sediment Grabs (Resampling)	4/18/11
87-91	Oversight of Sediment Grabs (Resampling)	4/19/11

Reference Page Index

- 147 Error codes, Hazardous classifications, Container types
- 148 Sampling guidelines (Liquids)
- 149 Sampling guidelines (Solids)
- 150 Approximate Volume of Water in Casing or Hole, Ground Water Monitoring Well
- 151 PVC Pipe casing tables
- 152 Soil Classification
- 153 Soil Classification
- 154 Conversions (Length, Weight, Volume, Temp, etc...)
- 155 Conversions (Concentrations, Volume/Flow or Time, Velocity, Acceleration)
- 156 Maximum Concentration of Contaminants for the Toxicity Characteristic

Location Casco/Silttronic Date 9/13/10
 Project / Client Oversight of Area 1 TZW
 and Groundwater Sampling

0900 Arrived at Cathedral Park and met James Peale, Maul Foster Alongi. Waiting for Cascade Drillers to arrive. Barge is parked at boat ramp. Weather overcast, 63°F.

0955 Cascade Drilling arrived. Began loading equipment and vehicles on barge. Visqueen was laid down before drilling truck driven onto barge. Photo #1.

0956 Boat driver is Kurt, his assistant is Chris, Diversified Marine.

1025 Cascade Driller began Health & Safety Meeting. Discussed safety procedures associated with the drill rig, pinch points, emergency shut-off, slips trip and fall hazards. AED is located in Maul Foster Alongi (MFA) van on the barge. It is charged and was checked this morning by Cascade. Cascade personnel are trained - two staff trained on AED.

1045 End H&S meeting

1050 moving barge to site.
 Super Dune 9/13/10

Location Casco/Silttronic Date 9/13/10
 Project / Client Oversight of Area 1 TZW
 and Groundwater Sampling

1052 MFA personnel are: Justin Pounds (lead) and Mike Murray. They are establishing exclusion zone, decontamination zone and support zone on barge. Sampling will be done in exclusion zone.

1100 Barge arrived offshore of Silttronic site. Justin, MFA, using GPS to locate first sampling location. Photo #2. Photo #3 shows Silttronic site, taken from barge offshore.

1102 Drillers assembly casing and disk. Photo #4 and #5 show this piece of equipment sitting in the pressure wash decontamination area. White disk sits on mudline to stabilize casing and seal off river water. Photo #6 shows back of drill rig with geoprobe unit sitting (on visqueen) in moon pool.

1108 Photo #7 shows AED sitting on passenger side of MFA truck on barge. Photo #8 shows support zone with canopy, MFA truck, looking toward drill rig.

Super Dune 9/13/10

6

Location Gasco/Siltstone Date 9/13/10Project / Client Oversight of Area 1 TZW
and Groundwater Sampling.1116 Barge is maneuvering to GP-207,
first TZW sampling location.1127 Drillers lowering casing through
moon pool. Photo #9. MFA does
not have water sampling equipment
needed. Waiting to get YSI
and other equipment from James
Peake who is back on shore -
went to his office to get equipment
and will be picked up by tug.1130 Casing is 3" diameter and is being
installed in 5' sections.1140 Drillers measuring depth to ^{water} ~~mudline~~ _{9/13/10}
as casing has now reached mudline.
It is 42.2' from deck to mudline,
and 39.7' from water surface to
mudline. This will change with river stage.1145 Tug left to go back to Cathedral
Park to pick up equipment needed
to begin sampling.1205 Tug arrived back at barge. Brought
YSI and PID. MFA personnel began
calibrating YSI and then measured
river water parameters. Photo #10:

Justin Jones 9/13/10

7

Location Gasco/Siltstone Date 9/13/10Project / Client Oversight of Area 1 TZW
and groundwater sampling.1215 Drillers adding geoprobe water
sampler inside casing. Sampler has
pointed end and four (4")
screen inside. Only 1' of this
screen will be exposed to
TZW to collect it from 1' below
mudline. Photo #11 shows screen
inside Geoprobe sampler.1230 Drillers assembling trip rods
inside geoprobe DP rods. Photo
#12. Photo #13 shows close view
of top of DP rod with trip rod inside.
Then trip rod used to expose
screen 1 foot and collect water
sample. MFA crew want to
verify based on conductivity
if they have collected TZW.1240 Drillers lowering tubing into
rod and then attaching it to a
pump. Set up a drum next to
rig to pump water through YSI
and then directly into drum.
Collection - need to measure 5 gallons
purge volume so pump into measured container
Justin Jones 9/13/10

8 Location Gasco / Siltstone Date 9/13/10
Project / Client Oversight of Area 1 TZW
and Groundwater Sampling

1250 Conductivity of river water was 98 $\mu S/cm$. Conductivity of TZW should be higher. Currently measuring 112 on YSI. Photo #14 shows pump connected to YSI. Photo #15 shows water going from pump to YSI to measured container. Photo #16 is closer view of set-up.

1258 Driller stated (explained to MFA) that screen is attached to drill rod, not outer casing, so screen is moving up and down with barge, and pulled up above mudline. YSI parameters showing water is same as river water parameters. MFA - Justin asked if driller could attach rod to casing to keep it stable. Driller doing that now.

1310 After stabilizing rod/screen still measuring parameters similar to river water. Conductivity is reading 113 $\mu S/cm$.

1315 Justin, MFA and lead driller discuss that water may be coming through casing threads. Driller will tape all the threads.
Get done 9/13/10

9 Location Gasco / Siltstone Date 9/13/10
Project / Client Oversight of Area 1 TZW
and Groundwater Sampling

1345 Taping ^{the 90 9/14/10} to DP rods threads seemed to work. Conductivity of water being pump is much higher now, consistent with what would be expected. Greater than 200 $\mu S/cm$.

1400 Conductivity now back down to ~125. I mentioned to MFA crew that workplan states a plunger teflon ring would be installed on drill rods to push water out. Justin, MFA, discussing with drillers how to do this. Will try to fashion a plunger ring and try again.

1430 Drillers made a plunger out of hard white plastic. Photo #17.

1435 Pulling up drill rods so that they can use plunger.

1450 Photo #18 shows plunger and pointed cap on end of drill rod with screen.

1451 will pull up casing and move over 1' to try to get sample again.

1503 Moving barge over 1' toward the east

Get done 9/15/10

Location Gasco/Silt Trane Date 9/13/10
 Project / Client Oversight of Area 1 T2W
 and Groundwater Sampling.

1522 Casings and drill rods in place. Trip rods used to open screens. Crew is replacing water tubing for new use in this boring.

1525 Beginning to pump water from boring. Conductivity is low $\sim 95 \mu S/cm$.

1610 Conductivity by the YSI meter is still < 100 . However, using another meter, an Oakton meter, conductivity is 7300. Measuring the river water now, conductivity by Oakton meter is 114, YSI = 113.

1620 Justin and Mike, MFA collecting water samples in VOA vials.

Photo # 19 and #20. Filled 4 40ml VOAs for 8260 analysis. Samples were collected even though MFA is not confident in meters or if in transition zone.

1625 Drillers pulling up casing and rods.

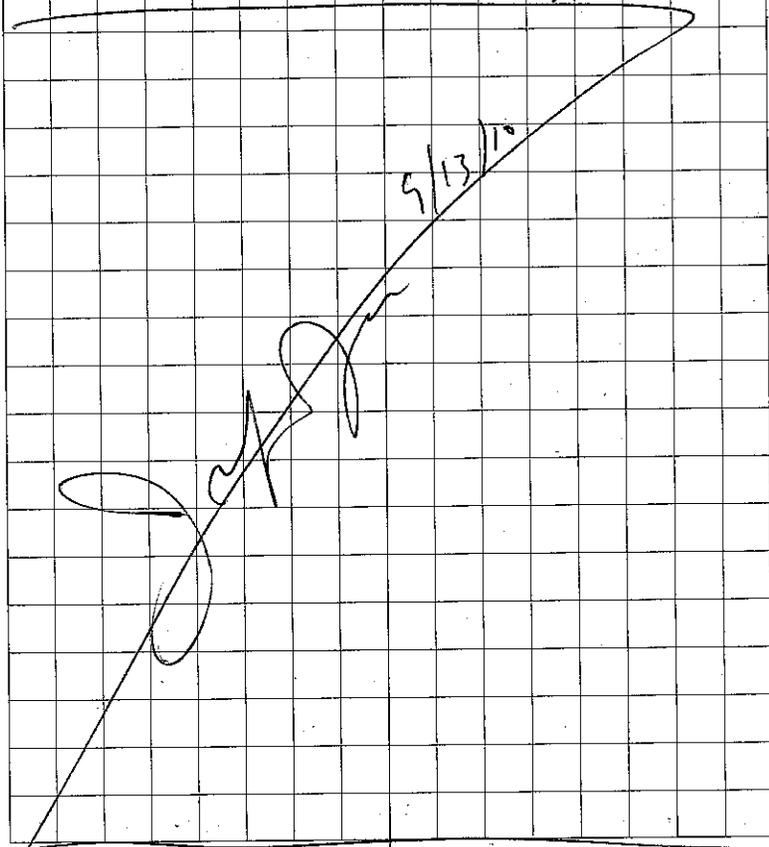
1630 MFA crew using PID in drillers' breathing zone. No elevated readings.

1640 Driller decontaminating drill rods and casings with pressure washer. Photo # 21.

1652 Moved barge back to dock @ Cathedral Park. Depart.
 Trip 9/13/10

Location Gasco/Silt Trane Date 9/13/10 11
 Project / Client Oversight of Area 1 T2W
 and Groundwater Sampling

1653 Correction: barge will remain in this location. They used to transport all personnel back to Cathedral Park.
 1705 Arrived at Cathedral Park and disembarked tug. Work will start at 0700 tomorrow morning.



Location Casco/Siltstone Date 9/15/10
 Project / Client Oversight of TZW and
 Groundwater Sampling - Area 1.

- 0800 Arrived at Cathedral Park
 and met Justin Ponds and Kelly
 Tittmeier of Maul Foster Alzgi (MFA).
 Weather overcast 63° F.
- 0810 Embarked ~~barge~~ ^{at 9:10/10} tug to transport
 to barge.
- 0822 Embarked barge which is
 docked offshore of Casco site
 next to boom. photo #1.
- 0825 Two personnel from Cascade Drilling
 are present: Mark (lead driller)
 and assistant (not here on Monday).
 Two barge operators also present.
- 0830 Pulled up barge spuds. Some
 sheen visible at spud locations
 but no tar or other material
 visible at surface. I mentioned
 to Justin, MFA, that Casco should
 not be used as a location for
 docking the barge, as spuds disturb
 contaminated sediments. He agreed.
 Took photo #2 of water surface
 after spud pulled up. Sheen is
 somewhat visible in surface in photo.
- John Doe 9/15/10

Location Casco/Siltstone Date 9/15/10
 Project / Client Oversight of TZW and
 Groundwater Sampling - Area 1

- 0835 Justin using GPS unit to locate
 first sampling location. He stated
 this would be deep groundwater
 being ~50'. This is GP-30. According
 to Kelly, MFA, groundwater will be
 sampled at both 25' and 50' here.
 Yesterday TZW was collected from
 GP-200, GP-205, and GP-206.
- 0840 Mark, lead driller, lead HES
 meet. New Cascade personnel is
 Zane. Discussed general safety
 procedures, AED location, PPE.
 After HES meeting concluded, I asked
 driller about 1' disk on casing and
 lack of vertical siding. Neither
 driller or Justin knew that this was
 required and Justin stated this
 is the way water sampling was conducted
 during previous investigation. I
 asked driller about weighted
 measuring tape and he stated they
 have one to use today.
- 0900 Spoke with Suttcliffe about
 deviations and will discuss with Justin.
- John Doe 9/15/10

Location Gasco/Sitronie Date 9/15/10
 Project / Client Oversight of Area 1 T2W
 and Groundwater Sampling

- 0915 Justin is aware of need to take depth to water level elevations before sampling groundwater.
- 0916 Barge is now positioned at 6P-30.
 Driller using weighted measuring tape of 41.8' to measure depth to mudline, 21.8' 7/15/10
- Photo #3 41.8' from barge deck to mudline.
- 0917 Justin disembarked barge on tug to transport water samples collected previously to dock. Drillers install casing to mudline.
- 0944 Justin arrived back on barge. Drillers have completed installing casing. Now installing geoprobe rods. All casing and geoprobe rod threads taped to ensure no river water leaks through. PID is stationed near drillers' breathing zone. Photo #4. So far no elevated readings.
- 0951 Geoprobe is now at mudline, resting on it. Correction - geoprobe would sink in to sediment if allowed to stand on its own. It is being attached to winch on drill rig.
- Sub Jon 9/15/10

Location Gasco/Sitronie Date 9/15/10
 Project / Client Oversight of Area 1 T2W
 and Groundwater Sampling

- 1000 Driller measuring depth to water inside geoprobe sampler. Photo #5. Geoprobe is at 25' below mudline. Water level is at river level. That is, water level inside geoprobe = water level of river surface.
- 1005 Driller installing trip rods. Once installed, opened screen of geoprobe sampler 4'.
- 1022 Began pumping. Water is very dark - reddish brown. Driller stated it might be rust from the rods. Conductivity is reading 455 $\mu\text{S}/\text{cm}$. Kelly, MFA, stated YSI used Monday was set to read specific conductivity, hence the strange readings. Temp is 18.5 $^{\circ}\text{C}$, DO = 0.53 mg/L, pH = 6.87, ORP = 93.2. Fe (iron) will be measured using a Hach colorimetric kit.
- 1047 Have pumped about 1.75 gallons. Parameters fairly steady: Temp = 18.55 $^{\circ}\text{C}$, conductivity 693 $\mu\text{S}/\text{cm}$, DO = 0.46, pH = 6.70, ORP = -18.0. Pump is running slowly to keep turbidity down.
- Sub Jon 9/15/10

Location Gasco/Siltstone Date 9/15/10
 Project / Client Oversight of Area 1 TZW
and Groundwater Sampling

1055 Turbidity measured by MFA's Kelly:
 319.1 NTU at 10:34 hrs and
 118.1 NTU at 10:50 hrs. 10:34 was
 at 1 gallon purged and 10:50 was 2 gallons.

Took photo # 6 of Kelly, MFA,
 recording turbidity data.

1120 About 3.75 gallons have been
 pumped. Asked Justin about calculation
 used to determine 5 gallon purge
 volume. At 3 gallons pumped ^{on 9/15/10}

Pore volume is ~~5.75 gallons~~ ^{42.1'}
 (water level initially inside geoprobe)
 + 25' below mudline = 67.1' x 0.023

inside volume of 3/4" well = 1.54 ^{gal} pore
 volume, so + 3 x pore volume = 5 gallons

1140 Reached 5 gallons purged. Justin
 collecting water samples in 4 VOAs.

The following parameters were recorded
 by MFA: at 3 gallons purged: pH =
 6.68, Temp = 18.45°C, Cond = 743 μ S/cm,
 DO = 0.28 mg/L ORP = -95.7. ~~Find~~ ^{off} Turbidity
 = 65.22 NTU. At 4 gal: pH = 6.69, Temp
 = 18.64°C, Cond = 738 μ S/cm, DO = 0.29 mg/L, ORP =

-98.2, Turbidity = 64.33 NTU.

Site On 9/15/10

Location Gasco/Siltstone Date 9/15/10
 Project / Client Oversight of Area 1 TZW
and Groundwater Sampling

1142 At 5 gallons purged, pH = 6.68,
 Temp = 18.64°C, Cond = 727 μ S/cm,
 DO = 0.28 mg/L, ORP = -96.7,
 Turbidity = 63.24 NTU.

1145 Justin measuring iron using Itach Kit.
 Fe = 4.8 mg/L.

1155 Rollers pull out tubing (pump
 still running) so that Justin can
 measure depth to groundwater
 depth = 2.69' which is at the
 river surface. Measured inside
 Geoprobe. Photo # 7.

1200 Spike with drillers about berming
 w/ plastic sheeting around decon
 area at EPA request to keep
 decon water from going over side
 of barge to river. Photo # 8.

124 Justin, MFA, mentioned that due to
 large ship coming into river later this
 afternoon, this will likely be the only
 work done today. Have to work
 around large container ships coming
 through navigation channel. Sampling
 locations are near ^{or in} navigation channel.

Site Done 9/15/10

Location Gasco/Siltstone Date 9/15/10
 Project / Client Oversight of Area 1 TZW
and Groundwater Sampling

1215 Drillers pulling up geoprobe rods.
 Must down screen and rods to collect
 deeper 50' sample. Photo # 9 shows
 drillers decontaminating geoprobe rods.

1250 Drillers making geoprobe rods to
 depth of mudline, then will advance 50'.
 Threads were re-taped after decon.

1303 Geoprobe sampler installed to 50'
 below mudline. Drillers installing trip rods
 to open screen. Then installed tubing.

1320 Began pumping water from 50' below
 mudline. Justin using GPS to
 measure coordinates of barge to make
 sure it hasn't moved off the location.

Justin stated didn't move much, maybe
 0.5', which is probably the amount the
 casing can move inside the moon pool.

1330 Justin's calculations on pore volume:
 42' of water above mudline + 50'
 below mudline = $92' \times 0.023$ ($3/4"$ rods)
 = 2.16 gallons.

1330 Water parameters at 1 gal purged: pH=6.76,
 Temp = 19.33°C, Cond = 671 μ S/cm, DO=0.38 mg/L,
 ORP = -114.3, Turbidity = 179.1 NTU.
 Justin Jones 9/15/10

Location Gasco/Siltstone Date 9/15/10
 Project / Client Oversight of Area 1 TZW
and Groundwater Sampling

13:47 2 gallons purged. Water parameters:
 pH=6.74, Temp = 19.01°C, Cond = 701 μ S/cm,
 DO = 0.11 mg/L, ORP = -121.2, Turbidity =
 71.57 NTU.

14:05 3.1 gallons purged. Water parameters:
 pH=6.75, Temp = 19.32°C, Cond = 715 μ S/cm,
 DO = 0.07 mg/L, ORP = -121.9, Turbidity =
 86.21 NTU.

14:20 Drillers assembling hopper for
 mixing grout when sampling is done.

14:25 4.2 gallons purged. Water parameters:
 pH=6.76, Temp = 19.81°C, Cond = 730 μ S/cm,
 DO = 0.07 mg/L, ORP = -122.1, Turbidity = 145.3 NTU.
 MFA crew concerned that turbidity is
 increasing. Justin pulled sampling tube up
 about 2 inches and clamped it to probe rod
 so that it's not resting on bottom outside screen.

1450 Turbidity increased to 323 NTU.
 Justin called James Peake, MFA Project
 Manager to discuss whether or not to
 go ahead and collect water sample.

15:10 For grout, need $50' \times 0.092$ gal/ft = 4.6
 gallons of grout needed. Outside diameter
 of geoprobe = 1.5" = 0.092 volume
 Justin Jones 9/15/10

Location Gasco/Sitonic Date 9/15/10
 Project / Client Oversight of Area 1 TZW and Groundwater Sampling

1520 Collecting another turbidity sample
 Result = 79.56 NTU. Collecting water samples in VOAs (4). Water parameters recorded at 15:16 with 6.3 gallons (3 pore volumes) purged:
 pH = 6.73, Temp = 19.90 °C, Cond. = 74 µS/cm, DO = 0.10 mg/L, ORP = -119.0, Turbidity = 127 NTU.
 Kelly, MFA, also collecting Fe sample.

1525 Justin collecting reading of depth to water. Depth to groundwater inside geoprobe = 2.0'; depth to water from barge deck = 2.2'.
 Photo #10.

1530 Drillers installing fry rods to push out plug from bottom of geoprobe sampler so grant can be placed into hole.

1532 Driller beginning to mix grant. "Puregold" brand. Getco is maker. Mixing into 5 gallons of water. Water spinkles.

1535 Fe reading = 3.8 mg/L.

1536 Photos #11 and 12 show drillers mixing grant in bucket. Grant is then poured into hopper which is sitting on top of decon tray.

Garth Jones 9/15/10

Location Gasco/Sitonic Date 9/15/10
 Project / Client Oversight of Area 1 TZW and Groundwater Sampling.

1540 water samples kept in cooler on ice

1542 Driller stated using approximately 17 lbs of grant. Mixed with water this is 30% mixture. Used less than 1/2 of 50 lb bag of grant.

1544 Driller beginning to pump grant into sampler. Photo #13 shows attachment of tube from hopper to top of geoprobe.

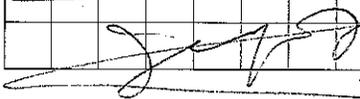
1550 Having trouble getting hopper to pump grant. Driller discovered a check valve was stuck. Able to start pumping grant into hole.

1600 Driller adding more grant as pulling up geoprobe rods.

1625 Granting is complete. Drillers pull up remaining geoprobe rods and casing. Barge will be left here tonight since it is far enough off navigation channel.

1645 Departed on tug for shore. Will call Justin tomorrow afternoon to get start time on Friday.

9/15/10



Location Gasco/Silttronic Date 9/17/10
 Project / Client Oversight of Area 1
TZW and Groundwater Sampling

- 0700 Arrived at Cathedral Park.
 Weather overcast, 62° F, light rain,
 Cascade Drilling personnel loading
 equipment onto tug sitting at boat
 ramp. Justin Pounds, MFA, is
 only MFA personnel present today.
- 0735 Arrived at barge, docked off-shore
 of Silttronic site. Justin stated
 they will deploy the boom around
 the barge first thing. Photo #1 & 2.
- 0750 Driller led H&S meeting. Very
 thorough as there is a new
 driller, Lukas. Justin mentioned
 hazards at site, CO₂s as well
 as hazards of river water.
 AED is kept in MFA van, passenger
 front seat.
- 0755 Noted a light sheet inside boom
 as it's being pulled out. Photo #3.
- 0756 Justin stated new visqueen
 sheeting was laid out yesterday.
 Also, drillers made a new disk for casing
 with 4" vertical slot. Photo #4
 Shows disk on casing.
- Justin Jones 9/17/10

Project / Client Oversight of Area 1 TZW
and Groundwater Sampling

- 0820 Boom is now in place around barge.
 Operator moving barge to first sampling
 location - GP-203. Yesterday, sampling
 was completed at GP-32. Sampling depths
 were 2' and 24' below mudline.
- 0825 Photos #5 + 6 show boom around barge.
- 0826 Photo #7 shows visqueen bermed
 up around decm area.
- 0840 Currently waiting for a large oil
 tanker to pass before moving
 barge further out into channel.
- 0900 Barge is in position at GP-203.
 Drillers lowering casing. Photo #8.
 All casing threads are being taped.
- 0922 Casing now installed to mudline.
 Justin, MFA taking depth to
 mudline inside casing. At top of
 casing to mudline = 52'. Now
 measuring depth to water inside casing =
^{SP}_{Photo} 47.69' - 4.31' Top of casing to water
 52 - 4.31 = 47.69' to mudline. Photo #9
 Shows Justin taking depth to water measurement.
- 0928 Drillers placing all geoprobe rods on
 decm tray to pressure wash.
- Justin Jones 9/17/10

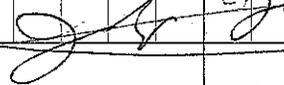
Location Gasco/Siltstone Date 9/17/10Project / Client Oversight of Area 1 TZW
and Groundwater Sampling

- 0929 Justin started sampling at this location, GP-203 will be transition zone water only, so 1' below mudline.
- 0934 Drillers taping all geoprobe sampler threads. Photo #10. Photo #11 shows end of geoprobe sampler with white teflon plunger.
- 0941 Geoprobe sampler at mudline. Justin taking depth to water reading inside geoprobe. He thought screen was open. Driller explained that white plunger ring will not allow the geoprobe to pass through shot of casing. So both are even with mudline.
- 0945 Driller install trip rods to open geoprobe sampler screen.
- 0954 Driller stated he can't push screen down because there is refusal. Justin requested driller pull up geoprobe and then lift casing up so that barge can be moved over < 1 meter to try again.
- 1017 Barge operator moving barge ~ 1 foot east.
- 1035 Casing installed to mudline. Driller pressure washed geoprobe screen and reassembled plunger
John Jones 9/17/10

Location Gasco/Siltstone Date 9/17/10Project / Client Oversight of Area 1 TZW and
Groundwater Sampling

- 1045 Drillers installing trip rods to open screen on geoprobe. Driller was able to advance screen only 8" until hrt refusal. Justin decided to go ahead and pump water from 8" below mudline to see how parameters look instead of just abandoning the barge. Justin stated that barge operator was unable to push one of the spuds into bottom very far as it hit refusal so there may be a large rock at river bottom in this location.
- 1100 Begin pumping water from 8" down. So far, conductivity of sampled water is very high $\sim 1900 \mu S/cm$.
- 1104 Justin sampling river water parameters:
Temp = $18.6^\circ C$, Conductivity = $90 \mu S/cm$,
DO = 7.20, pH = 7.31, ORP = -102.1.
- 1116 At about 1.5 gallons purged, water parameters of TZW = pH = 6.89, Temp = $19.1^\circ C$, Conductivity = $1989 \mu S/cm$, DO = 0.43 mg/L
ORP = -93.9.

9/17/10



Location Gasco/Siltironic Date 9/17/10Project / Client Oversight of Area 1 TZW
and Groundwater Sampling

1125 From MFA's notes: 80 9/17/10
OZP

Time	Purge Vol	pH	Temp	Cond	DO	DTW	Turbidity
1100	1.0	6.70	19.56	1900	0.51	-73.5	190.4
1120	2.0	6.92	19.02	2009	0.45	-713.9	82.39
1135	3.0	6.95	19.11	2023	0.22	-136.2	68.99
1150	3.5	6.96	19.45	2049	0.18	-139.4	15.34

1151 Justin stated 3.3 gallons is 3 pore volumes. ~~with~~ ^{80 9/17/10} purged 4 total before collecting sample. Took photo #12 of MFA collecting water sample in UCA.

1152 Justin's notes state this location is 1.75' east of original attempt. DTW = 4.31, DTB (depth to bottom) = 47.39', pore volume = 1.1 gal.

1155 After tubing pulled out, Justin measuring DTW inside geoprobe. Photo #13. Also measuring DTW in casing. Water level = 4.31' both inside geoprobe and inside casing. This is same as at 0922 hrs.

Drillers pulling up geoprobe and casing.

1215 Drillers decontaminating geoprobe and casing.

1216 Justin stated the next sampling location will be GP-61, where groundwater will be sampled at 5' below mudline. This is further west and out of large ship's way.
George Jones 9/17/10

Location Gasco/Siltironic Date 9/17/10 27Project / Client Oversight of Area 1 TZW
and Groundwater Sampling

1220 Barge operators moving barge to GP-61 while Justin uses GPS unit to guide to location.
1305 Drillers installed casing to mudline and took depth to mudline with weighted measuring tape: 52' to top of casing. Justin also measuring DTW inside casing = 4.05'. $52 - 4.05 = 47.95'$ = depth to mudline.

1320 Drillers have installed Geoprobe sampler to mudline and now advancing it 5' past mudline. Now installing trip rods to open screen 4'.

1328 Justin taking DTW inside geoprobe = 3.9'. This is from top of ^{80 9/17/10} casing, which is how depth to mudline was measured.

1334 Starting pumping from 5' below mudline.

1336 Drillers departing barge on tug to get lunch.

1340 At start of pumping, conductivity ~ 650 $\mu\text{S}/\text{cm}$.

1341 Pore volume calculation = $52 - 3.9' = 48.1 + 5' = 53.1' \times 0.023 \text{ gal/ft} = 1.22 \text{ gal} \times 3 = 3.66 \text{ gal}$ to purge.

George Jones 9/17/10

Location Basco/Siltbronic Date 9/17/10
 Project / Client Oversight of Area 1 T2W
and Groundwater Sampling.

1347 From MFA's notes:

Time	Purge Vol	pH	Temp	Cond	DO	ORP	Turbidity
1343	1.0	6.79	19.53	675	0.35	-97.0	238.0
1400	2.0	6.76	18.98	671	0.25	-99.5	244.6
1414	3.0	6.76	19.44	672	0.24	-100.6	233.2
1436	4.0	6.72	19.35	685	0.18	-100.2	197.1

1410 MFA collecting water samples in 4 VOAs.

1444 After pump turned off and tubing removed, Justin taking depth to water level in geoprobe. Water level = 2.75' from top of casing.

1445 Justin measured Fe = 5.9 mg/L.

1450 Drillers pulling up geoprobe rods and casing and decontaminating them. Photo #14.

1500 I asked Justin if drillers grouted this hole, as I did not observe them doing it, and he asked drillers who confirmed they did not grout the hole. According to workplan should grout any boring greater than 1 foot.

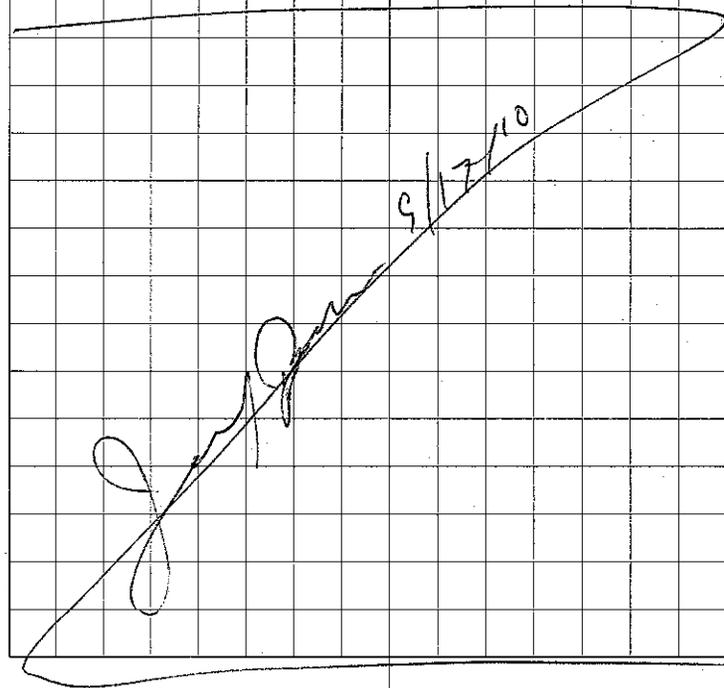
1510 Barge operators lifting spuds. No sheen visible on either side of barge. Operator moving barge to dock offshore of Siltbronic.
 per Jones 9/17/10

Location Basco/Siltbronic Date 9/17/10
 Project / Client Oversight of Area 1 T2W
and Groundwater Sampling.

1520 Driller stated to me that it doesn't make sense to try to grout at 5' since only have 1 foot of geoprobe rod and 4 feet of screen. He stated grout would just blow out and not stay in hole.

1525 Barge docked offshore of Siltbronic at same location as last night. Boom left in place for weekend.

1540 Arrived at Cathedral Park.



Location Basco/Sitroniz Date 9/20/10
 Project / Client Oversight of Area 1 TZW
and Groundwater Sampling

0800 Arrive at Cathedral Park. Weather overcast, 60°F. Justin Pounds, MFA, and Mark (lead driller with Cascade Drilling) and Lucas, driller assistant, present. Embark tug to transport to barge.

0815 Arrive on barge, docked off Sitroniz site. Boom is in place around perimeter of barge.

0820 Cascade Drilling personnel led Health & Safety meeting, then Justin MFA, added a few points about location of AED (front passenger seat of MFA van) and biohazard of river water. Plan for the day is to collect transition zone samples in possible 3 locations. No big ships coming in channel today.

0830 Spoke to Lance Peterson, CDM on phone about work plan deviations. Will discuss these with Justin.

0845 Justin using GPS unit to locate first sample location. Photo #1.
 Justin Jones 9/20/10

31
 Location Basco/Sitroniz Date 9/20/10
 Project / Client Oversight of Area 1 TZW
and Groundwater Sampling

0909 Barge now in place at 6P-204.

0912 Driller measured depth to mud line with weighted tape = 52 feet. Now lowering casing to mud line.

0930 Casing is on mud line. Driller's taping threads of geoprobe sampler.

0940 Geoprobe sampler lowered to casing at mud line. Driller installing trip rods to open screen 1 foot.

0941 Justin stated depth to mud line inside casing = 48.70 feet. This was calculated by 52 feet depth to mud line ^{outside} ~~inside~~ casing - 3.30 depth to water inside casing = 48.70 feet.

0942 Driller using rig to push screen open - unable to push it open by hand.

0945 Justin measuring depth to water inside geoprobe. At casing to 3" depth to water = 3.20 feet. So this is done by lowering depth to water meter inside geoprobe and then subtracting the length from top of geoprobe to top of 3" casing inside geoprobe. Will wait 10 minutes and measure again.
 Justin Jones 9/20/10

Location Casco/Sitka area Date 9/20/10
 Project / Client Oversight of Area / TZW
and Groundwater Sampling

1002 Justin measured depth to water again = 3.20 feet. D.T.W. not change from last measurement so stable. Photo #2. Drillers now inserting sampling tube into geoprobe sampler. Photo #3.

1016 Begin pumping water from 1' below mudline at GP-204.
 From MFA notes:

Time Pump Vol at Temp Cond. DO ORP Turbidity

1017 1.0 6.75 17.89 1715 0.47 -91.4 29.99

1025 2.0 6.79 18.07 1739 0.27 -111.1 19.56

1035 3.0 6.81 18.36 1745 0.23 -117.1 19.98

1040 3.5 6.80 18.40 1744 0.22 -118.1 14.59

1043 Almost 4 gallons purged. MFA collecting water samples in 4 vial vials.

1046 Justin reading depth to water inside geoprobe casing after tubing removed. Depth to water = 3.51 feet

1057 Justin measured depth to water again - 3.21 feet. This is same as prior to purging. Will measure again in a few minutes.

Justin Jones 9/20/10

Location Casco/Sitka area Date 9/20/10
 Project / Client Oversight of Area / TZW and
Groundwater Sampling

1100 Depth to water is 3.21 feet. Was stabilized now.

1105 Drillers pulling up geoprobe and casing. Will decontaminate all equipment prior to sampling at next location.

1118 Barge operators moving barge as guided by Justin using GPS unit. Driller decontaminating geoprobe and casing.

1130 Barge is in place at GP-202.

1140 Drillers lowering casing to mudline.

1155 Justin measured depth to mudline inside casing = 52.14 feet. Now measuring depth to water inside casing = 3.27 feet.

So depth to mudline = $52.14 - 3.27 = 48.87'$

1156 Drillers siphoning gas from truck to generator that powers decom pressure washer.

1207 Geoprobe in place at mudline. Drillers installing trip rods to open screen 1 foot. Again, using drill rig to pound open screen.

1211 Justin measuring depth to water inside geoprobe. DTW = 3.08'

1220 Justin measured DTW again. Same = 3.08'

1224. Begin pumping from 1' below mudline at GP-202.

Justin Jones 9/20/10

Location Gasco/Siltstone Date 9/20/10Project / Client Oversight of Area 1 TZW
and Groundwater Sampling

1225 Drillers left barge on tug to get lunch.

1230 From MFA's notes:

Time	Range Vol.	pH	Temp	Conductivity	DO	ORP	Turbidity
1230	1.0	6.71	18.98	1757	1.22	-95.7	62.65
1246	2.0	6.70	19.21	1794	0.54	-99.7	52.86
1300	3.0	6.70	19.06	1821	0.37	-98.5	37.95
¹³¹⁵ 9/20/10 1320	4.0	6.71	19.96	1824	0.26	-104.2	31.16

1255 Took photo #4 of pump in with purged water being measured. Pump, YSI, are shown in photo.

1316 MFA collecting water samples in 4 VDAs.

1320 MFA measuring depth to water inside geoprobe. 3.12' DTW.

1330 Justin measured DTW again still 3.12'. Drillers pulling up casing and geoprobe.

1340 Drillers decontaminating geoprobe. Justin using GPS unit to guide to next location, GR201. Photo #5 shows decon. Photo #6 shows GPS unit antennae at moon pool.

1400 Took photo #7 showing how plunger on end of geoprobe fits into shoe of casing.

Justin Jones 9/20/10

Location Gasco/Siltstone Date 9/20/10Project / Client Oversight of Area 1 TZW
and Groundwater Sampling

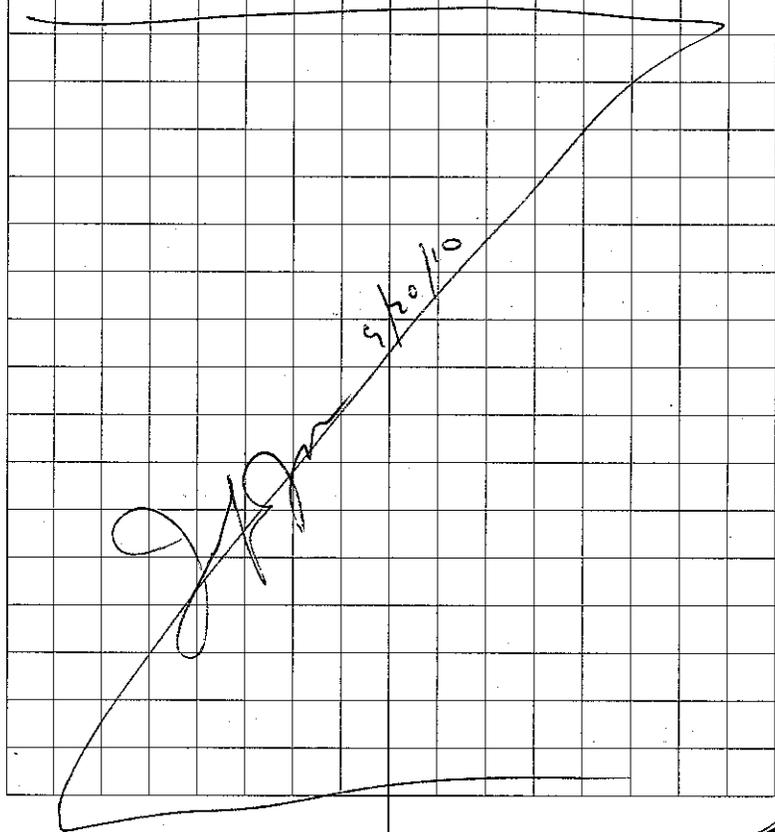
1405 Barge is in position at GR-201. Will sample transition zone water here at 1 foot below mudline.

1406 Drillers lowering casing to mudline.

1420 Disembarked barge on tug to shore.

Took Photo #8 showing barge at GR-201.

1430 Arrived Cathedral Park.



Location GASCO/SilTronic Date 9/21/10Project / Client oversight of Area 1TZW and
and groundwater sampling

0800 - Departed cathedral park boat launch
with Justin pounds of MFA, Mark
(Lead driller) and Lucas Lassis (driller)
Weather is ~60 deg and cloudy, no wind,

0815 - Health and safety meeting on barge,
discussed slips-trips and Falls, PPE,
Pinch points, AED location, site specific
hazards, like contaminated soil & water, ship
and barge traffic causing wake. Mark pointed
out location of geoprobe kill switch, First aid
Kit, spill kits, Fire extinguishers and our
logs:

0830 - retracted spuds and began re-locating
to ^{MPLH 9/21/10} GP-085 GP-065

0855 - Re-located to GP-0⁶⁵ and drillers
Began installing sleeves, teflon tape used.

0856 - photo #1 Drillers lowering first
conductor casing at ^{MPLH 9/21/10} GP-085 GP-065

0905 - Justin said they'll sample GP-0⁶⁵ & GP-038
Today they re-sample at location GP-027
tomorrow. Parameters were not as expected.

0908 - Drillers have hung 52' of casing.
^{TOP OF casing} 52.15 - 3.94 = ^{TO mud} ~~48.21~~
↑
TOP OF casing TO water.

MPLH 9/21/10

Location GASCO/SilTronic Date 9/21/10Project / Client oversight of Area 1TZW and
ground water sampling.

0915 - Drillers begin installing Probe sections.
Spoke to Lance Peterson, he asked
about status of GP-201, Justin confirmed
that this was completed yesterday
afternoon.

0920 - Have placed 54' of rod, bottom
section is 3.7' screen. Placed internal
push rods inside outer rod to push
out 1' of screen at bottom. used
Geoprobe hammer to push inner rod.
groundwater level at 3.81' From top of
conductor casing,

0931 - Lucas decons trip rods with pressure
water.

0936 - water level measured at 3.82'
From top of conductor casing.

Depth to mud = top of casing to mud 52.15' -
Water level from casing 3.82' = ^{MPLH 9/21/10} 49.19' ^{49.19'}
Pore volume calculated for .75" ID rod at
0.023 gal/ft × 49.19' = 1.14 gal
~~49~~ ^{MPLH 9/21/10} 53.15' + 1' screen = 53.15' - 3.81'
= 49.34' From top of water to bottom
of screen × 0.023 gal/ft = 1.14 gal.
Justin stated that they'll purge 3x pore vol.

MPLH 9/21/10

Location Gasco/Siltionic Date 9/21/10Project / Client oversight of Area 1 TZW
and ground water sampling

0950 - Photo #2 of Purge of GPO65.

Water quality data GPO65-W-1.0 (YSI-556 MPS)

Water Quality data MPA 9/21/10

Time	Purge vol	pH	Temp	E Cond	PO
952	1.0 MPA	7.21	18.00	724	0.39
1004	2.0	7.02	17.98	719	0.38
1016	3.0	6.99	18.20	721	0.20
1030	4.0	7.06	18.34	721	0.16

1030 Turbidity measured using orbeco TB200

1032 Samples taken, using 4 VOA's, Photo #3 taken of sampling.

1037 Parasaltic tubing removed and discarded.

1040 ^{MPA 9/21/10} ~~Pop~~ water level from top of casing = 4.15'

1050 Water level from top of casing = 4.16

1054 Drillers begin removing DP rods.

1059 Lucas begins decoupling of DP rods.

New SS screen & expandable tip is assembled.

1100 Justin measured air quality around
moon pool & waste water container
ND - 0.4 ppm1107 Drillers begin lowering DP rods & screen
down in place conductor casing to sampleLocation Gasco/Siltionic Date 9/21/10Project / Client oversight of Area 1 TZW and
ground water sampling

GPO65 at 3' below mud line.

1115 DP Rods encountered resistance at ~40-45'

Mark needed to hammer rods to get to depth

1123 Trip rods were installed

1126 Hammering caused outer casing to
drop 2'. Therefore an additional 2' extension
was added to conductor casing. DP
Rods & screen were pushed 1' beyond
conductor casing to equal 3' beyond
mud line.3.07' From top of conduit casing to
water, now casing is 54'
1130 12.7' ^{IN} From inner rods From top of
casing to water level.1135 Mud line measured at 37' From top
of casing.54.0 Feet of casing - 3.07 casing to water =
50.93 From bottom of casing to water line.
Case is ^{MPA 9/21/10} 2.7' lower than
previous. ^{MPA 9/21/10} assuming by calculating
previous depth to mud line = 48.21' so
50.93 - 48.21 = 2.72'. Screen was
pushed 2.72 - 3.72 below original mudline.

MPA 9/21/10

Location GASCO/Silttronic Date 9/21/10
 Project / Client oversight of Area 1 TZU and
groundwater sampling.

1155 began pumping but very little flow
 Through pump. check valve installed
 on tubing. ~~Water level measurement~~
~~taken on DP rods~~ ^{MPH 9/21/10}

1200 Justin decided to move slightly and
 re-drill for 3' sample.

1210 drillers are having problems removing
 DP rods from conducting rods but were
 able to free them and recover everything.

1234 Picked up spud on east side of barge
 to pivot rig ~ 1.5' NW of original location.
 For second drill of GPO65 for 3' depth
 sample. Drillers began taping threads
 on outer conduction casing.

1250 photo # Drillers lowering 3' conduction
 casing for GPO65

1255 Drillers lowered 52' of casing depth to
 mudline = 52.02 measured using weighted
 tape. depth to water = 4.79' from top
 of casing. Therefore top of water
 to top of mud = $52.02 - 4.79 = 47.23'$

1300 - Drillers lower DP rods & new ss screen
^{MPH 9/21/10}
 Justin decided and new trip rods.

1312 - Trip rods were held in place as
^{MPH 9/21/10}

Location GASCO/Silttronic Date 9/21/10
 Project / Client oversight of Area 1 TZU and
groundwater sampling.

DP rod was pulled up 1', since DP
 rods were pushed 3' beyond casing. screen
 is 3' below conduit casing mudline.

1315 - $4.61 =$ top of casing to water level.

1320 - Water level to top of casing is the
 same as above.

1323 - tubing was lowered to bottom of screen
 and began pumping. Pore volume calculated
 as $52.02 - 4.61 = 47.41' + 3' = 50.41' \times 0.023 \text{ gal/ft}^3$
 $= 1.16 \text{ gal}$

Water Quality Data - From MFA log (GPO)

TIME	Purge vol (gal)	pH	TEMP (°C)	Cond (µS/cm)	DO (mg/L)	EH	Turb
1330	1	6.91	18.93	651	0.49	-85.0	120.3
1345	2	6.92	18.82	661	0.18	-110.4	67.92
1400	3	6.88	19.01	670	0.16	-116.5	52.34
1415	4	7.00	19.27	675	0.13	-119.9	50.54

1415 - water samples taken using 4 vials.
 Ferrus Iron measurement = 6.0 mg/L
 Ferrus Iron measurement of previous sample = 5.5 mg/L

1421 - DTW from top of casing = 4.21'

1426 - DTW same as above.

1430 - Drillers removed DP rods and
 conduction casing, observed them
 wearing all needed PPE.

^{MPH 9/21/10}

Location GASCO/Siltovic Date 9/21/10
 Project / Client Oversight of 1 TZW and
Groundwater sampling.

- 1438 Pulled up all casing, moving barge
 To refill drillers water for Decon.
 1520 - Filled water tank for Decon at
 barge on W side of River. Begin mob to
 G-PO38.
 1525 - photo #5 Lucas decontaminating rods & screens
 1558 - Reached correct position for G-PO38.
 1600 - Drillers begin lowering conducting rods.
 Drillers are using Teflon tape for threads.
 1614 - Lowered 54' of conducting casing. Depth
 from mud line to top of casing is
 53.92'. DTW from top of casing is
 4.52'. $53.92 - 4.52 = 49.40'$ top
 of water to mud line.
 1615 - Photo #6 Justin taking water level
 reading.
 1617 - Drillers lower DP rods, Teflon tape
 threads. Push DP rods 1' beyond casing
 1625 - Drillers lower trip rods, and push DP rods
 push screen 1' past outer casing. DTW = 4.49
 from top of outer casing. Driller
 had to hammer last 1' of DP Rod
 to reach depth of outer casing.
 it is assumed that mud pushed
 MPH 9/21/10

Location GASCO/Siltovic Date 9/21/10
 Project / Client Oversight of 1 TZW and
Groundwater sampling.

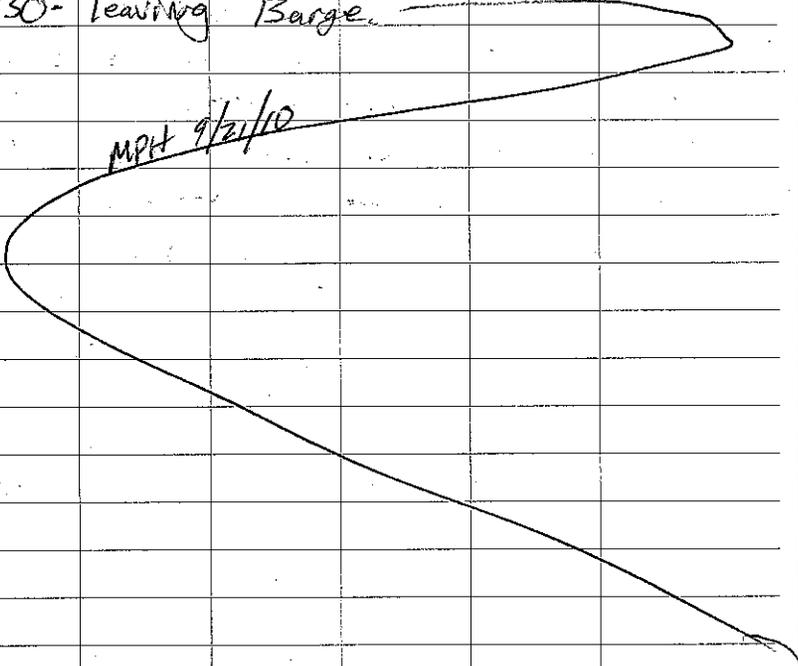
- into the casing, Note: in reading
 The sampling plan saw that 3' drill should
 have been grouted. Informed Justin.
 1641: DTW = 4.496 From top of casing,
 1645 - lowered tubing and begin purging.
 Pore volume calculated as: $53.92 - 4.46$
 $= 49.46 + 1' screen = 50.46 \times .023 \text{ gal/ft} = 1.16 \text{ gal}$
 Note: MFA would like to Re-do G-207
 because they feel that the sample represented
 the transition zone. The conductivity readings
 were much lower than the others and
 DO was also higher than other
 ground water samples. Pushed another 1' according to plan.
 1705 - Conductivity readings are low, re-calibrated
 meter and tightened DP rods, conductivity
 increased to closer to expected values.
 Water Quality data - From MFA notes
- | Time | Purge Vol | pH | Temp (C) | EC cond us/cm | DO mg/L | ORP | Turb |
|------|-----------|------|----------|---------------|---------|--------|-------|
| 1720 | 1.0 | 6.99 | 17.88 | 576 | 0.72 | -51.9 | 13.09 |
| 1735 | 2.0 | 7.06 | 18.23 | 593 | 0.28 | -88.5 | 6.19 |
| 1746 | 3.0 | 7.05 | 18.18 | 587 | 0.18 | -96.5 | 6.46 |
| 1800 | 4.0 | 7.02 | 18.11 | 585 | 0.17 | -100.2 | 5.86 |
- 1740 - Justin confirmed GPS position had
 changed.

MPH 9/21/10

Location GASCO/SILTRONIC Date 9/20/10
 Project/Client oversight of ITZW and
groundwater sampling.

- 1800 - 4 VOA samples taken at 6P-038-W-1.
 1804 - Photo # 7 Driller removing sample tubing.
 1805 - Drillers begin removing casings.
 Ferrus Iron for 6P-038 = 2.6 mg/L.
 1820 - photo # 8 & 9 removal of bottom conducting casing with attached separating plate. Drillers completed removal and begin cleanup.
 1830 - leaving Barge.

MPT 9/20/10



Location GASCO/SILTRONIC Date 10/4/10
 Project/Client Oversight of Final Data Gaps
Investigation - Sediment Core Sampling

- 1250 Arrived at Gasco site - front gate.
 Weather 60°F overcast. Guard at front gate called Dong Lafoon, Anchor, to escort me on site. Even though I have a TWIC card in my possession, Anchor wants to escort me.
 1300 Met Anchor QEA staff at on-site trailer: Matt Wilson and Dong Lafoon present, but Matt Wilson left to attend to on-site upland drilling/sampling. Anchor QEA staff here for in-water sampling are David G. Loggahan, Delaney Peterson, and Mike Crystal (Sr). Other Anchor QEA staff present include Joy Duray and Nathan Socorsky. All Anchor QEA staff depart to the FAN office for TWIC escort training except Delaney Peterson, who accompanied Dong Lafoon, myself, and boat operator Bill to the boat, anchored at permanent barge located at bottom of catwalk from Gasco site. Took photo # 1 of vibrocore "guides" setup on boat - taken from cabin. Vibrocore tubes on left side of deck.
 Super Jones 10/4/10

Location Gasco - Portland Harbor Date 10/4/10
 Project / Client Oversight of Data Gaps Investigation -
 Sediment Core Sampling

1345 Mike J. Crystal and Dale Dickerson (2nd boat operator) arrive on boat following TWIC Escort training. David Gillingham is on his way.
 1400 David Gillingham arrived and is talking with boat operators about where he wants to attempt first sampling core. Boat operators are setting up equipment. Coring sampler is mounted on a wooden platform hanging over bow of boat.

1410: A light rain has begun falling.

1415 Anchor Q&A (Delaney) calibrating PID.

1422 Took Photo #2 of crew loading new vibracore tube onto sampling equipment. Plunger inserted into tube to bottom.

1425 David G, Anchor, stated the plan is to collect first sample core from DGS-30. If clean here, no need to collect contingency cores surrounding DGS-30. DGS-13 would be second sampling location for the same reason.

1442 Begin Health + Safety Meeting. David, Anchor, discussing hazards on boat - watch step, etc. Don't fall in hatch. PPE - gloves, hard hat, safety glasses, steel toed boots, PFD.

Location Gasco - Portland Harbor Date 10/4/10
 Project / Client Oversight of Data Gaps Investigation -
 Sediment Core Sampling

1445 HES briefing, etc. Main Overboard procedures discussed - throw line on stern, fire extinguisher locations. Overhead hazards of sampling equipment. Boat operator Dale elaborated on boat hazards. After Dale finished, I asked for clarification on a few issues. First David Gillingham, Anchor, is Site Health + Safety officer. There is no AED on board and David was not aware of the need for one. Both David + Delaney, Anchor are trained to use one. I reiterated EPA's request that there be an AED on board + trained staff. David stated it was not in their HES plan. I stated there was a directed comment by EPA to that regard. David will ask Ryan Barth about it. I informed everyone that river water is a biohazard - don't get it on or near your mouth or ingest it. I clarified where exclusion zone is - basically anything to front of boat from cabin doors. No boom but do have absorbent pads.
 T.M. Jones 10/4/10

Location Gasco-Portland Harbor Date 10/4/10Project / Client Oversight of Data Gaps -
Sediment Core Sampling.

1455 Boat operator moving boat to location
of DGS-30

1500 David stated when core is brought
up, it will be hosed off into river
so sediment is not brought on deck.
As much as possible, will contain all
sediment from inside vibracore tube
with absorbent pads so it doesn't
get on deck.

1505 David stated he spoke with
Ragnar Bahr and it was confirmed
an AED is needed on boat at all
times. Will get one for tomorrow.

1510 Boat operator's positioning boat at DGS-30.
GPS unit is attached to top of sampler
so boat operator gets close to point
and then lowers sampler to get a
precise GPS reading at sampling point.

1511 Photos #3, 4, and 5 show core sampler
being lowered over bow. Photo #6
is close-up of GPS unit on top of sampler.
On board LoranC meter shows progress
of vibracore tube going in. Slope of
chart indicates rate of sampler going into sediment.
Jenifer Jones 10/4/10

Location Gasco-Portland Harbor Date 10/4/10Project / Client Oversight of Data Gaps -
Sediment Core Sampling

1515 Sampler at 20' below mudline.
Now bringing core back up. Photo
#7 + 8 shows this, and crew hosing
off vibracore with water into river.

1522 Anchor crew tying lead lines on
vibracore so that they can move it
and pick it up off the deck later.
Meanwhile core is hanging in a vertical
position off front of boat. Now
laying core and sampler down on
deck. Boat operator is unhappy
with set-up. 20' cores are
longer than he is used to using
and set-up is hard to fit on deck.

1525 Boat operator now moving boat
back to barge where originally
docked to handle (cut) core.
Boat operator explained end of vibracore
tube has stainless steel fingers that
close to keep material in. Date, other
boat operator, estimates only 8 feet
of material was collected in core tube
(estimated by tapping on side of tube.)

Jenifer Jones 10/4/10

Location Gasco-Portland Harbor Date 10/4/10Project / Client Oversight of Data Gaps -
Sediment Core Sampling

- 1529 Boat operator giving GPS coordinates where sample was collected to Delaney, Anchor crewmember.
- 1530 Boat arrived back at barge. Boat operator Dale explaining to Anchor crew how to handle sediment core.
- 1531 Took photo # 9 + 10 of crew moving core to mounted bracket on side. Anchor crew then measured amount of sediment in core tube with measuring tape - photo # 11. Got 9.5 feet of sediment in core tube. David is marking tube and measuring off where to cut tube based on amount of sediment recovered. Boat operator Bill Jaworski said based on his experience it is likely they encountered volcanic medium-grained sand that liquefies and is hard to keep in sampler.
- 1542 Anchor discussing what to do with this core, as recovery is too low to keep as a sample. Unsure about if they can dump the sediment.
- Jupiter Jones 10/4/10.

Location Gasco-Portland Harbor Date 10/4/10Project / Client Oversight of Data Gaps -
Sediment Core Sampling

- 1545 Delaney stated they only have 25 vibracore tubes. Discussing on phone what to do (w/ Ryan). Will hang on to this core and try again at same location.
- 1600 Put cap on end of vibracore tube. Trying to figure out where to store it.
- 1615 Spoke with Scott Coffey (COM) and then Lance Peterson (COM PM) regarding lack of AED on board. Lance then spoke to David to inform him that they must have an AED before work can continue. David left boat to try to find Doug Laffan on-site to get an AED so work can proceed.
- 1640 David returned to boat and stated that they will not be able to get AED today so work will stop - "can't leave dock". They will empty tube into buckets so tube can be decontaminated and reused at second attempt at same location.
- 1645 It was decided to empty tube + decon tomorrow morning.
- 1655 Left boat and walked to trailer.
- 1705 Departed site.
- Jupiter Jones 10/4/10

Location Gasco-Portland Harbor Date 10/5/10Project / Client Oversight of Data Gaps Investigation
Sediment Core Sampling.

0725 Arrive at Gasco front gate. Weather overcast, 54°F.

0746 Begin Health and Safety meeting with all Anchor QEA crew associated with the Data Gaps Sediment Sampling. Scott Coffey, CDM, leading meeting to discuss stop work status and necessary procedures to resume work with EPA approval. Scott going over 5 bullets.

1. All Anchor QEA staff on board are trained to use AED.
2. AED will be located in cabin of boat.
3. Needs to be regularly inspected to ensure functionality.
4. Procedures for AED use provided - David explained steps of use.
5. Each morning explain procedures, location of AED, etc.

Following AED discussion, David G, Anchor QEA briefly discussed other H&S issues associated with sediment sampling. HASP on board boat w/ map to hospital. Throw ring for man overboard situation. Back of boat is off limits unless inform boat operator. PPE includes PFD.

Jesse Jones 10/5/10

Location Gasco-Portland Harbor Date 10/5/10Project / Client Oversight of Data Gaps Investigation
Sediment Core Sampling.

0750 H&S, etc. Exclusion zone is front deck of boat. No eating or smoking. Absorbent pads will be used to contain any sediment or material from deck.

Buckets on deck to contain F.D.W.
0755 End H&S meeting. Scott called Lance to inform him H&S meeting complete, AED procedures & other H&S issues discussed.

0808 Lance called with confirmation from EPA that Anchor is cleared to resume work.

0815 All personnel, including David, Rebekah, Mice (Anchor), myself (CDM) and 2 boat operators Bill and Dale board boat. Anchor crew discussing how to store cores in ice box on boat.

0830 Anchor crew and boat operator Dale lifting core tube from yesterday up on end. Photo #1 shows crew upending tube to dump sediment into bucket. Photo 2 shows Anchor David G hammering on tube to get sediment out.

0840 Tube is now empty. Took photo #3 of cutting end of tube showing finger catchers.

Jesse Jones 10/5/10

Location Gasco-Portland Harbor Date 10/5/10Project / Client Oversight of Data Gaps Invest -
Sediment Core Sampling

- 0845 Anchor crew clearing out tube with hose, spraying water inside tube and allowing it to run into over. Photo #4 + 5 show this.
- 0859 Tube after decon placed back on rack with others. Photo #6. David stated they will attempt to sample at DG-5-13 first, since have loaded a new tube onto sampler. Will save deconed tube for another attempt at DG-5-30. David stated the material collected in tube and put into bucket was clean - no sheen visible.
- 0900 Boat operator moving boat to DG-5-13. Bucket containing IDW is labeled as such and has a lid on it. On boat deck.
- 0908 Sampler lowered over bow of boat. Photo #7.
- 0911 Boat in position. David measuring depth to mudline = 45.6'. Lowrance meter shows steep slope of descent all the way to 20'.
- 0914 Pulling core back up. Anchor hoisting it off.
- 0925 David stated he observed a light sheen on water that spilled from tube upon opening.
Gertie Jones 10/5/10

Location Gasco-Portland Date 10/5/10 55Project / Client Oversight of Data Gaps Invest -
Sediment Core Sampling

- 0926 Recovery = $21.1 - 3.6 = 17.5'$ of recovery. Marking tube to be cut from 0-5', 5-10', 10-15', and 15-20'. Tube is 4" diameter.
- 0926 Anchor cutting vibro core tube. Photo #8. Correction on where tube will be cut: 0-6', 6-12', 12-17'. 12-17' segment will cut off the material that's in the fingers.
- 0938 Took photo #9 showing Anchor crew collecting water from tube at first cut. David reading IDW meter. Anchor is rinsing out cut top of tube (scrap).
- 0942 As sections are cut, foil is placed on end and then capped. Photo #9. Then capped is duct taped. Photo #10. 10/5/10
- 0942 Tubes then placed into holding tank on deck on ice. Photo #11. 10/5/10
- 0950 David examined material to be medium sand, multi-colored, no silt. Medium-fine sand. Photo #12. No odor or sheen.
- 1005 Anchor crew carrying core segments up ramp to core processing area. Photo #13. Took photo #13 of Lowrance meter in cabin of boat.
Gertie Jones 10/5/10

Location Gascon Portland Harbor Date 10/5/10Project / Client Oversight of Data Gaps Investigation
Sediment Core Sampling

- 1030 Anchor personnel back on board and boat operator moving boat to DGS-30 to reattempt sampling there.
- 1040 Boat in position and sampler lowered over bow. Water depth is 46.7 feet. According to Loran meter, sampler quickly advanced to 20' below mudline.
- 1050 B71 provided GPS readings at sampling location to Anchor personnel. Moving boat back to docking location. In route, Anchor crew moved core tube from sampler to mount. Water poured out from bottom of tube during this; some silt came out too. David measured recovery - poor, around 40%. Will dump this one and do 3rd attempt.
- 1110 Anchor dumping tube into bucket. Fine wood fragments found in sample tube. Anchor cleaning out tube for 3rd attempt.
- 1120 Took photo #15 showing AED in back of boat cabin.
- 1125 Crew loudly disconnected tube back on sampler.
- 1130 Boat operator moving back to DGS-30 for 3rd attempt.
- Jennifer Jones 10/5/10

Gascon Portland Harbor Date 10/5/10Project / Client Oversight of Data Gaps Investigation
Sediment Core Sampling

- 1135 Lowering vibrocore sampler over bow of boat. Water depth here is 47.8' plus is ~14' from station coordinates. Loran meter indicates stiffer material - looks similar to that of 2nd attempt.
- 1147 Photo #16 shows Dale, boat operator, placing cap on bottom of tube. W.71 also tape cap on to keep material from falling out when tube is moved.
- 1152 Crew moved tube to mounting bracket. About 13' of core recovered. Only 19.5' of penetration based on where guides had stopped. 72% recovery. Core will be cut from 0-5', 5-10', and 10-13.5'. Small wood fragments observed at top of core. Material is brown wet silt but 95% wood.
- 1215 Anchor crew cutting tube into sections and placing in ice.
- 1219 David stated material from 10-13.5' is more coarse sand. No sheen or odor.
- 1230 Break for lunch. Remain on boat.
- 1252 Resume work. Boat operator moving boat to DGS-3, next sampling location.
- Jeff Jones 10/5/10

Location Basco-Portland Harbor Date 10/5/10
 Project / Client Overview of Data Gaps Investigation
Sediment Core Sampling

1302 Boat in position at DGS-3. Location is very close to large wooden dock. Slope here is steep - 4' difference from one side of boat to the other. American dipper noted at location, foraging from floating logs. This bird usually forages mountain rivers. ^{gg} Crew is adjusting guides so ~~the~~ ^{base} will sit on slope and keep tube vertical. ^{gg 10/5/10}

1313 Sampler lowered over bow. Depth to mudline = 30.5' here.

1315 Pulling sampler back up. Fairly steep slope & indicably loose material and good rate of drive.

1328 5 feet 7 inches of space at top of core so 15 feet 5 inches of sediment. This is about 77% recovery. This tube will be cut into 3 5' sections for processing.

1335 Begin cutting core. Material at top is very oily with strong petroleum odor. With creosote odor. Wood debris in sample also.

1345 Material at 5' is sandy silt, strong odor
 Jerb - gannet 10/5/10

Location Basco-Portland Harbor Date 10/5/10
 Project / Client Overview of Data Gaps Investigation
Sediment Core Sampling

1355 Material at 10' medium sand, no sheen or odor.

1405 Finished cutting core tube. Crew retracted sampler back to flat bottom. ^(base of sampler) ^{Moving} boat to DGS-11. ^{gg 10/5/10}

1414 Boat in position and sampler lowered into water. Depth to mudline is 46.3 ft.

1429 Upon moving core tube from sampler to mount on cutting rack, headspace water that poured out of top of core was very oily with a strong naphthalene odor. Photo #17 shows this and #18 shows Anchor crew using absorbent pads to soak it up off deck.

^{gg} ^{10/5/10}

$$\frac{3.33}{3.33} \text{ ft of space at top of core so}$$

$$21 - 3.25 = 17.75 \text{ ft} / 20 = 89\% \text{ recovery.}$$

Core will be cut in 3 segments: 0-6, 6-12, 12-17.7'. Crew poured water from top of core tube into bucket. Photo #19 and #20 show this. Close-up view in photo #20 shows oily water.

1440 Crew is now placing lots of absorbent pads on deck in preparation for cutting core tube.

Jerb - gannet 10/5/10

Location Gasco-Portland Date 10/5/10
 Project / Client Oversight of Data Bags Investigation
Sediment Core Sampling

1444 Rather than placing absorbent pads on deck, tube was wrapped with pad below cutting location to catch any oily water that comes out when it's cut. Bucket w/ absorbent pad is placed below cutting operation. Photos #21 and #22 show oily material caught in bucket. Anchor crew stated this looks like substantial product. Strong naphthalene odor.

1445 Core segments are labelled DGS11a, b, and c with "a" being the most shallow segment and "c" being the deepest, "b" middle. This has been the procedure for all core segments thus far.

1500 At 6', material is dark gray sand, heavy sheen and strong petroleum odor noted.

1505 At 12', material is dark gray sand, no odor or sheen noted.

1515 All segments cut and capped, taped.

1516 Ryan Barth and Dong Laifson, Anchor, walked to dock to pick up core segments for DGS-03 for processing.

John Jones 10/5/10

Location Gasco-Portland Date 10/5/10
 Project / Client Oversight of Data Bags Invest-
Sediment Core Sampling

1520 Next (and last) sampling location for today will be DGS-19.

1535 Boat leaving dock for DGS-19.

1543 Boat in position, sampler being lowered. Water depth here is 42.5'. Sampler encountered refusal at around 17 feet below mudline. Sampler being pulled up.

1555 David stated he observed sheen and strong nap/odor in water that poured out of nose of tube as it was pulled up out of water. When tube removed from sampler to place on mounting bracket, headspace water ran out into deck - very oily and strong naphthalene odor. 11 feet of headspace measured out of 21 feet. 10' of material / 17 ft of penetration = 59% recovery. Anchor discusses that they cannot reuse this tube due to product encountered.

1620 It was decided by Anchor that this core sample is a reject because need 20' of penetration. Will do 2nd attempt tomorrow morning.

John Jones 10/5/10

Location Gasco: Portland Harbor Date 10/5/10Project/Client Oversight of Data bagsInvestigation - Sediment Core Sampling

1625 Anchor discussing how to best
 decontaminate this core tube. David
 left boat to get more buckets
 from his car to empty waste into.

1635 David returned and he and Mike
 are dumping core and water inside
 tube into buckets as IDW. Took
 photo #23 of material from DGS-19.

1655 After sediment emptied from tube,
 now using hose to clean inside of
 tube, catching water in bucket.

1700 Anchor will finish decontaminating
 the core tomorrow morning before reuse.
 They plan to use a 20' telescoping
 pole and brush or absorbent pads
 for inside of tube.

1712 Departed site.

Location Gasco-Portland Harbor Date 10/8/10Project/Client Oversight of Data bagsInvestigation - Sediment Core Sampling

1250 Arrive at Gasco site - front gate. Weather
 partly cloudy, 67°F.

1300 Escorted to on-site trailer by Doug
 Lafoon, Anchor OEA. Then drove
 to visitor parking by dock and
 walked to boat, which was docked
 at permanent barge. Anchor OEA
 and boat operators on lunch break.

1305 David Gilligham, Mike Crystal,
 Delaney Peterson, and Kim Stinski
 present from Anchor OEA. Boat
 operators Bill and Dale present.
 David Gilligham stated they
 collected DGS-23 and DGS-18
 today. DGS-18 was very
 contaminated, and boom was
 deployed over bow to contain
 material at river surface. A light
 spotty sheen was observed but
 Anchor crew able to contain
 most if not all.

1325 Recovery today was 76% on
 DGS-23 (2nd attempt) and 53% on
 DGS-18 (3rd attempt).

Judy Jones 10/8/10

Location Gasco-Portland Harbor Date 10/8/10Project / Client Oversight of Data Gaps Investigation - Sediment Core Sampling

1330 Kim Slinko left boat for core processing area. Anchor OEA personnel David, Delaney, and Mike preparing to collect next sample at DG5-44.

1331 AED is present in cabin of boat.

1332 Boat operator moving boat to DG5-44. All personnel wearing PFDs, hard hats, safety glasses, steel-toed boots. Personnel handling sediment sampling equipment wearing nitrile gloves.

1335 Sampler lowered over bow of boat. Boom is still present along bow. Photo #1 shows boat deck. Will try to get photo of boom when it is safe to access the deck. Water depth here is 46.7 ft, measured with weighted tape to mud line.

1339 Loran meter indicates sampler starting to slow down its progress through the sediment.

1341 Pull up sampler. Anchor crew hoisting it off before it is laid on deck.

1350 Boat docked for examining core. Took photo #2 showing boom over bow.
Jenifer Jones 10/8/10

Location Gasco-Portland Harbor Date 10/8/10 65Project / Client Oversight of Data Gaps Investigation - Sediment Core Sampling

1352 Crew moving core tube to mooring rack. Photo #3 shows this. David measuring recovery - Photo #4. Only ~10 ft of material in tube. 10.7 ft of sediment = ~53.5% recovery. Some sheen observed in heads pull water but not a lot. Since low recovery will reject.

1402 Crew lifted tube on end and are emptying it into buckets. Boat operator given GPS coordinates to Delaney.

1405 Delaney stated substantial product found during core processing in DG5-08, collected on 10/6/10. So that is what triggered collection of DG5-44 (this sample). Also substantial product found in DG5-19, collected on 10/6/10, which triggered collection of DG5-18, collected today.

1410 Material extruded from tube has slight hydrocarbon odor.

1411 Cores collected on 10/6/10: DG5-08, DG5-19, DG5-28. On 10/7/10 they collected DG5-06, DG5-14, DG5-20.

1415 Crew hoisting out sampling tube.
Jenifer Jones 10/8/10

Location Gasco-Portland Harbor Date 10/8/10
 Project / Client Oversight of Data Gaps Investigation -
 Sediment Core Sampling

- 1417 DeLaney on phone w/ Ryan Barry,
 Anchor QEA PM. Ryan stated
 contingency cores that will not
 be collected include: DGS-12, 14,
 15, 45, 46, 02, 41, 27, 29, 33.
- 1427 Moving boat back to DGS-44 for
 second attempt
- 1432 Boat in position and sampler being
 lowered over bow. Lowrance indicates
 sampler encountering tight material.
 Boat operator abandoning attempt
 and pulling sampler up. TOOK photo
 # 5 from inside cabin showing DeLaney
 watching Lowrance meter. Photo #6
 shows Lowrance meter showing flat slope
 indicating stiff material?
- 1447 Tube moved to mummy rack.
 Recovery 21' - 15.3' = 5.7'. Penetration
 here only 10'. This core sample is rejected.
- 1500 Crew cleaning out coil tube and
 placing material into IDW buckets.
- 1517 Moving boat to DGS-44 for 3rd
 attempt.
- 1524 Lowering sampler over bow. Depth 47.1'.
 Julie Jones 10/8/10

Location Gasco-Portland Harbor Date 10/8/10 67
 Project / Client Oversight of Data Gaps Investigation
 Sediment Core Sampling

- 1525 Progress of sampling tube through
 sediment appears OK on Lowrance.
 Encountering stiffer material at ~15'.
 Penetration looks to be nearly if not
 equal to 20'. Pulling up sampler.
- 1540 Recovery measured at 9' 8" of
 material. Will be cut from 0-5', ~~22~~^{22.45}
 and 5-9.3'. Recovery = ~~48~~⁴⁹%. 49%.
- 1547 Took photo # 7 of Anchor crew
 examining top of sediment core after
 tube was cut. Slight hydrocarbon
 odor noted, no sheen.
- 1600 Core segments are placed upright
 on ice. Photo # 8.
- 1601 ~~PIID~~^{PIID} meter is on - no elevated readings.
- 1602 Boat operator moving boat to DGS-26.
- 1609 Boat in position and sampler lowered over bow.
 Water depth here is 46.6'. Lowrance shows
 progress is OK, slow at around 10' but
 then picked up speed.
- 1625 Measuring recovery at 9' 5". Oil
 present in headspace water and sediment very oily.
 Strong naphthalene odor. Core will be
 rejected due to low recovery of ~~52~~⁵²%.
 Julie Jones 10/8/10

Location Gasco-Portland Harbor Date 10/8/10
 Project / Client Oversight of Data Gap Investigation -
 Sediment Core Sampling.

1640 Boat arrived back at barge dock at Gasco site. Anchor crew planning to work tomorrow (Saturday) 10/9 to continue collecting sediment cores there are 8 more cores to collect. Anchor will empty and decom take used for 1st attempt at DGS-26 tomorrow morning for reuse. Anchor will offload core segments from DGS-44 and IPW buckets at Cathedral Park now.

1648 Took Photo #9 showing boat docked at barge at Gasco site.
 Taken from catwalk above.

1650 ^{99 10/8/10}
 1655 left site.

Jeff Jones 10/8/10

Location GASCO-PORTLAND HARBOR Date 10/12/10
 Project / Client OVERSIGHT OF DATA GAP INVESTIGATION -
 SEDIMENT GRAB SAMPLES.

0810-Arrive on-site, Board boat. MET David
 Gillingham, Delaine, Dale.

0845-Anchor working on equipment setup.

0855-leave GASCO DOCK For Cathedral Park.

0915-MET Mike with Anchor at Cathedral Park, loaded coolers & buckets & other materials

0920-Anchor personnel health health & safety Meeting covering: slips trips & Falls, AED location, Fire extinguishers location, First Aid Kit location, Biohazard of Columbia river, PPE, when Hazard of sediment pinch points, Fallway overboard, Throw rings, open hatches. All Anchor Personnel are First Aid Certified & trained in AED USE.

0945-MOB to First Sample location DGS-30

0955-ARRIVE AT SAMPLE location. Drop Sampler.

1000-Depth = 49.8', visible leaking from sampler. as its loaded.

1005-Photo #1 - Close up of DGS-30

1005-Photo #2 - Zoomed out of DGS-30

1010-29cm recovery measured using 12' ruler.
 Sample collected.

1020-Photo #3 DGS-30 visual inspection core
 MPA 10/12/10

Location GASCO-PORTLAND HARBOR Date 10/12/10Project / Client OVERSIGHT OF DATA-LAPS INVESTIGATIONSurface sediment grab sample

1025 - continuing sample collection at DGS-30 collection done by digging main portion of sampler out and placing in SS Pot for handling. Plastic sleeve placed first for observation core. In DGS-30 observed soft brown sandy silt on surface (0-2) FOLK with no odor or sheen. Followed by dark grey sand followed by brown sandy silt. Then dark woody debris at bottom with slight odor & no sheen. 41% Fines.

1045 - collection of IDW and rinsing of sampler ^{mpat 10/12/10}

1045 - com asked David about collecting rinse water from sampler. David stated that they are allowed to use site water to rinse and it isn't possible to collect all initial rinse water.

1100 - Begin DECON of equipment using scrub brush & site water initially.

1105 - MOB TO DGS-33

1110 - lowered sampler, collected at depth of 42.5'

1115 - photo #4 photo of DGS-33 with observation core included.

mpat 10/12/10

Location GASCO-PORTLAND HARBOR Date 10/12/10Project / Client OVERSIGHT OF DATA-LAPS INVESTIGATIONSurface sediment grab sampling

1115 - Begin sample collection at DGS-33
SAMPLE DEPTH = 29cm.

1130 - observation of core: NO visible product or odor throughout. 0-2" very soft sandy silt, no odor or sheen. 2" "ILS" wet loose medium to fine sand with a few imbedded pockets of brown silt. No odor & no sheen.

1145 - complete sample collection 4/8/90
Fines in DGS-33.

1155 - PHOTO #5 loading IDW into funnel & buckets (DGS-33)

1205 - MOB to GASCO dock for lunch.

MIKE DECON vanveen sampler.

1240 - MOB TO DGS-34.

1245 - 45.9 = DEPTH OF sample, sample collected -
sample depth = 30 cm. 73% Fines.

1250 - Begin sample collection, observed collection of VOC samples first.

1300 - PHOTO #6 collection of sample DGS-34
From to Bot., observed no product in sample.

mpat 10/12/10

Location GASCO PORTLAND HARBOR Date 10/12/10Project / Client OVERSIGHT OF DATA GAP INVESTIGATIONSurface sediment grab sampling

1305 - DGS-34 observations From Anchor notes: 0-2" very soft, very wet sandy silt, no odor, no sheen, brown color

3" ~~1.5~~ wet silty sand, fine to med grain loose, brown, interbedded layers of soft brown silt, no odor, no sheen.

1315 - Sample collected, begins TDW collection & Decon for DGS-34.

1330 - MOB to sample location DGS-35.

1335 - Depth to sample = 17.8', depth of sample = 27cm.

1345 - Begin sample collection, VOC first. observed clam shell ~~found~~ ^{fragments} in sample. David believes it's an invasive *Corbicula fluminea*.

1420 - Photo #7 Sample collection of DGS-35.

1417 - DGS-35 complete, begin TDW collection and Decon of equipment.

DGS-35 Notes From Anchor: 76% Fines.

0-2" very wet very soft brown silty sand slight H₂S odor with ^{MPA labels} ~~no~~ sheen, moderate wood debris ^{MPA labels} ~~no~~ ^{MPA labels} ~~no~~ ^{MPA labels} ~~no~~

3-9" damp soft silty clay, gray, slight H₂S odor no sheen, occasional clam shells. Sample was compressed from 11" ^{MPA labels} ~~to~~ 9" ^{MPA labels} ~~to~~

Location GASCO PORTLAND HARBOR Date 10/12/10Project / Client OVERSIGHT OF DATA GAP INVESTIGATIONSurface sediment grab sampling

1426 - MOB to GASCO shore line to repair bent sampler

1426 - Observed EPA boat & USACE boat pass by & take pictures.

1449 - Repair of sampler teeth complete, used chain & hydraulic open/close mechanism.

MOB to DGS-31

1452 - Sample - 43.9 = sample depth DGS-031

Depth of sample = 30cm

1500: Begin sample collection of DGS-031, Moved back to GASCO site and tied off.

NOTE: David performs settling test for every sample.

1515: Photo #6 observation core of DGS-31

1530: Collection complete begin Decon & TDW collection.

Sample description From Anchor notes:

0-3" very wet very soft brown slightly sandy silt. trace sheen & debris, no odor - 77% Fines -

3-12" wet soft brown sandy silt with interbedded pockets of dark gray sand medium to fine grain. No odor, no sheen. — MPA 10/12/10 —

Location GASCO PORTLAND HARBOR Date 10/12/10Project / Client OVERSIGHT OF DATA GAP INVESTIGATIONSubsicial Sediment Grab Sample

1546 - Mob to DGS-25

1550 - Drop Van Veen sampler to 48.6 Sample rejected, only partial recovery. Sample treated as DTW and put in buckets. Looks like jaws may have been partially held open by woody debris. Jaws had to be bent back into place.

1610 Drop Van Veen sampler for second attempt at DGS-25. Acceptable recovery.

Depth to sample = 48.4' depth of sample is 26cm.

1620 begin taking sample at DGS-25

1640 completed sample collection began DTW collection & Decan.

observations from Anchor notes:

0-2" Very wet very soft brown slightly sandy silt. No odor, no sheen

2-5" wet, loose dark gray slightly silty sand. No odor, no sheen. Multi colored grains.

5-9" Gradual transition to silt to soft wet brown sandy silt. No odor, no sheen.

9-10" Same as 2'-5"

Fines = 40%

MPH 10/12/10

Location GASCO PORTLAND HARBOR Date 10/12/10Project / Client OVERSIGHT OF DATA GAP INVESTIGATIONSUBSICIAL SEDIMENT GRAB SAMPLES.

copy of Anchor log of DGS-30:

0-2 very soft, very wet brown sandy silt. No odor, no sheen, trace wood debris on surface

2-5 wet loose dark gray sand medium to fine grain - no odor no sheen, grains are multi-colored

5-7 wet soft sandy silt, brown no odor no sheen.

7-8 same as 2-5

8-12 wet, loose woody debris, black, slight HC odor, no sheen.

1655 - MOB to Cathedral Park to unload DTW.

1705 - Disembark from boat. Assisted Anchor unload DTW.

MPH

10/12/10

Location GASCO - PORTLAND HARBOR Date 10/14/10Project / Client OVERSIGHT OF DATA GAP INVESTIGATIONSurficial sediment grab sample

0735 - Arrive on site

0800 - Disembark From GASCO DOCK
For CATHRAL PARK.0815 - HEALTH & SAFETY AED, SLIPS trips &
FALLS, Biohazard OF water, Fog look For
debris & boats, PPE, NO cell phone, First
Aid Kit, Fire extinguisher, Throw ring.

0825 - MOB TO DGS-02

0830 - Arrive AT DGS-02 lower sampler
To depth of 44.6', sample depth = 30cm.

0836 - Begin sampling. PID = 0.0

0850 - PHOTO #1 DGS-02 sampling.

0855 - All Anchor personnel wearing PPE.

0855 - Sampling complete, sample characterization,
IDW collection & decan beginning.

0900 - PHOTO #2 DGS-02 sample characterization.

DGS-02 characterization:

0-6" Very soft Very wet brown silt. No odor
Trace sheen on top of grab.6-12" Same as above except wet & soft
Trace wood debris & organic fibers.70% fines, but biased by larger organic
material. (using 63 micrometer sieve)

MPH 10/14/10

Location GASCO - PORTLAND HARBOR Date 10/14/10Project / Client OVERSIGHT OF DATA GAP INVESTIGATIONSURFICIAL SEDIMENT GRAB SAMPLE

0910 - MOB TO DGS-01.

0915 - Sample depth = 57.6' unacceptable sample
Put in buckets as IDW.0925 - First sample was unacceptable due
TO over penetration of sampler. Sampler
Base was lowered to compensate for
softer sample. Over penetration causes
sampler flaps to push up, allowing
water into the sample during recovery.0947 - MOB back to DGS-01 after
lowering base.0950 - Lowered sampler to 56.8', acceptable
recovery. Sample depth = 27cm, observed
lots of woody debris, >50%. There for
RYAN advised taking another sample ~~30'~~ upstream.1005 - Rejected DGS-01 sample put in buckets
as IDW. (RYAN BARTH, ANCHOR) PID = 0.0 ppm1000 - PHOTO #3 second rejected DGS-01 sample
with lots of woody debris.1015 - MOB to DGS-01 site, now 50' upstream
of original. CDMA questioned the 50'
distance as compared to the 20' radius
mentioned in the sap. Anchor called
RYAN and he ~~repeated~~ stated that

Location GASCO - PORTLAND HARBOR Date 10/14/10Project / Client OVERSIGHT OF DATA GAP INVESTIGATIONSUBSIDIARY SEDIMENT GRAB SAMPLING

The locations were somewhat arbitrary and 50' difference would not effect data quality & to proceed with 50 feet since they feel a better sample could be obtained at this location.

1025 - lowered sampler to a depth of 54.8", depth of sample = 30cm. observed a lot of woody debris ^{MPH 10/14/10} ~~at~~ ^{at 30" depth} decide to sample due to 3rd grab. PID = 0.1 PM

1045 - Sample characteristics log from anchor.

0-12" Not possible to take core from grab. Due to substantial wood debris, Homogenized grab very wet, very soft, very woody, brown silt, no odor, no sheen grab appears to ^{MPH 10/14/10} be homogeneous throughout. wood is decomposed. ^{MPH 10/14/10} % Fines = 67%

1050 - completed sample collection of DGS-01, ^{MPH 10/14/10} lowered ~~sa~~ raised sampler base to original height in anticipation of firmer sediment at next location. begin FOW collection,

Decon.

1100 - MOB TO ~~DGS-06~~ ^{MPH 10/14/10} DGS-05

1105 - lowered sampler to depth of 47.4'

depth of sample = 27cm, recovered golf ball.

1115 Begin taking DGS-05 sample PID = 0.2

Location GASCO - PORTLAND HARBOR Date 10/14/10Project / Client OVERSIGHT OF DATA GAP INVESTIGATIONSUBSIDIARY SEDIMENT GRAB SAMPLES

1125 - 43% Fines measured

1135 - SAMPLE complete collecting FOW and Decon. Some sheen present from sample, recovered using absorbent boom in front of boat.

Characteristics from anchor log?
0-^{2.5"}12" very wet very soft brown silt, trace HC odor, moderate sheen. Golf ball found in silt layer

25"-4 wet, soft dark gray silty sand med-fine grain, moderate HC odor, no sheen

4-10.75" wet, loose med-fine grain dark gray sand, multicolored grains, moderate odor, moderate metallic & rainbow sheen. Flots, trace wood debris.

1145: MOB TO DGS-06.

1150 - lowered sampler to a depth of 48.3' depth of sample = 29cm.

1155: PHOTO #4 siphoning water from DGS-06

1200: PHOTO #5 vac sample of DGS-06

1200 - sample collection began DGS-06 PID = 0.1

1219 - PHOTO #6 just before FOWC of sampler after DGS-06

~~MPH 10/14/10~~

Location GASCO-PORTLAND HARBOR Date 10/14/10Project / Client OVERSIGHT OF DDT/PCP INVESTIGATIONSurficial Sediment Grab Sampling

1220- log of soil characteristics.

0-3" very wet very soft slightly sandy
silt no odor, no smell

3-9" same as above except wet & soft

9-11.5" same as above except slightly
stiff % Fines = 73%

1230- Disembark boat at GASCO DOCK.

MPH 10/14/10

Location GASCO-Portland Harbor Date 4-18-11 81Project / Client Oversight of SurficialSediment Sampling (Resample)

6800 Arrive at Cathedral Park. Meet
Anchor QEA crew: David Gillingham,
Delayrey Peterson and Gabe Nagler.
Dale Dickinson, Marine Supply Systems,
on boat. Load equipment on boat.
Boat is very small - hard to
get all equipment on board.

0850 Delayrey Peterson leads Health and
Safety meeting. Discuss slips, trips and
falls, biohazard, AED, overhead
hazards, PPE required is life jacket,
hard hat, steel-toed boots, gloves,
rain gear. Dale went over boat
safety issues. Boat is 27 feet x 8.5'.
Close quarters for 5 people and lots
of equipment, sampling activities.

0905 End health safety meeting.
0915 Dale adjusting hydraulic pressure.
David decontaminating stainless
steel mixing pot, spoons, and other
sampling equipment.

0920 Weather is mostly sunny,
approximately 42°F.

Grant Jones 4/18/11

Location Basco-Portland Harbor Date 4/18/11Project / Client Oversight of Surficial
Sediment Sampling - Resample

0935 Anchor crew decontaminating Van Veen sampler prior to first use. Took photo #1 showing this. Anchor has PID meter on - to check for VOCs and HCN. + H₂S.

0936 Moving boat to first sample location: DGS-08. Anchor is using the same coordinates as last sampling. 56.6 feet is the depth of water at this location - using electronic meter of boat because lead line is moving too much with the current. Lowered Van Veen sampler and collected surface grab. Anchor crew removing flaps on Van Veen to observe sample. Next water is siphoned off the sample. Measured sample thickness = 25 cm. (10 inches). Photographed sample (Anchor did). Anchor collected samples for VOCs and sulfides in 202 jars. Added zinc acetate preservative to sulfide sample. Anchor collected sample "core" in plastic tube for logging. Scooping rest of sample into stainless steel mixing pot.

John 4/18/11

Location Basco-Portland Harbor Date 4/18/11Project / Client Oversight of Surficial
Sediment Sampling (Resampling for midge)

1005 Anchor fully sample jars for: grain size, metals, TVS/TSS/TOC/NH₃/CN, SVOCs/pest/PCBs/PAHs, bioassay, and an archive. David analyzing % fines while Delaney logging core (pushed out from plastic tube onto wood plank). For % fines, using a sieve to push sample through with water. Sample core processing log:

Wet, soft, slightly sandy, brown silt, no odor, no sheen. 3-5 grades to wet, loose, gray and brown silty sand. No odor, no sheen. 6-7" pocket of wet, soft, brown silt. Bottom of core is at 11.5"

40% fines measured using sieve.

1025 Remaining material in Van Veen dumped into tray and funnelled into IDW buckets. Took photo #2 of this. Generated a total of 3 5-gal buckets of IDW here. Anchor crew now decontaminating Van Veen and sampling equipment.

John 4/18/11

Location Gasco-Portland Harbor Date 4/18/11
 Project / Client Oversight of Surficial sediment
Sampling (Resampling)

1035 Moving boat to next sample
 Location: DG-5-09. Water depth
 here is 56.0 feet. Date is targeting
 original coordinates but here is
 approx. 5 feet off (which is typical).
 Pulling up Vanveen sampler. Sample
 acceptable (filled to top, no
 disturbance). Siphoning off water.
 Took Photo #3 showing this.
 Sample thickness = 27 cm. Anchor
 collecting VOC and sulfides samples.
 Sample core with plastic tube
 shown in Photo #4. Anchor
 homogenizing sample in steel pot -
 shown in Photo #5.

1055 Took photo #6 showing sample
 core before logging. Vanveen
 sampler is shown in photo.
 Sample core is pushed out of
 tube (photo #7) and then sliced
 open (photo #8) for logging.
 David measuring ^{99 4/18/11} % fines, 59%
 From Delaney's log: soft, wet, brown
 sandy silt.
 J. P. Jones 4/18/11

Location Gasco-Portland Harbor Date 4/18/11
 Project / Client Oversight of surficial sediment
Sampling (Resampling)

1105 Con't from log:
 1-2" Band of loose, wet gray sand
 Dime size floret of rainbow sheen on
 At 2" soft wet brown ^{10 outside}
 slightly sandy silt. Interspersed ^{99 4/18/11}
 pockets of sand to bottom. Slight
 hydrocarbon odor throughout. Bottom
 of core @ 11".

1110 All samples kept on ice in coolers.
 Generated 3 more buckets of IDW.
 Anchor needs to get more buckets
 from truck at Cathedral Park. And
 Crane will be replaced with
 Doney Laffoon after collecting
 next sample. Anchor decommissioning
 sampling equipment.

1125 Moving boat to next sample location:
 DG-5-05. Depth here = 56.0 feet.
 Sample acceptable. Anchor crew
 siphoning off water to collect samples
 and core. Sample thickness = 25 cm.
 Anchor will collect a duplicate
 sample here. Anchor photographing
 all samples while in Vanveen and core.
 J. P. Jones 4/18/11

Location Gasco-Portland Harbor Date 4/18/11Project / Client Oversight of Surface
Sediment Sampling (re-sampling)

1135 Sample at DG-5-05 has naphthalene odor. No hit on PID. Sample has sheen and woody debris about half way down. Anchor decided not to collect duplicate here. Currently using boat to Cathedral Park for SW. Tech at personnel and to get more buckets will continue processing sample there.

From Delaney's log: wet, soft, slightly sand silt. At 1" loose moist medium to fine grain sand dark grey. Bottom of sample at 11". % fines = 20%. Added to log at 1' = occasional decomposed wood debris and fibers throughout. Moderate metallic and rainbow sheen throughout. Moderate HC odor throughout.

1205 Anchor unloading IDW buckets at Cathedral Park and will break for lunch.

1215 Departed Cathedral Park.

Jeff Jones 4/18/11

Location Gasco-Portland Harbor Date 4/19/11Project / Client Oversight of Surface
Sediment Sampling (re-sampling)

0800 Arrive at Cathedral Park and meet Anchor QEA personnel:

David Gillingham, Delaney, Peterson, and Greg LaFoon. Date Dickinson, MMS loading boat into water.

Weather: mostly clear, 41°F. No rain predicted today. Delaney, Peterson stated they completed sampling 7 locations yesterday:

DG-5-08, 9, 5, 12, 13, 16, 17.

0810 Anchor personnel decontaminating sampling equipment, mixing pot, spoons, etc.

0820 Anchor held Health and Safety Meeting to discuss hazards as yesterday - location of H&S, safety equipment (life ring, eye wash, fire extinguisher), AED, first aid kit. Hazards of Willamette River (bio hazards) mentioned. Proper lighting, PPE, tight spaces on board.

0827 April H&S meet and move boat to first location: DG-5-20.

0835 Arrive at DG-5-20 and lower Van Veen sampler over bow.

Jeff Jones 4/19/11

Location Gasco-Portland Harbor Date 4/19/11
 Project / Client Overnight of Surficial
 Sediment Sampling (Resampling)

0840 Took Photo #1 showing Van Veen
 Sampler being lower over bow. Took
 Photo #2 of sampler being
 pulled up with sample inside.

0845 Delaney stated samplers yesterday
 were mostly clean. DG-S-5 with
 the naphthalene odor and sheen
 was the most obviously contaminated
 sample collected yesterday.

0850 DG-S-20 sample acceptable.
 Siphoning off water. Sample
 thickness = 27 cm. Date stated
 57.6 depth of water here.

8ID meter is on located on deck
 just in front of cabin. Anchor
 collecting VOCs and nutrients samples.

0900 Took Photo #3 of Denny Laboon (Anchor)
 mixing sample in stainless steel pot for
 collection of samples in jars shown.

0910 Percent fines measured at 27%
 based on field sieve test.

0-1 Delaney's log: soft, wet brown, f-sandy-silt
 1- loose, wet, gray, m-f sand
 (cont on next page)

2 cont Jones 4/19/11

Location Gasco-Portland Harbor Date 4/19/11
 Project / Client Overnight of Surficial
 Sediment Sampling (Resampling)

0910 Anchor log of sample core, cont:
 3'- ~~last~~ ^{80 4/19/11} Interbedded layers of
 sand and m-f sandy silt as
 described above

6.5" - loose, moist, gray m-f sand.
 Sand grains are multicolored.

9" - end of core. NO sheen, no odor.

0917 Took Photo #4 showing
 bow of boat where boom is
 deployed to catch any oily
 material from the sediment washed
 off the tray. Van Veen is below
 water surface.

0920 Sampling complete at DG-S-20.
 Anchor crew has collected all
 leftover material as IDW in buckets.
 Now decontaminating sampling equipment.

0925 Arrive at next sampling location - DG-S-25.
 Depth here is 59.3 feet. Sample
 only 18 inches thick, some wood
 debris holding the jaws open slightly.
 Sample not acceptable. will be
 dumped into IDW buckets. This is
 same location where jaws were bent in October 2010.

2 cont Jones 4/19/11

Location Gasco-Portland Harbor Date 4/19/11
 Project / Client Oversight of Surficial Sediment Sampling (Resampling for midge testing)

0942 After cleaning off sampler, making second attempt at collecting sediment grab at DGS-25. Depth = 59.2 feet. This grab appears acceptable.

Sample thickness = 25 cm. Anchor proceeded with sample processing and collecting. 19% fines measured.

1005 From Anchor's log of core:

Loose wet gray m-f sand.

1" - soft, wet, gray slightly f-sandy.

3" - loose, wet, gray m-f sand

11" - bottom of core. No odor, no sheen.

1015 Completed sampling at DGS-25.

Moving to next location: DGS-30.

1022 Collecting grab sample at DGS-30. Depth here is 59.0 feet. Sample is acceptable. Sample thickness is 25 cm.

Anchor crew processing sample core and filling sample jars. Flap on Van Keen sampler needs repair.

Dave G measuring percent fines in DGS-30 sample: 12%. There is a layer of wood debris in sample.

Sample core log on next page.

John Jones 4/19/11

Location Gasco-Portland Harbor Date 4/19/11
 Project / Client Oversight of Surficial Sediment Sampling (Resampling for midge)

1045 Anchor log of sample DGS-30: Very thin (21 cm) brown silt layer on top. Loose, wet gray m-f sand w/ occasional small wood debris and fibers.

3" - loose wet light gray slightly silty slightly clayey f-sand.

4" - loose wet black wood and wood fibers, wood is decomposed.

6" - loose wet gray sand (m-f).

7" ~ 2" diameter pocket of soft wet light gray sandy silt.

11" - bottom of core. No sheen or odor through out.

1056 Headed back to Cathedral Park to offload IDW and have bathroom break. Anchor decontaminating sampling equipment. Dale has repaired Van Keen Flap.

All samples kept on ice in coolers.

1105 Departed site ^{00 4/19/11} Cathedral Park.

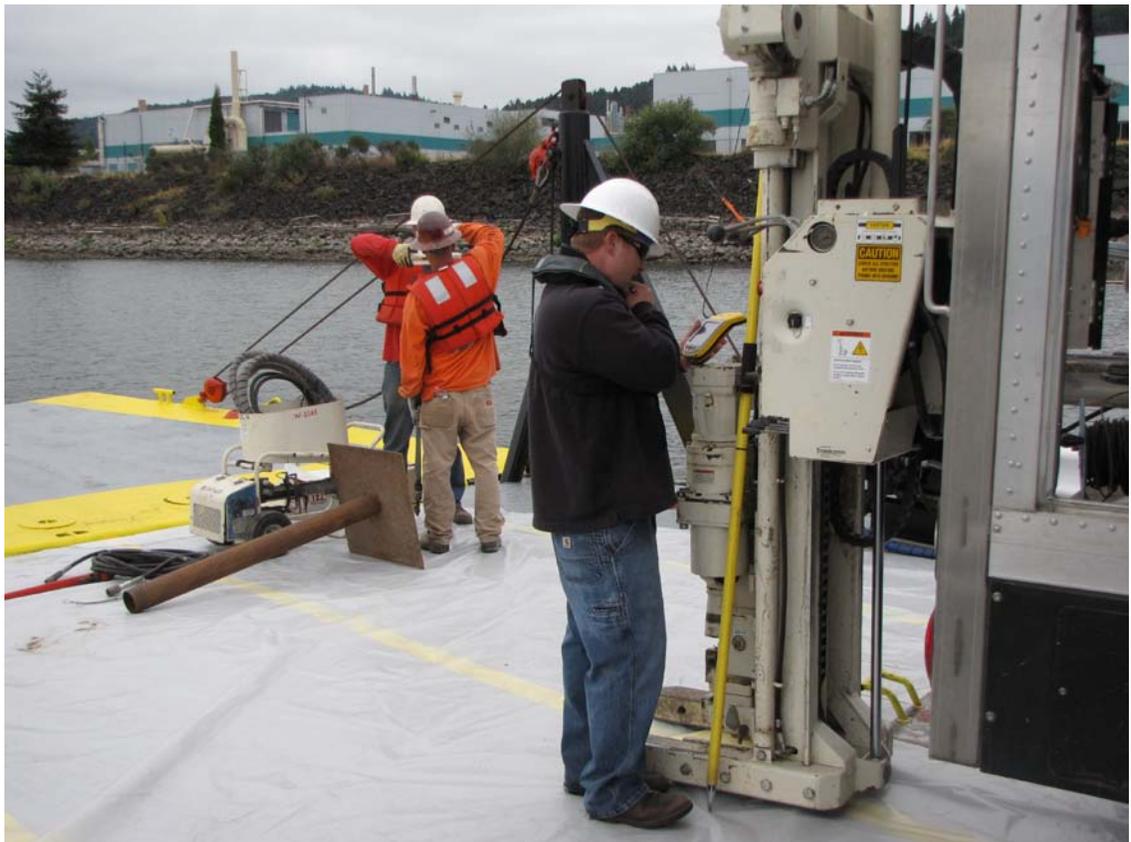
John Jones 4/19/11

Appendix B

Field Oversight Photographs

Data Gaps
September 13, 2010 (TZW and GW Sampling)

Photos 001 and 002



Data Gaps
September 13, 2010

Photos 003 and 004



Data Gaps
September 13, 2010

Photos 005 and 006



Data Gaps
September 13, 2010

Photos 007 and 008



Data Gaps
September 13, 2010

Photos 009 and 010



Data Gaps
September 13, 2010

Photos 011 and 012



Data Gaps
September 13, 2010

Photos 013 and 014



Data Gaps
September 13, 2010

Photos 015 and 016



Data Gaps
September 13, 2010

Photos 017 and 018



Data Gaps
September 13, 2010

Photos 019 and 020



Data Gaps
September 13, 2010

Photo 021



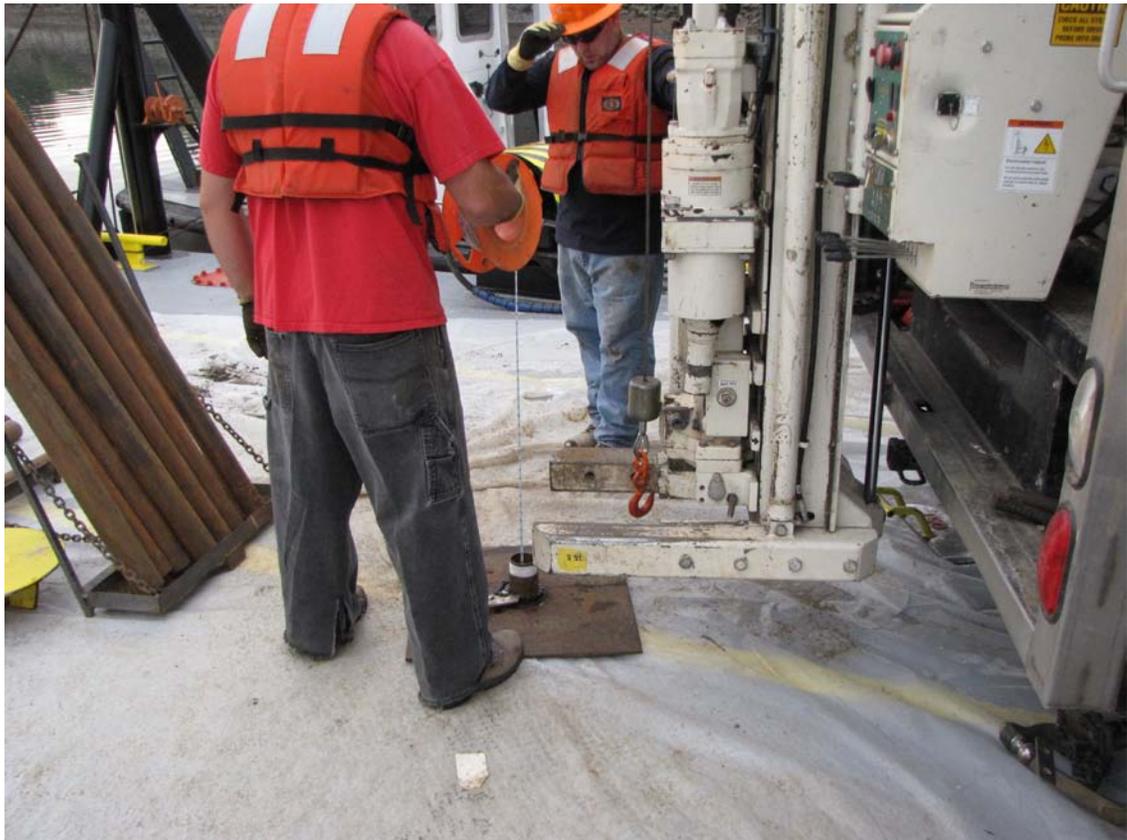
Data Gaps
September 15 2010 (TZW and GW Sampling)

Photos 001 and 002



Data Gaps
September 15 2010

Photos 003 and 004



Data Gaps
September 15 2010

Photos 005 and 006



Data Gaps
September 15 2010

Photos 007 and 008



Data Gaps
September 15 2010

Photos 009 and 010



Data Gaps
September 15 2010

Photos 011 and 012



Data Gaps
September 15 2010

Photo 013



Data Gaps
September 17 2010 (TZW and GW Sampling
Photos 001 and 002



Data Gaps
September 17 2010

Photos 003 and 004



Data Gaps
September 17 2010

Photos 005 and 006



Data Gaps
September 17 2010

Photos 007 and 008



Data Gaps
September 17 2010

Photos 009 and 010



Data Gaps
September 17 2010

Photos 011 and 012



Data Gaps
September 17 2010

Photos 013 and 014



Data Gaps
September 20 2010 (TZW and GW Sampling)

Photos 001 and 002



Data Gaps
September 20 2010

Photos 003 and 004



Data Gaps
September 20 2010

Photos 005 and 006



Data Gaps
September 20 2010

Photos 007 and 008



Data Gaps
September 21 2010 (TZW and GW Sampling)

Photos 001 and 002



Data Gaps
September 21 2010

Photos 003 and 004



Data Gaps
September 21 2010

Photos 005 and 006



Data Gaps
September 21 2010

Photos 007 and 008



Data Gaps
September 21 2010

Photo 009



Data Gaps
September 27 2010 (Soil Borings)

Photos 001 and 002



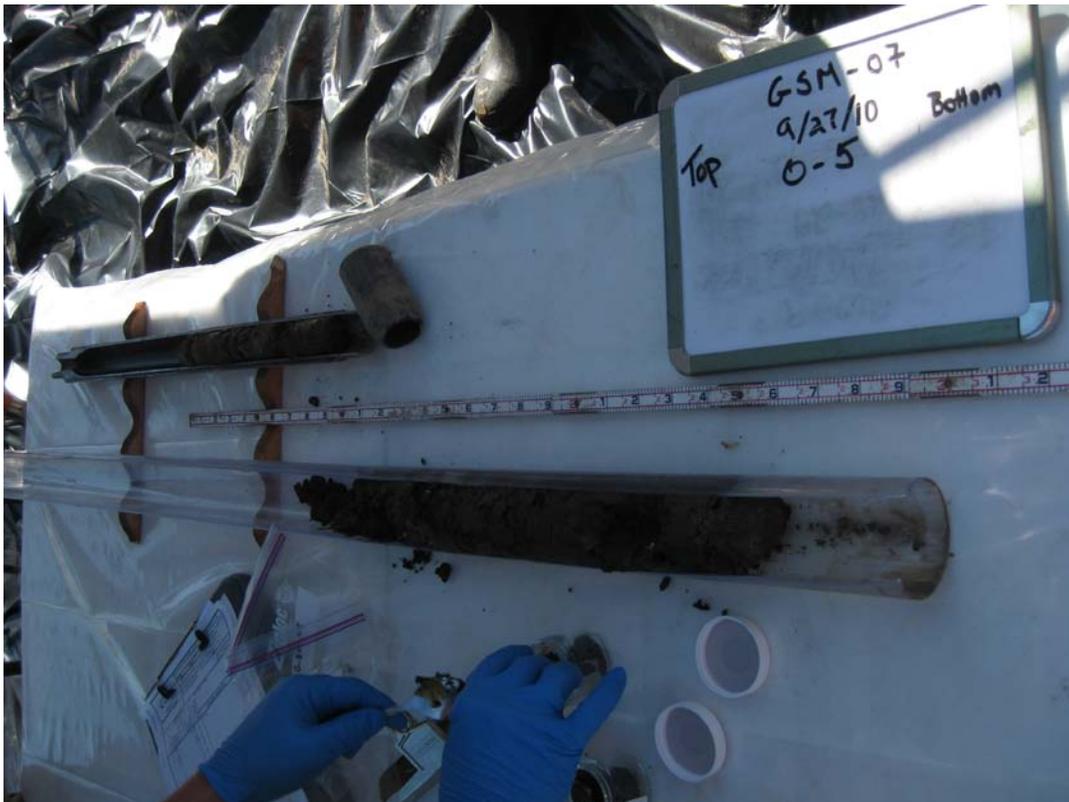
Data Gaps
September 27 2010

Photos 003 and 004



Data Gaps
September 27 2010

Photos 005 and 006



Data Gaps
September 27 2010

Photos 007 and 008



Data Gaps
September 27 2010

Photos 009 and 010



Data Gaps
September 27 2010

Photos 011 and 012



Data Gaps
September 27 2010

Photo 013



Data Gaps
October 1, 2010 (Soil Borings)

Photos 001 and 002



Data Gaps
October 1, 2010

Photos 003 and 004



Data Gaps
October 1, 2010

Photos 005 and 006



Data Gaps
October 1, 2010

Photos 007 and 008



Data Gaps
October 4, 2010 (Sediment Cores)

Photos 001 and 002



Data Gaps
October 4, 2010 (Sediment Cores)

Photos 003 and 004



Data Gaps
October 4, 2010 (Sediment Cores)

Photos 005 and 006



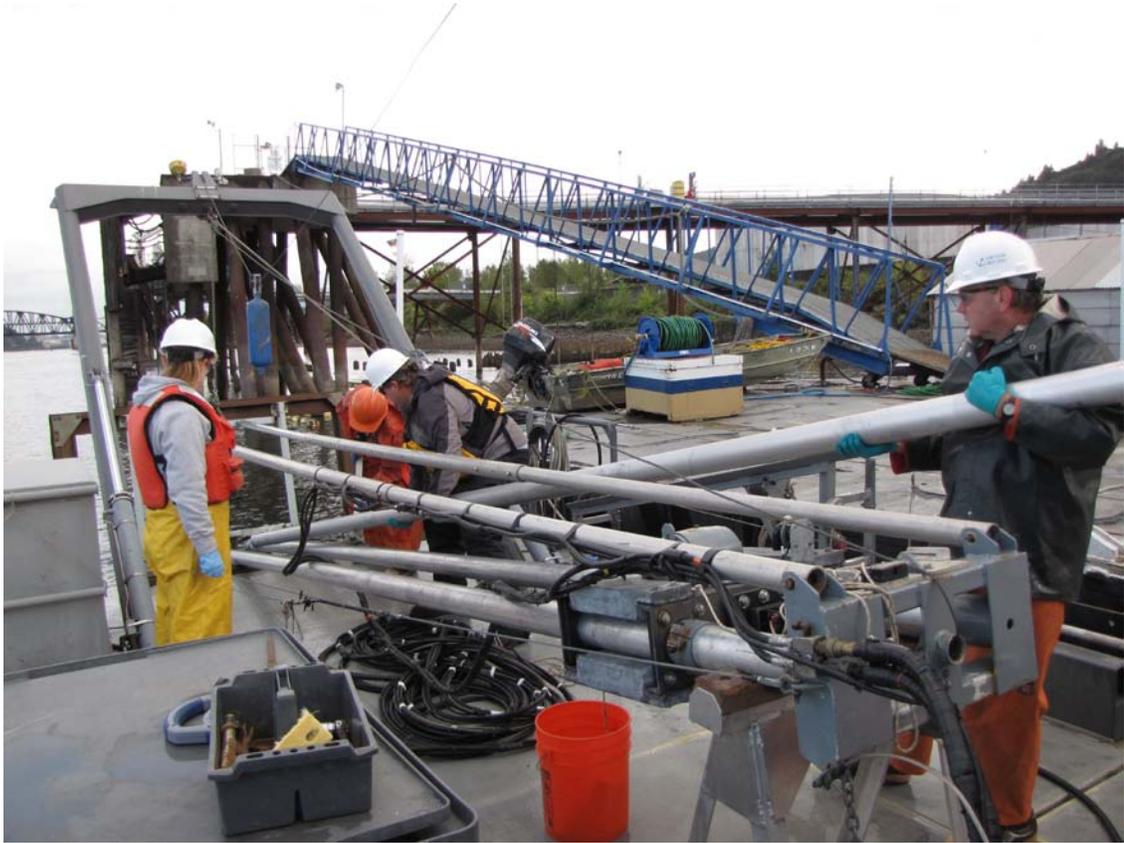
Data Gaps
October 4, 2010 (Sediment Cores)

Photos 007 and 008



Data Gaps
October 4, 2010 (Sediment Cores)

Photos 009 and 010



Data Gaps
October 4, 2010 (Sediment Cores)

Photo 011



Data Gaps
October 4, 2010 (Soil Borings)

Photos 001 and 002



Data Gaps
October 4, 2010 (Soil Borings)

Photos 003 and 004



Data Gaps
October 4, 2010 (Soil Borings)

Photos 005 and 006



Data Gaps
October 4, 2010 (Soil Borings)

Photos 007 and 008



Data Gaps
October 4, 2010 (Soil Borings)

Photos 009 and 010



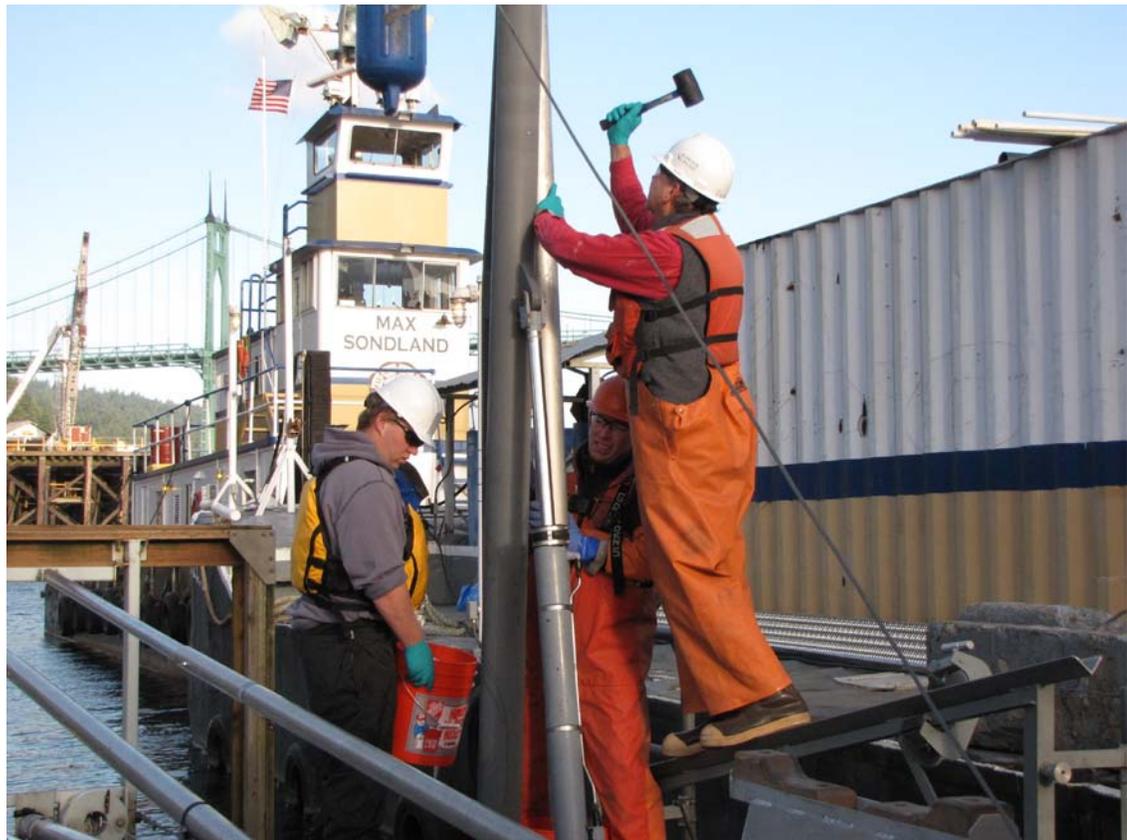
Data Gaps
October 4, 2010 (Soil Borings)

Photos 011 and 012



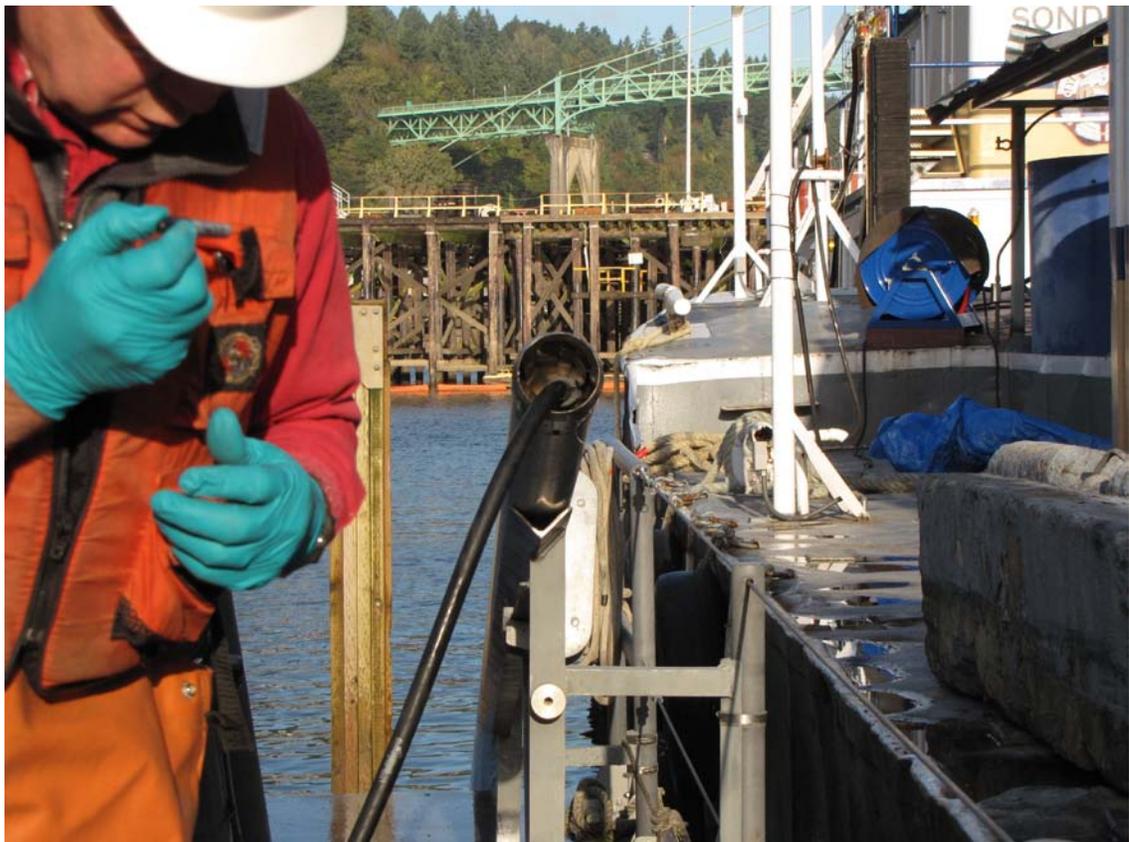
Data Gaps
October 5, 2010 (Sediment Cores)

Photos 001 and 002



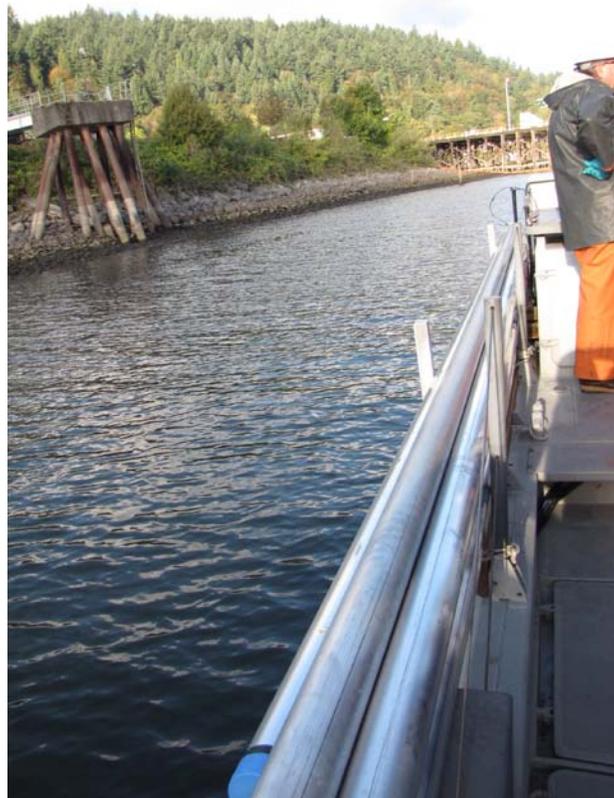
Data Gaps
October 5, 2010 (Sediment Cores)

Photos 003 and 004



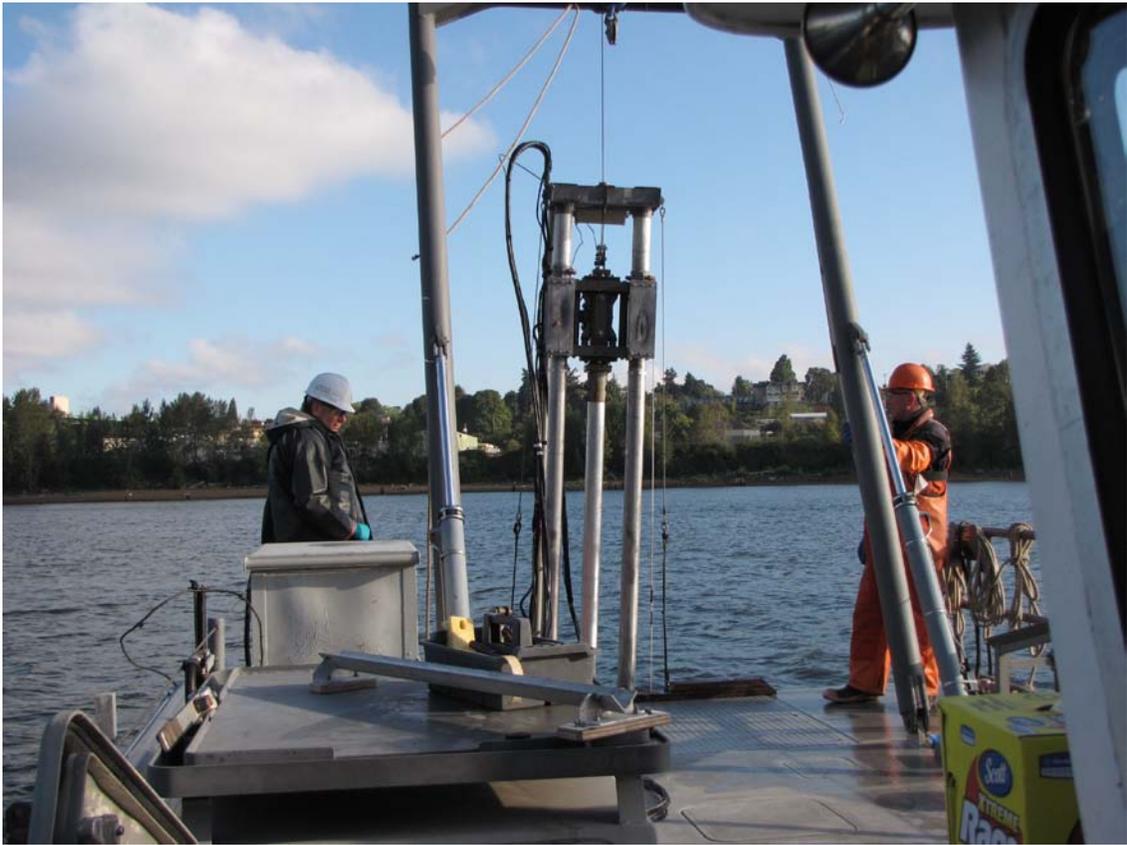
Data Gaps
October 5, 2010 (Sediment Cores)

Photos 005 and 006



Data Gaps
October 5, 2010 (Sediment Cores)

Photos 007 and 008



Data Gaps
October 5, 2010 (Sediment Cores)

Photos 009 and 010



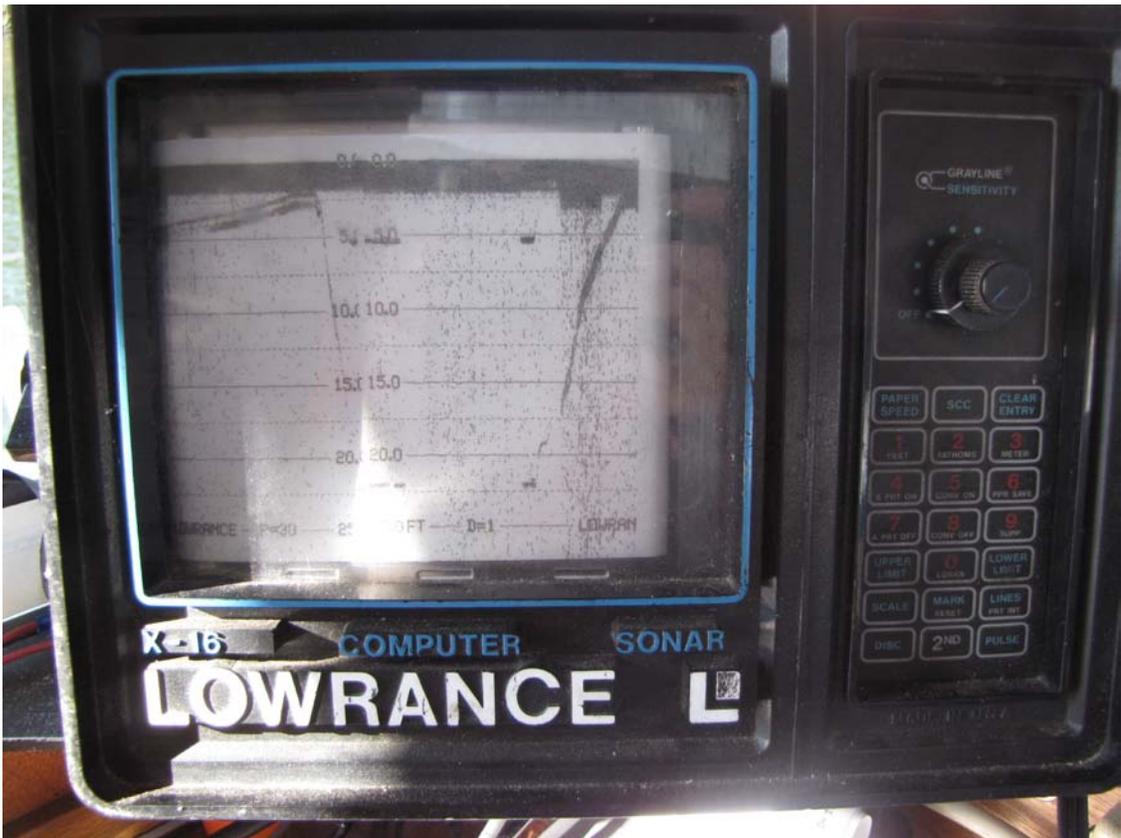
Data Gaps
October 5, 2010 (Sediment Cores)

Photos 011 and 012



Data Gaps
October 5, 2010 (Sediment Cores)

Photos 013 and 014



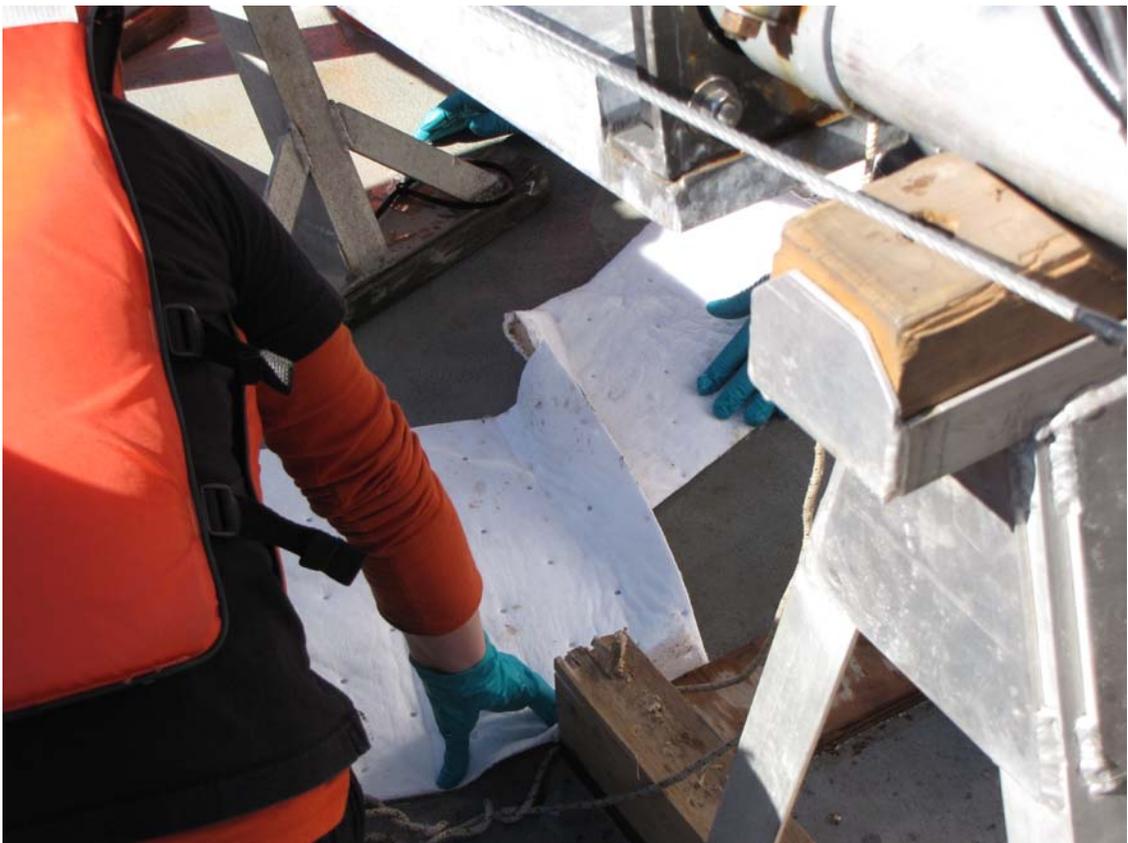
Data Gaps
October 5, 2010 (Sediment Cores)

Photos 015 and 016



Data Gaps
October 5, 2010 (Sediment Cores)

Photos 017and 018



Data Gaps
October 5, 2010 (Sediment Cores)

Photos 019and 020



Data Gaps
October 5, 2010 (Sediment Cores)

Photos 021and 022



Data Gaps
October 5, 2010 (Sediment Cores)

Photo 023



Data Gaps
October 5, 2010 (Soil Borings)

Photos 001 and 002



Data Gaps
October 5, 2010 (Soil Borings)

Photos 003 and 004



Data Gaps
October 5, 2010 (Soil Borings)

Photos 005 and 006



Data Gaps
October 5, 2010 (Soil Borings)

Photos 007 and 008



Data Gaps
October 5, 2010 (Soil Borings)

Photos 009 and 010



Data Gaps
October 5, 2010 (Soil Borings)

Photos 011 and 012



Data Gaps
October 5, 2010 (Soil Borings)

Photos 013 and 014



Data Gaps
October 6, 2010 (Soil Borings)

Photos 001 and 002



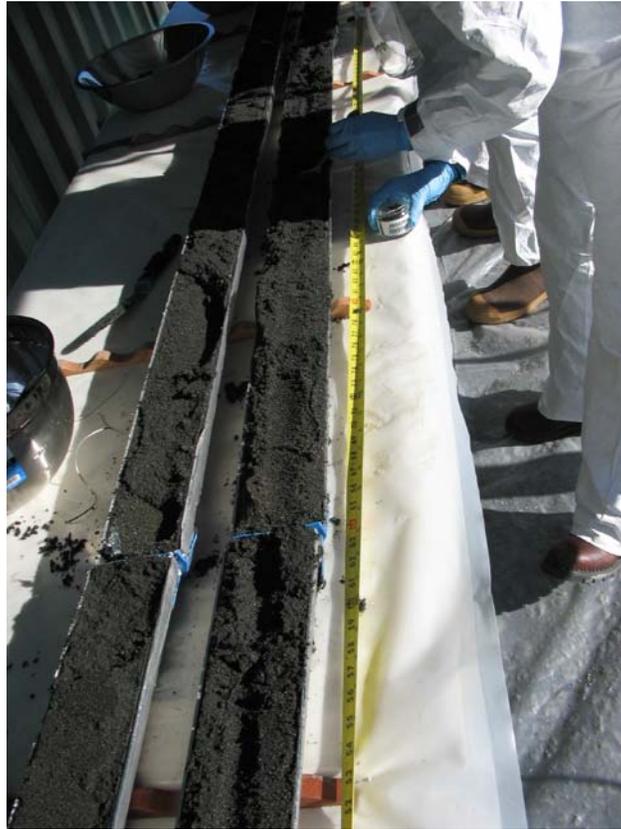
Data Gaps
October 6, 2010 (Soil Borings)

Photos 003 and 004



Data Gaps
October 6, 2010 (Soil Borings)

Photos 005 and 006



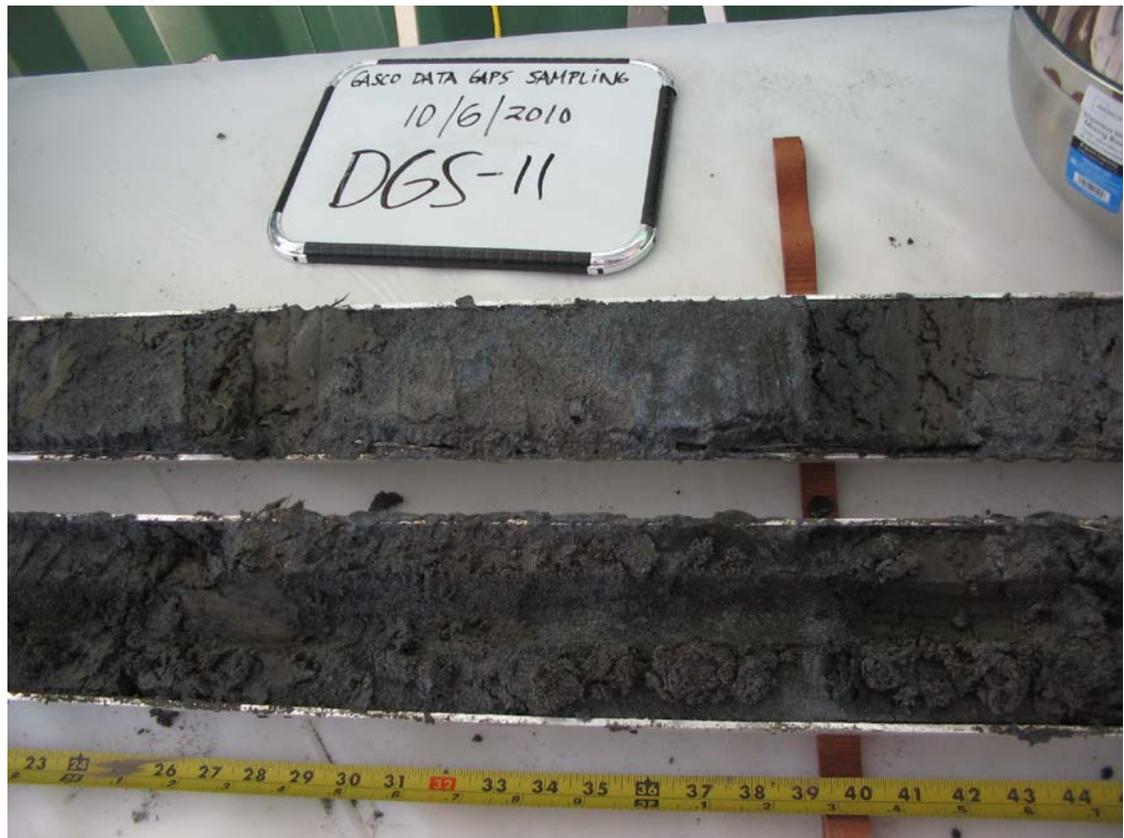
Data Gaps
October 6, 2010 (Soil Borings)

Photos 007 and 008



Data Gaps
October 6, 2010 (Soil Borings)

Photos 009 and 010



Data Gaps
October 6, 2010 (Soil Borings)

Photos 011 and 012



Data Gaps
October 6, 2010 (Soil Borings)

Photos 013 and 014



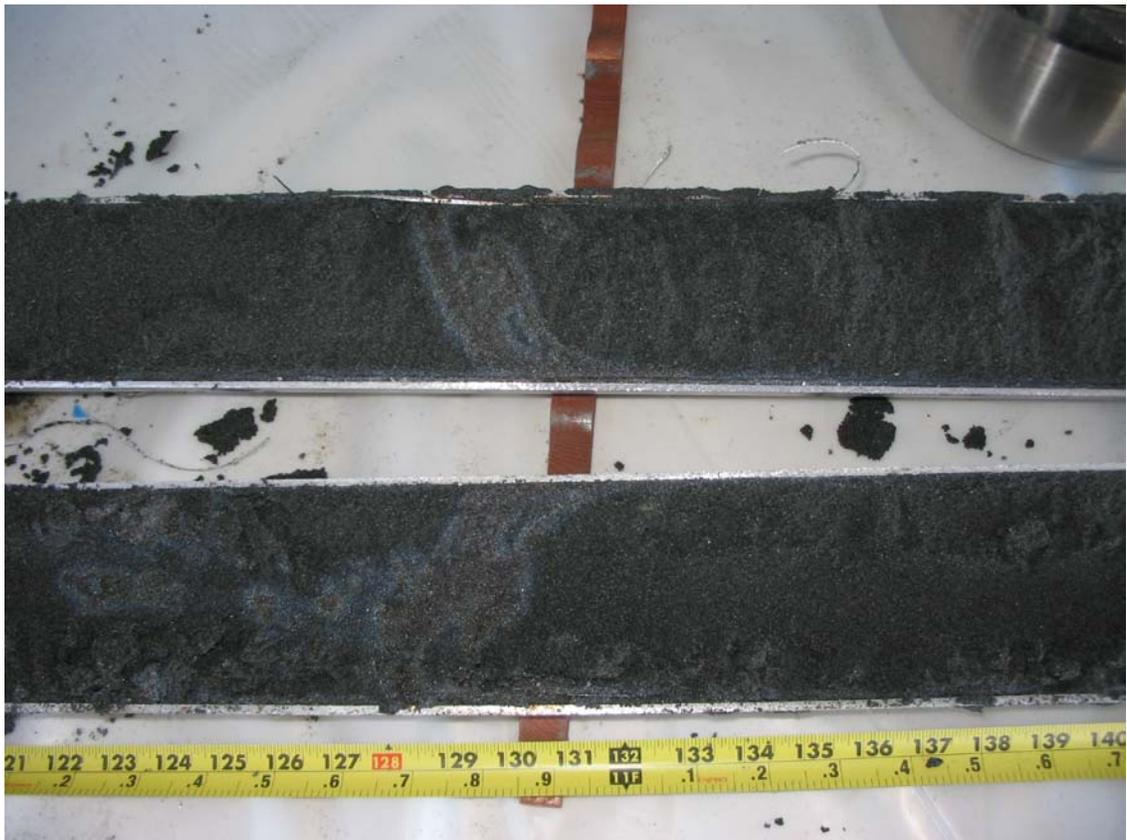
Data Gaps
October 6, 2010 (Soil Borings)

Photos 015 and 016



Data Gaps
October 6, 2010 (Soil Borings)

Photos 017 and 018



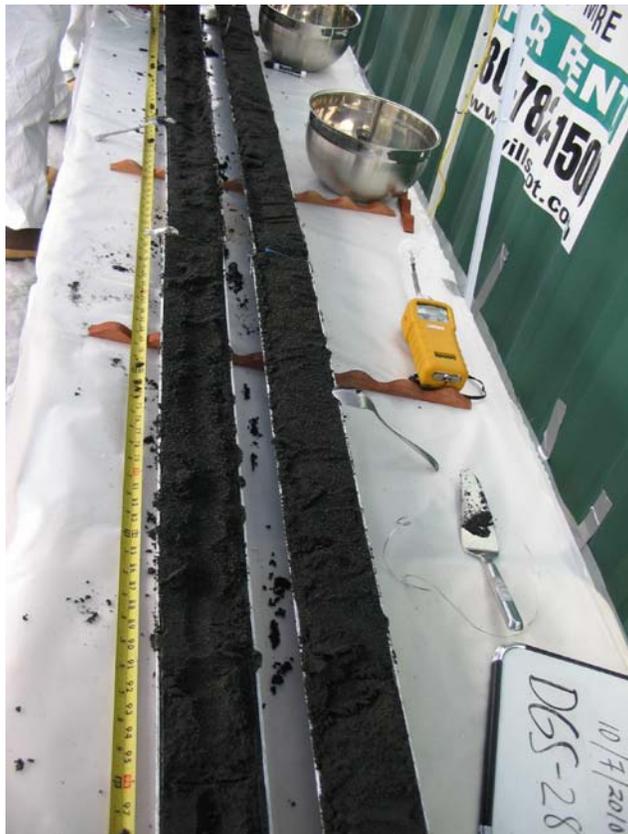
Data Gaps
October 7, 2010 (Soil Borings)

Photos 001 and 002



Data Gaps
October 7, 2010 (Soil Borings)

Photos 003 and 004



Data Gaps
October 7, 2010 (Soil Borings)

Photos 005 and 006



Data Gaps
October 7, 2010 (Soil Borings)

Photos 007 and 008



Data Gaps
October 7, 2010 (Soil Borings)

Photos 009 and 010



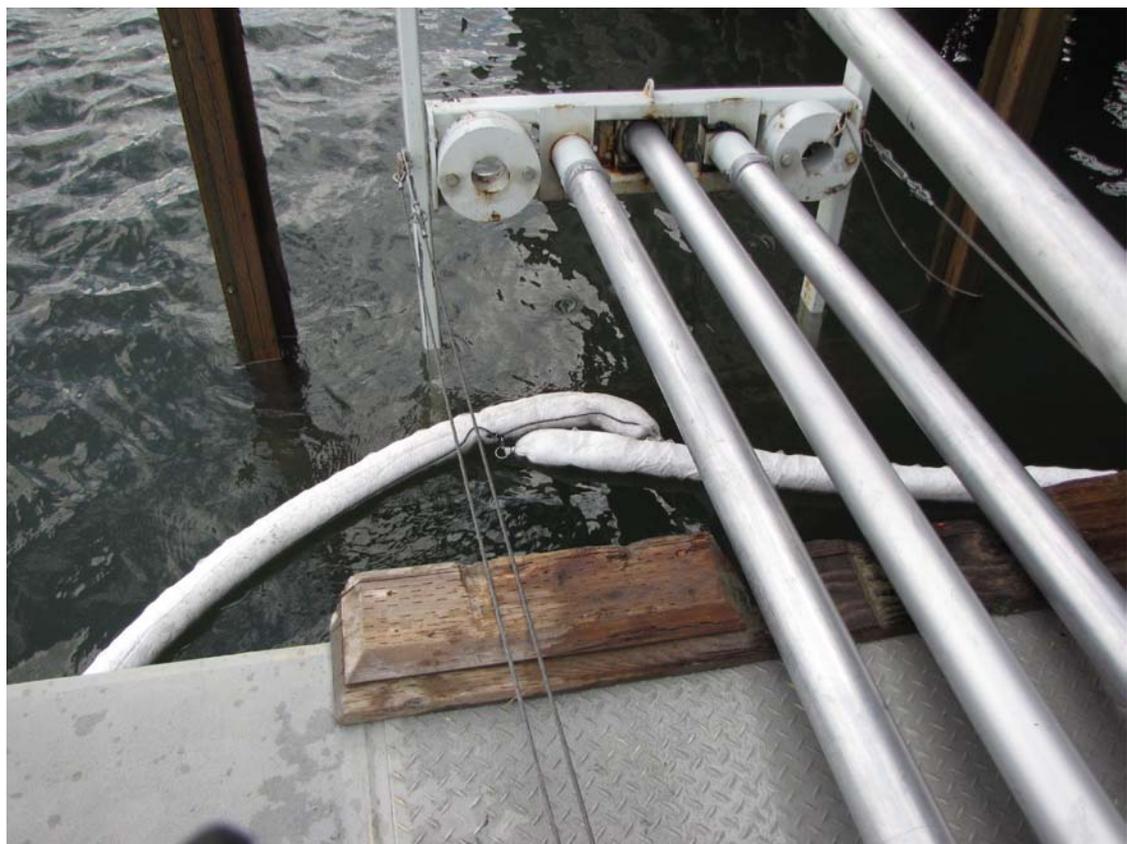
Data Gaps
October 7, 2010 (Soil Borings)

Photo 011



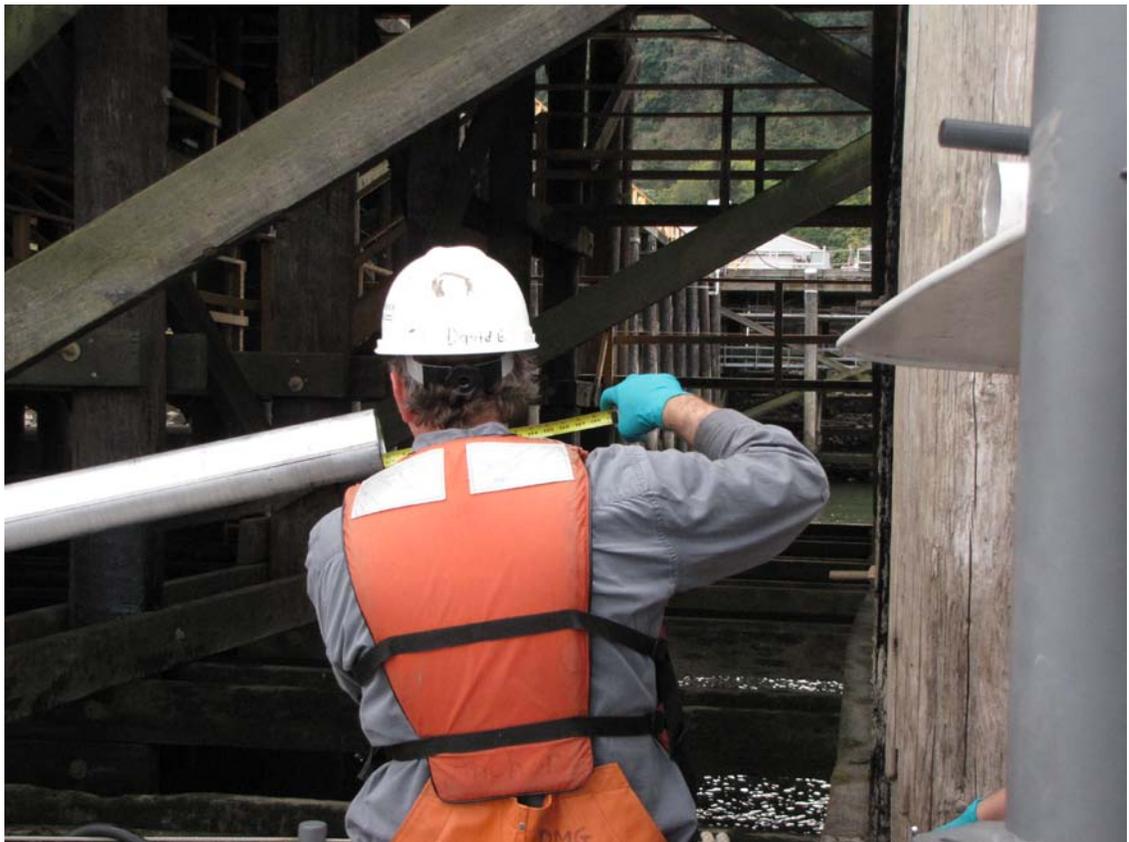
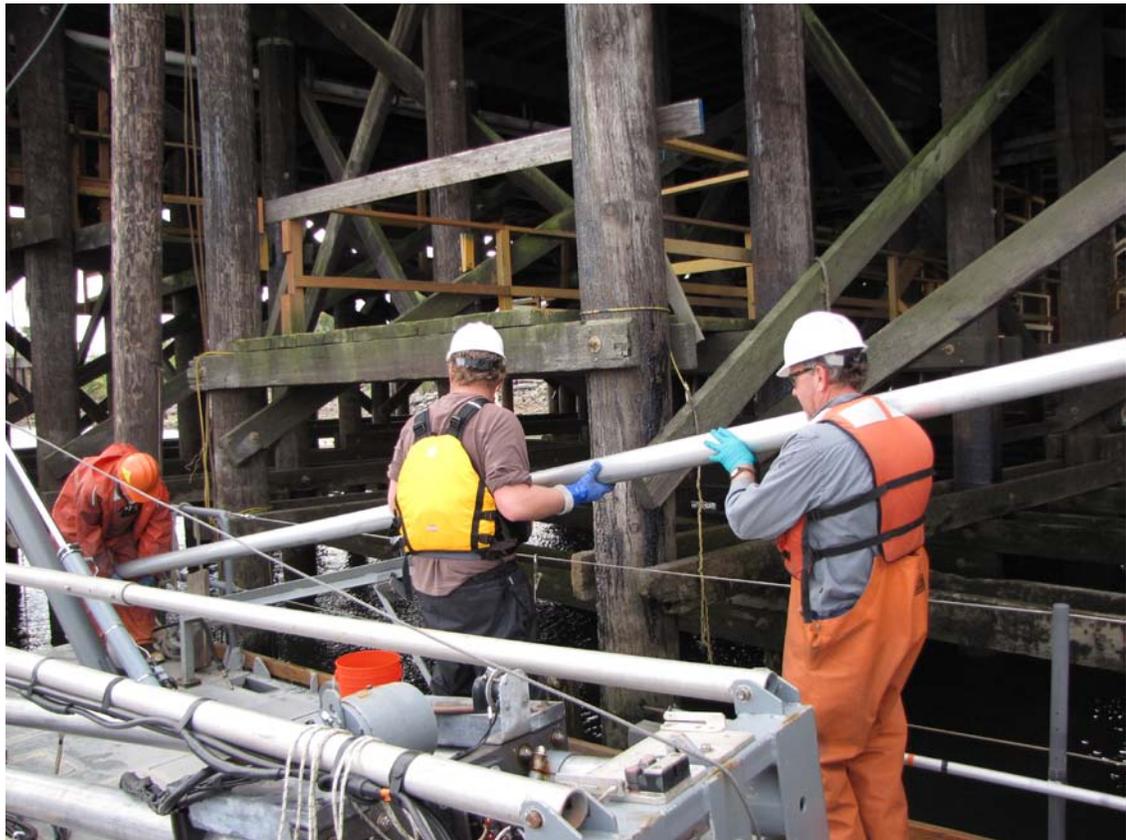
Data Gaps
October 8, 2010 (Sediment Cores)

Photos 001 and 002



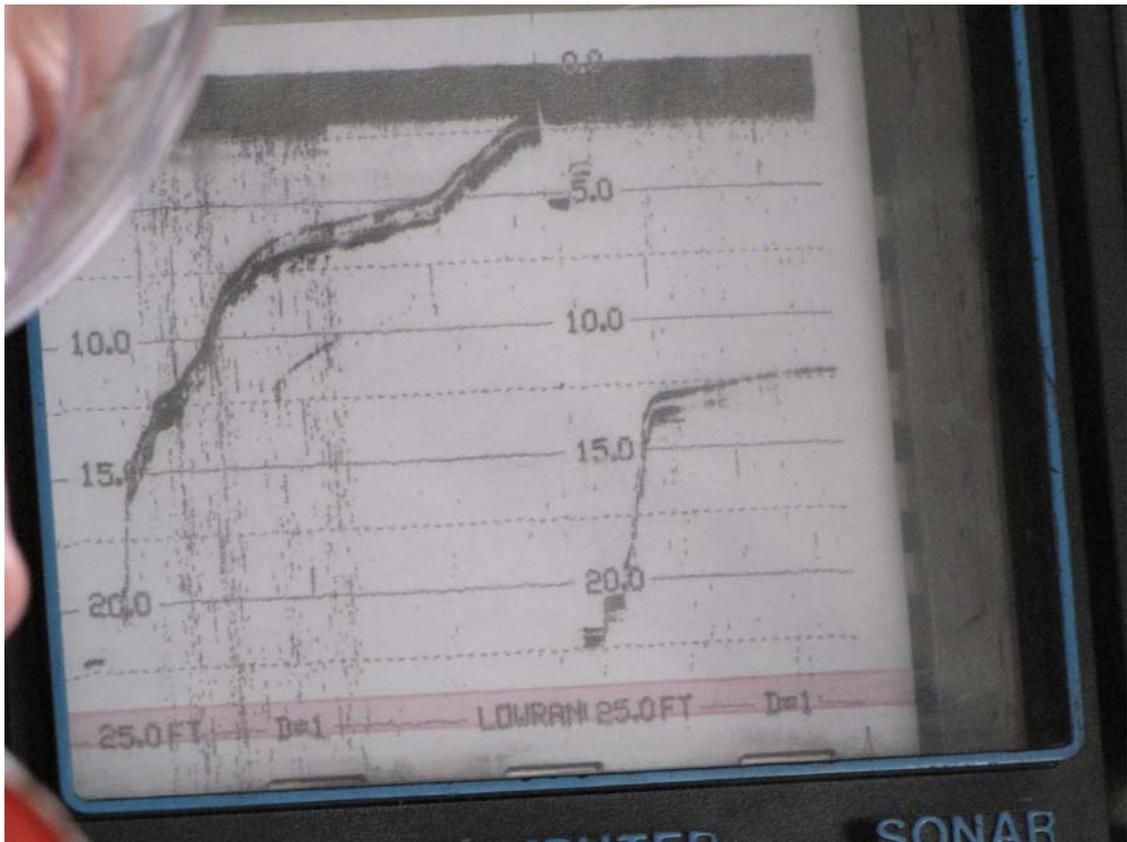
Data Gaps
October 8, 2010 (Sediment Cores)

Photos 003 and 004



Data Gaps
October 8, 2010 (Sediment Cores)

Photos 005 and 006



Data Gaps
October 8, 2010 (Sediment Cores)

Photos 007 and 008



Data Gaps
October 8, 2010 (Soil Borings)

Photos 001 and 002



Data Gaps
October 8, 2010 (Soil Borings)

Photos 003 and 004



Data Gaps
October 8, 2010 (Soil Borings)

Photos 005 and 006



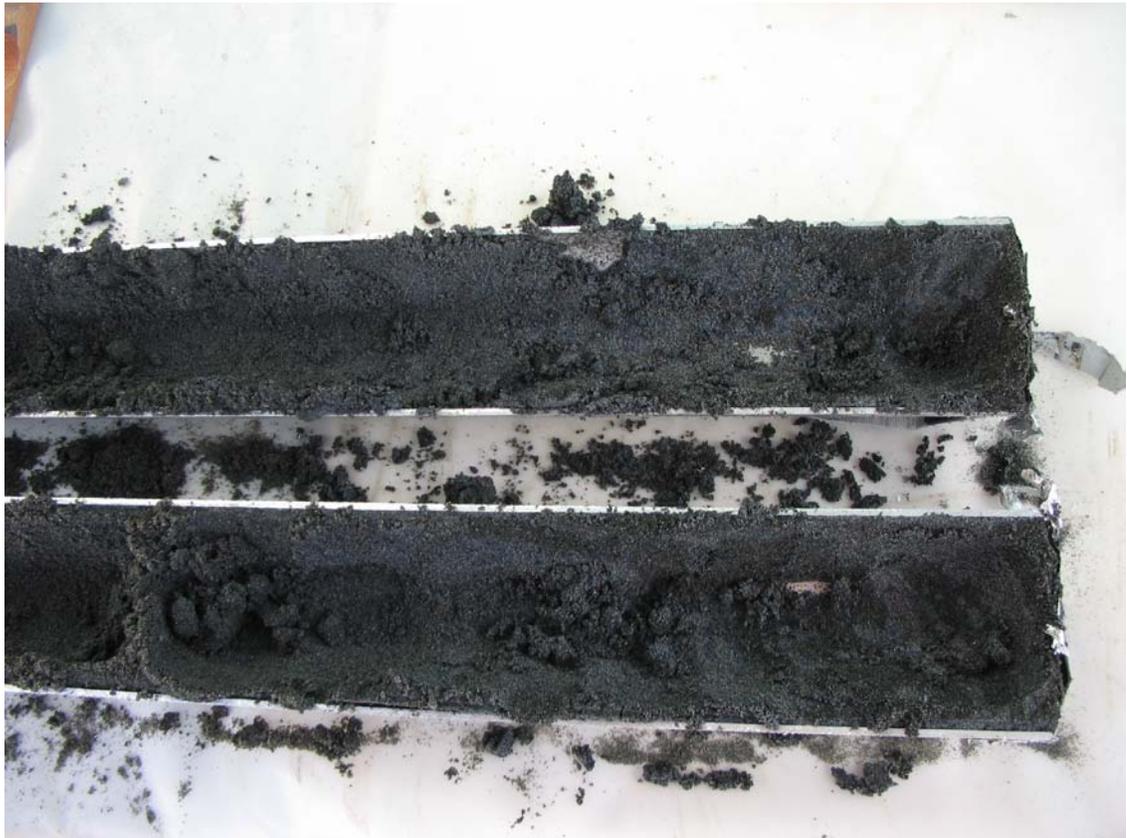
Data Gaps
October 11, 2010 (Soil Borings)

Photos 001 and 002



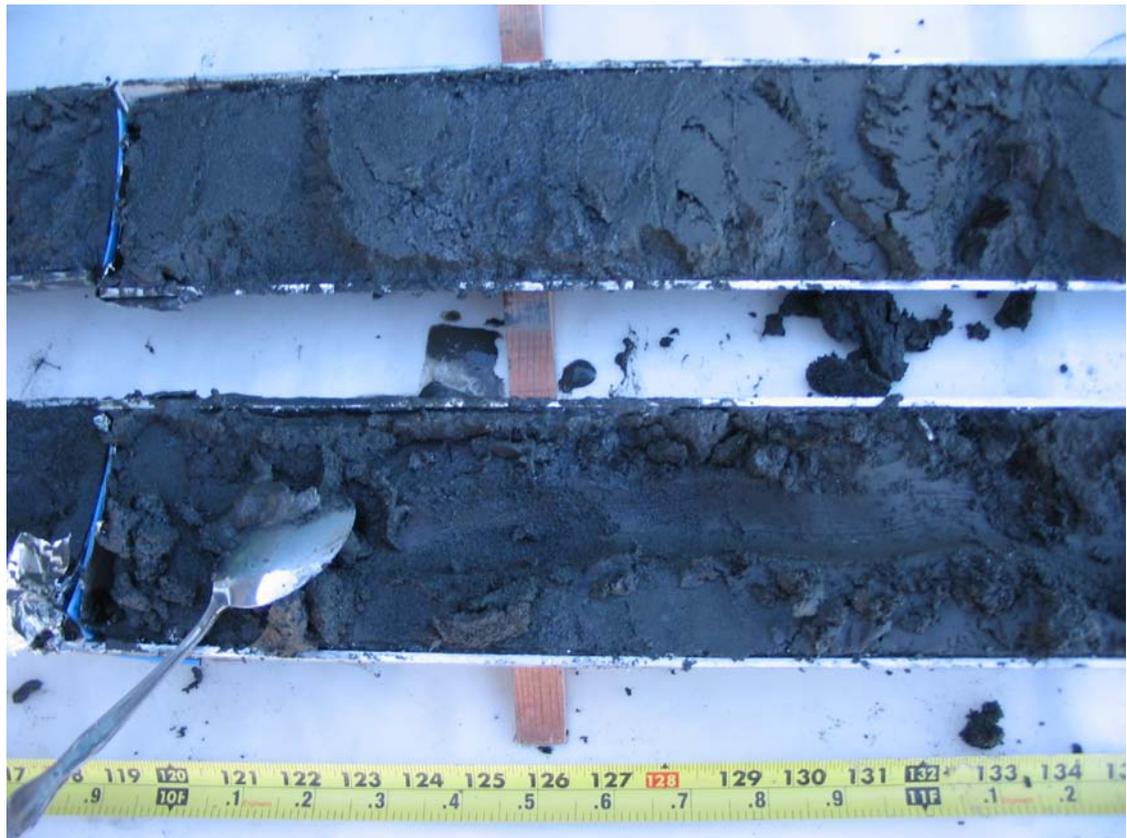
Data Gaps
October 11, 2010 (Soil Borings)

Photos 003 and 004



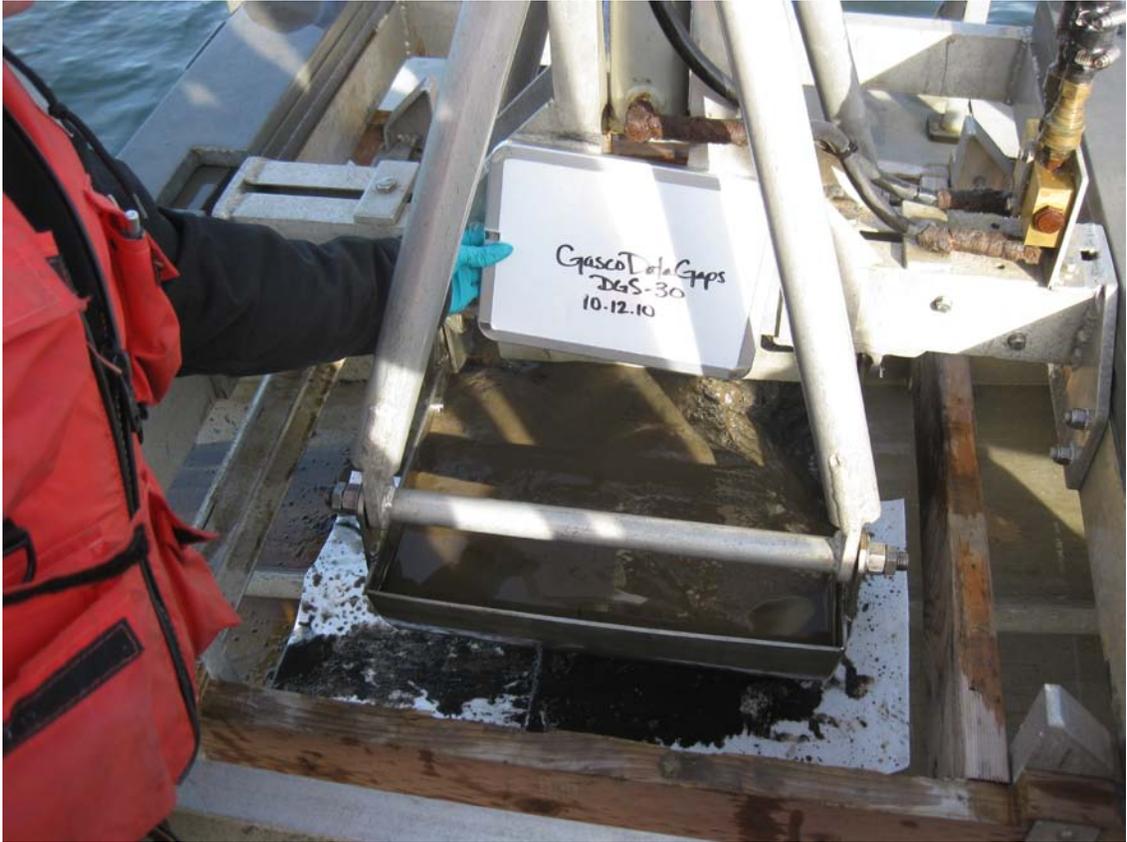
Data Gaps
October 11, 2010 (Soil Borings)

Photos 005 and 006



Data Gaps
October 12, 2010 (Sediment Grabs)

Photos 001 and 002



Data Gaps
October 12, 2010 (Sediment Grabs)

Photos 003 and 004



Data Gaps
October 12, 2010 (Sediment Grabs)

Photos 005 and 006



Data Gaps
October 12, 2010 (Sediment Grabs)

Photos 007 and 008



Data Gaps
October 12, 2010 (Soil Borings)

Photos 001 and 002



Data Gaps
October 12, 2010 (Soil Borings)

Photos 003 and 004



Data Gaps
October 12, 2010 (Soil Borings)

Photos 005 and 006



Data Gaps
October 12, 2010 (Soil Borings)

Photos 007 and 008



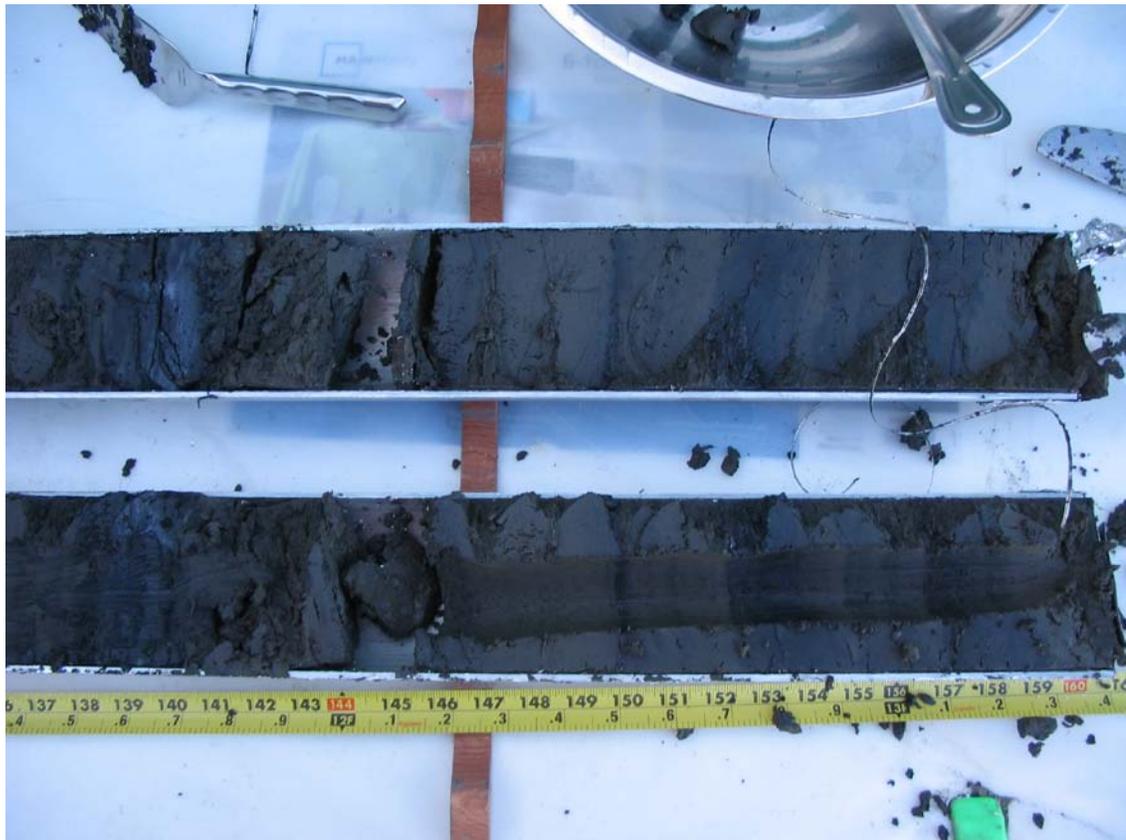
Data Gaps
October 12, 2010 (Soil Borings)

Photos 009 and 010



Data Gaps
October 12, 2010 (Soil Borings)

Photos 011 and 012



Data Gaps
October 14, 2010 (Sediment Grabs)

Photos 001 and 002



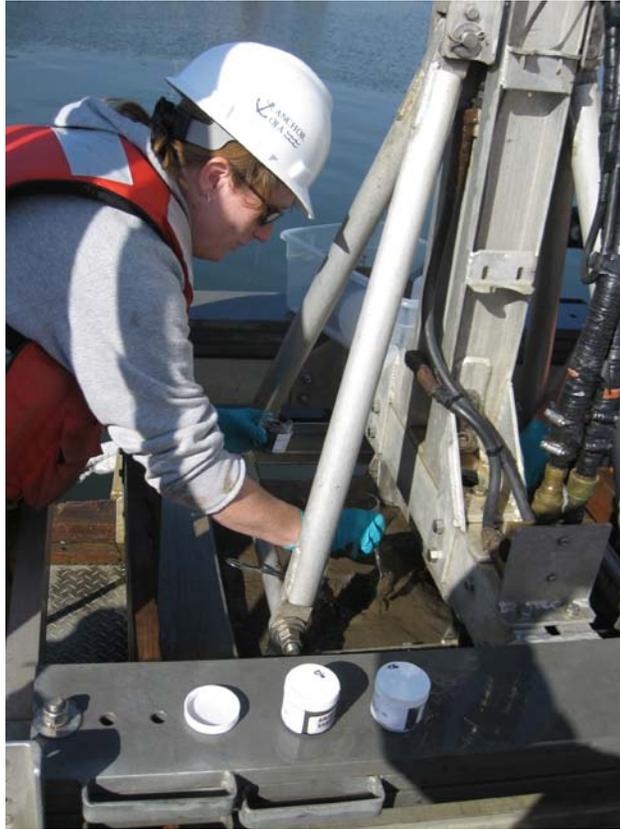
Data Gaps
October 14, 2010 (Sediment Grabs)

Photos 003 and 004



Data Gaps
October 14, 2010 (Sediment Grabs)

Photos 005 and 006



Data Gaps
October 15, 2010 (Soil Borings)

Photos 001 and 002



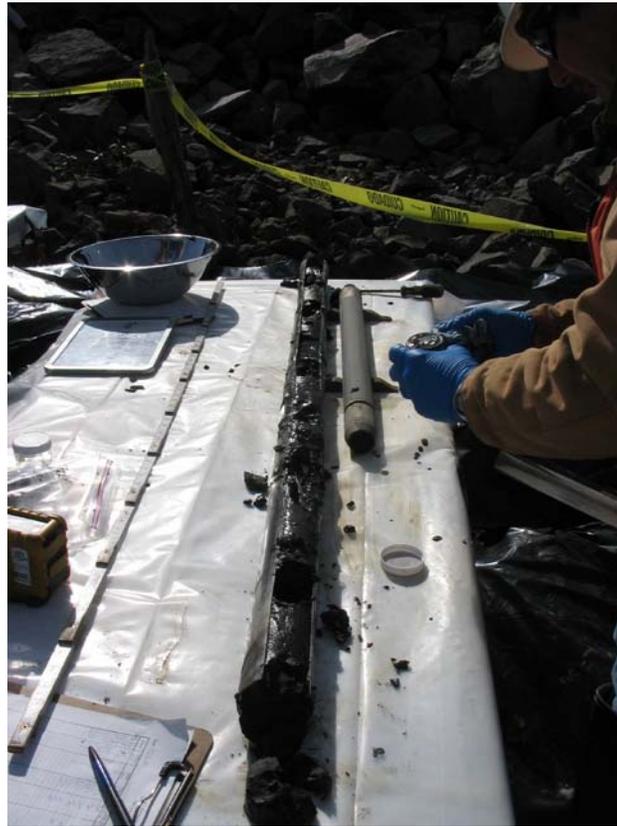
Data Gaps
October 15, 2010 (Soil Borings)

Photos 003 and 004



Data Gaps
October 15, 2010 (Soil Borings)

Photos 005 and 006



Data Gaps
October 15, 2010 (Soil Borings)

Photo 007



Data Gaps
April 18, 2011 (Sediment Grabs)

Photos 001 and 002



Data Gaps
April 18, 2011 (Sediment Grabs)

Photos 003 and 004



Data Gaps
April 18, 2011 (Sediment Grabs)

Photos 005 and 006



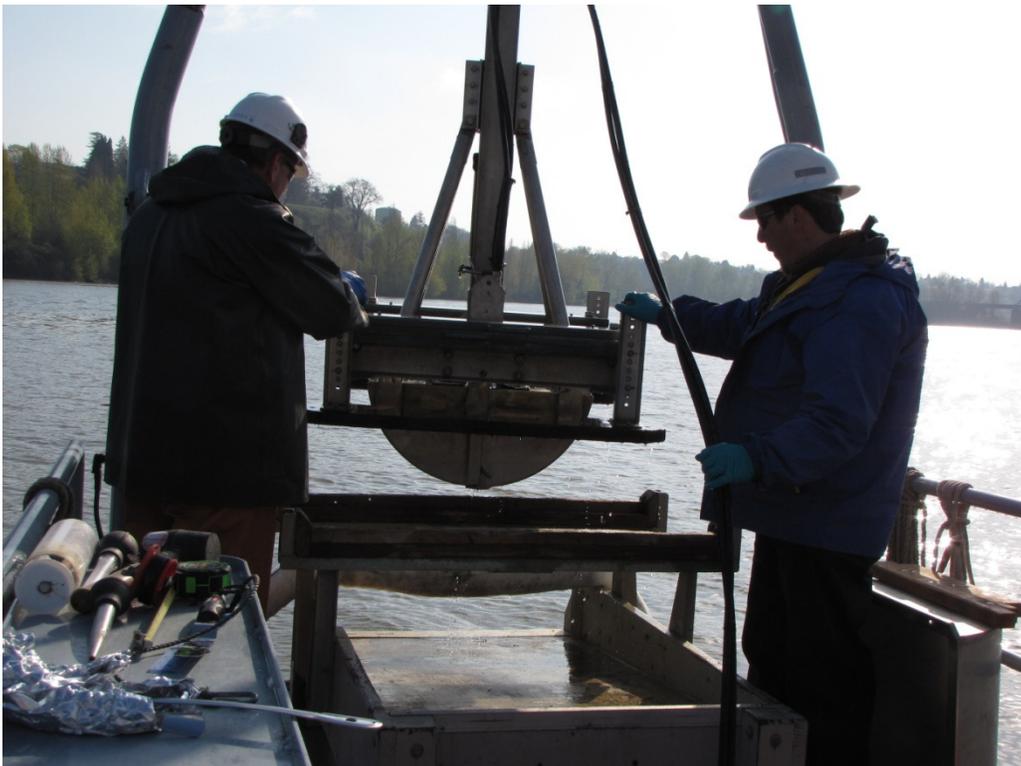
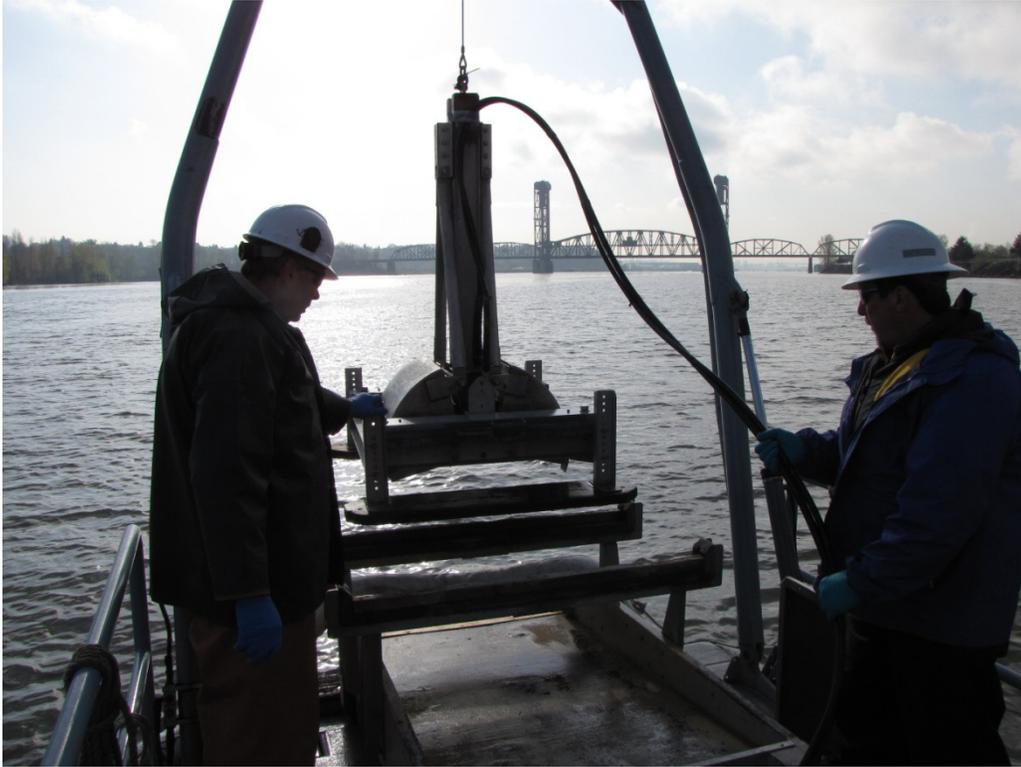
Data Gaps
April 18, 2011 (Sediment Grabs)

Photos 007 and 008

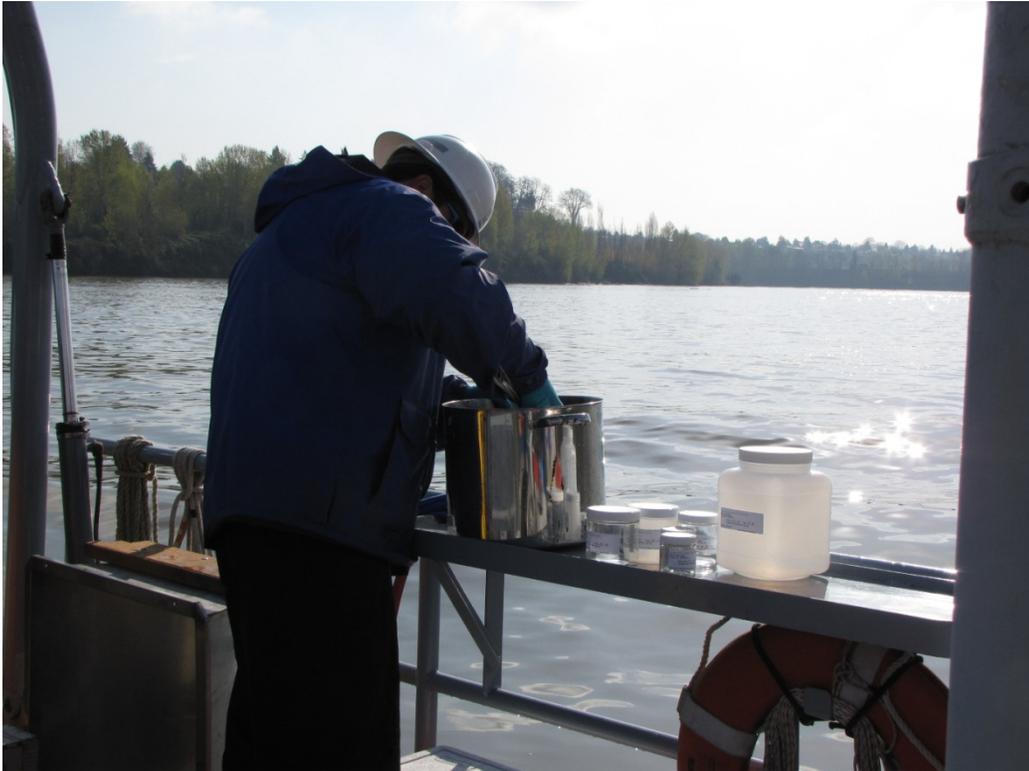


Data Gaps
April 19, 2011 (Sediment Grabs)

Photos 001 and 002



Data Gaps
April 18, 2011 (Sediment Grabs)
Photos 003 and 004



Appendix C

Health and Safety Inspection Reports

CDM Field Safety Report: Gasco/Siltronic Area 1 TZW and Groundwater Sample Collection - 9/14/10

Health and Safety Summary

Recorded by: Paul Opem, Certified Safety Professional

0700 hrs: Maul, Foster, and Alongi (MFA) personnel (Justin Pounds, Kelly Titkemeier), Cascade drilling crew, and CDM health and safety (H&S) oversight (Paul Opem) met at Cathedral City Park boat launch. Personnel donned personal protective equipment (PPE), including personal flotation devices (PFDs), and loaded gear needed for day's activities onto tug boat transport. Offload at barge located offshore of Siltronics facility.

0725: Daily tailgate H&S briefing conducted by Justin Pounds (MFA), with the drill rig safety component led by the Cascade drilling foreman. Items discussed by MFA were the significant safety requirements and safe work practices included in MFA's project health and safety plan (HASP), including the following:

- Appropriate PPE
- Contaminants of concern: trichloroethene (TCE), metals, volatile organic compounds (VOCs), total petroleum hydrocarbons (TPHs), and polycyclic aromatic hydrocarbons (PAHs).
- Work zone boundaries and practices (exclusion zone, contamination reduction zone, and support zone)
- Air monitoring using photoionization detectors (PIDs), Drager tubes, and combustible gas indicators (CGIs), along with the associated actions levels and action requirements.
- First aid, eye wash, and CPR availability.
- AED availability, with a rundown of the machine's operations and personnel certified as trained in AED operations. Machine was powered on for CDM H&S verification of functionality.
- Spill kit usage and locations.
- Working over water.
- Emergency procedures (medical, weather, and vessel).

Cascade drilling foreman reviews important safety features and operations of the Geoprobe equipment, including:

- Pinch points.
- Equipment guarding.
- Emergency shutdown location.
- Communication (visual) with drill rig operator at all times when in exclusion zone.
- Equipment decontamination procedures.
- Clearance when hoisting pipe sections.

CDM Field Safety Report: Gasco/Siltronic Area 1 TZW and Groundwater Sample Collection - 9/14/10

0750 hrs: MFA directed tug and barge to sample location GP-206. Cascade personnel measured depth from water surface to sediment at 47 feet, and begin drilling. All crew members on barge provided with and using hearing protection.

0900 hrs: PID reading at 0.2 parts per million (ppm), well below the required action level. CDM H&S confirms with Justin Pounds (MFA) that CGI readings will be regularly collected regardless of PID levels, and that a Drager tube will be employed if levels are detected greater than 1 ppm. Air monitoring activities observed to be in compliance with the procedures in the MFA HASP.

CDM H&S performed a comprehensive safety inspection and recorded the following H&S issues:

- CDM H&S observed that although the drill rig vehicle's wheels are chocked, the MFA equipment van's wheels are not, creating the potential for a rolling vehicle as the barge moves. MFA supervisor Justin Pounds shall retrieve and install wheel chocks as soon as the tug can bring personnel to shore.
- CDM H&S observed MFA and Cascade non-compliance with drum labeling for the investigation-derived waste (IDW) during purging for the water sampling. Justin Pounds corrects and updates the label to include the contents of the day's sampling location.
- CDM H&S expressed concern to MFA that the barge's permanently affixed guardrails are too low to meet OSHA guardrail standards. Because the guardrails are permanent and their modification is not feasible, CDM and MFA reiterate with entire crew the need to stay clear of the rails at all times to prevent a man overboard situation. Personnel are reminded to not rest, lean, sit, or stand on rails for any reason, and to be especially wary of their location when waves produced by other watercraft approach the barge.

The ends of barge used for on/offloading, which do not have attached railings, are appropriately marked with caution tape.

1010 hrs: MFA directed tug and barge to sample location GP-205. Cascade personnel measure depth from water surface to sediment at 50 feet, and begin drilling. All barge crew members using hearing protection.

1050 hrs: All MFA water sampling activities observed to be in compliance with MFA HASP and general H&S protocol.

CDM Field Safety Report: Gasco/Siltronic Area 1 TZW and Groundwater Sample Collection - 9/14/10

1245 hrs: MFA directed tug and barge to sample location GP-200. Cascade personnel measured depth from water surface to sediment at 50 feet, and began drilling. All barge crew members using hearing protection.

CDM H&S performed a comprehensive safety inspection and records the following H&S issue:

- CDM H&S observed that while plastic sheeting had been placed beneath the entire Geoprobe, the areas beneath the drill rig truck's engine and the entire MFA support van have no sheeting placed to capture potential vehicle fluid spills. A plastic sheeting barrier with raised edges shall allow for an easier containment of any engine fluid or gasoline spills, and reduce their potential for entering the waterway.

Both Cascade and MFA personnel installed plastic sheeting to provide 100% coverage beneath their vehicles as requested by CDM.

1345 hrs: Cascade drilling foreman determined that the steel cable hoist on the Geoprobe is due for replacement following observation of crush marks in the cabling. Although cable is determined not to present any imminent danger to life or health, Cascade schedules installation of a new cable for later in the day. During a discussion with CDM H&S, the drilling foreman states that this is considered normal wear and tear on the Geoprobe due to a function of the small cable roller size, but that all drilling activities for the day should be concluded as a precautionary measure until the line can be replaced.

1415 hrs: Sample collection was completed for day; drilling crew began decontamination of drilling equipment. CDM H&S observed all equipment decontamination activities to be in compliance with established H&S protocol and any MFA HASP requirements.

1330 hrs: Tug transported barge to location near shore of Gasco plant and anchored barge with spuds.

1345 hrs: MFA, Cascade, and CDM personnel disembarked tug at Cathedral City Park.

Overall Safety Summary

Based on a review of the Gasco/Siltronic Area 1 TZW and Groundwater Sample Collection efforts performed by MFA and their subcontractors, all program elements are in place to the degree required by Federal OSHA standards and the project HASP as documented in the safety review inspections.

CDM Field Safety Report: Gasco/Siltronic Area 1 TZW and Groundwater Sample Collection - 9/14/10

The following are photos from 09/14/10 Area 1 TZW and groundwater sampling activities at Gasco/Siltronics offshore locations.

1. Cascade Drilling crew using the Geoprobe.



CDM Field Safety Report: Gasco/Siltronic Area 1 TZW and Groundwater Sample Collection - 9/14/10

2. MFA personnel at their groundwater sample prep station.



CDM Field Safety Report: Gasco/Siltronic Area 1 TZW and Groundwater Sample Collection - 9/14/10

- 3. MFA personnel determining sample locations with GPS and directing barge positioning by tug.



CDM Field Safety Report: Gasco/Siltronic Area 1 TZW and Groundwater Sample Collection - 9/14/10

SafetyNet Inspection Review

The SafetyNet system employs a user-friendly platform to quickly and efficiently record observations of field activities. Checklists are stored on a PDA device and are used by CDM H&S personnel to evaluate work progress and compliance with the September 2010 HASP for Over Water Work, prepared by MFA. Observations of activities are objectively treated as either safe or unsafe. Safe observations are uploaded to the server and tracked accordingly. Unsafe observations are treated as an open issue that must be corrected. Information related to the unsafe observation, such as the type and severity of the hazard, recommended corrective action, party responsible for implementing the corrective action, and the timeframe required to complete the corrective action, must be entered. Unsafe observations (i.e., open issues) remain open until a corrective action had been confirmed. The time duration of open issues is also tracked.

The SafetyNet inspections allow for a comprehensive assessment of all program elements required under the HASP.

The following tables provide a summary of the SafetyNet inspections performed by CDM H&S at the Gasco/Siltronics over water site on 9/14/10.

CDM Field Safety Report: Gasco/Siltronic Area 1 TZW and Groundwater Sample Collection - 9/14/10

Inspection Type	Inspections	Observations	Unsafe Conditions	% Safe
Safety	2	121	4	96.7%

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
Administration	Summary	6	0	6	100.0%
	First Aid/CPR trained person	2	0	2	100.0%
	First aid kit available	2	0	2	100.0%
	Safety meetings	2	0	2	100.0%
Drilling Operations	Summary	28	1	27	96.4%
	Atmospheric monitoring	2	0	2	100.0%
	Bore hole secure	1	0	1	100.0%
	Emp aware of med fac locat.	1	0	1	100.0%
	Equipment clean	1	0	1	100.0%
	Exclusion zone for drill rig	2	0	2	100.0%
	Fuel properly labeled	1	0	1	100.0%
	Hydraulic hose condition	2	0	2	100.0%
	IDW handling/drum lifting	3	1	2	66.7%
	Knowledge of shut down switch	1	0	1	100.0%

CDM Field Safety Report: Gasco/Siltronic Area 1 TZW and Groundwater Sample Collection - 9/14/10

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
	Leaks on rig	2	0	2	100.0%
	Material handling	1	0	1	100.0%
	Rig set up	2	0	2	100.0%
	Shut down devices	1	0	1	100.0%
	Smoking policy observed	2	0	2	100.0%
	Struck by hazards	2	0	2	100.0%
	Trip hazards	2	0	2	100.0%
	Work area organized	2	0	2	100.0%
Environmental	Summary	14	1	13	92.9%
	Containers labeled	2	0	2	100.0%
	Dust Control Adequate	2	0	2	100.0%
	Spill containment adequate	2	0	2	100.0%
	Spill kit available	2	0	2	100.0%
	Spill response awareness	2	0	2	100.0%
	Vehicle / machinery leaks	4	1	3	75.0%
Fall Protection	Summary	3	1	2	66.7%
	Ext/int guardrails	2	1	1	50.0%
	Floor/wall opening protected	1	0	1	100.0%
Fire Protection	Summary	2	0	2	100.0%
	Ext charged and inspected	2	0	2	100.0%

CDM Field Safety Report: Gasco/Siltronic Area 1 TZW and Groundwater Sample Collection - 9/14/10

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
Hazard Communications	Summary	1	0	1	100.0%
	Employees trained	1	0	1	100.0%
Housekeeping	Summary	5	0	5	100.0%
	Proper material storage	1	0	1	100.0%
	Slip, trip, fall hazards	2	0	2	100.0%
	Trash in protected cont	2	0	2	100.0%
Medical / Emergency	Summary	4	0	4	100.0%
	1st Aid/CPR/AED trained staff on site	1	0	1	100.0%
	1st aid kit/AED	1	0	1	100.0%
	Eye wash	1	0	1	100.0%
	Map to medical facility	1	0	1	100.0%
Motorized Equipment	Summary	6	1	5	83.3%
	Operator appears competent	2	0	2	100.0%
	Wheels chocked	4	1	3	75.0%
P.P.E.	Summary	49	0	49	100.0%
	Glasses / face shields	9	0	9	100.0%
	Gloves	8	0	8	100.0%
	Hard Hats	8	0	8	100.0%
	Hearing protection	8	0	8	100.0%
	Proper Clothing	8	0	8	100.0%
	Work Boots	8	0	8	100.0%

CDM Field Safety Report: Gasco/Siltronic Area 1 TZW and Groundwater Sample Collection - 9/14/10

Site / Public Protection	Summary	3	0	3	100.0%
	Adequate drinking water	1	0	1	100.0%
	Adequate toilets	1	0	1	100.0%
	Adequate washing facilities	1	0	1	100.0%

OSHA Recordables/Lost Time:09/14/10 = 0	OSHA Recordables/Lost Time To Date = 0
-----------------------------------------	----------------------------------------

CDM Field Safety Report: Gasco/Siltronic Riverbank Soil Sampling: 10/1/10

Health and Safety Summary

Recorded by: Paul Opem, Certified Safety Professional

10/1/10:

0815 hrs: CDM, Anchor QEA, and Cascade Drilling personnel meet at Anchor's Gasco site job trailer.

0830 hrs: Daily tailgate H&S meeting started by Jeff Jones, Cascade drilling foreman. Discussed by Cascade were: emergency procedures; location of spill and first aid kits; personal protective equipment (PPE); decontamination procedures; fall hazards (e.g., steep riverbank); stop work authority; work zones; and drill rig operations (e.g., pinch points, machine guarding). CDM H&S inquires as to proper communication in the exclusion zone, which is to include visible contact with the operator at all times.

Anchor QEA's John Renda (site safety officer) then proceeded with a summary of the day's planned events, potential hazards, and a synopsis of Anchor QEA's project HASP. Included in the discussion were the following:

- Appropriate PPE for boring at GST-01. John called attention to the need for both nitrile inner gloves and chemical resistant outer gloves worn by the drillers at all times in the exclusion zone. CDM H&S reminded Cascade and Anchor that if drilling personnel were showing visible signs of possible soil contamination from drilling activities, Tyvek or similar impermeable suits would be required. Cascade drillers state that they do not have Tyvek or equivalent suits available. John Renda informs drillers that they will be supplied with a box of Tyvek for the short-term.
- Contaminants of concern: metals; volatile organic compounds (VOCs), notably benzene; total petroleum hydrocarbons (TPHs); polycyclic aromatic hydrocarbons (PAHs); and hydrogen sulfide. Scott Coffey (CDM) reiterated the need to avoid contact with Willamette River water, along with precautions (e.g., gloves) and decontamination steps.
- Contaminant exposure routes (inhalation, dermal contact, and ingestion). CDM H&S inquired as to past experience with dust generation during Sonic drilling, and the onsite means of controlling potential dust.
- Work zone boundaries and practices (exclusion zone, contamination reduction zone, and support zone). John reminded everyone that all personnel decontamination is to occur in the contamination reduction zone.
- Air monitoring using a 4-gas meter to measure organic vapors and hydrogen cyanide. CDM H&S inquired as to action level awareness, which John Renda reviewed in the HASP and imparted to the group at large. Anchor stated that breathing zone air monitoring would be conducted continuously (recorded every 15-30 minutes) for organic vapors and hydrogen cyanide, with actions implemented to detect benzene and

CDM Field Safety Report: Gasco/Siltronic Riverbank Soil Sampling: 10/1/10

vinyl chloride if there is a sustained reading above 1 part per million (ppm).

Colorimetric detector tubes would be used to detect benzene and vinyl chloride.

- First aid, eye wash, CPR, and AED availability. CDM H&S verifies that all Anchor and Cascade personnel are CPR and AED-trained, and requests a run-through of AED operations following the meeting. AED is to be available at the boring location in the Anchor van.
- Fall hazards at the drilling location, in particular the steep and overgrown riverbank in proximity of the bore hole.
- Equipment and personnel decontamination procedures.

0900 hrs: Anchor explains AED usage to CDM H&S and powers up unit for tutorial.

0930 hrs: Crew moves to GST-01 location, and awaits delivery and establishment of drilling equipment by Cascade.

0945 hrs: CDM H&S performs a safety inspection during set up activities, and observes two Cascade crew members not wearing hard hats. Personnel are informed and don hard hats. Cascade and Anchor personnel continue set up of drill rig and sampling/decontamination stations. Activities observed to be in compliance with established H&S protocol and the Anchor QEA HASP.

1110 hrs: CDM H&S performs a comprehensive safety inspection of set up activities, and records the following issue:

- A Bobcat hauling water and container drums to the drill site is observed to be without a functioning backup alarm. CDM and Anchor personnel are behind the machine as it backs up, creating the potential for a struck-by hazard. CDM H&S requests repair/correction of the alarm as soon as possible.

Equipment and personnel (boot wash, hand/face wash) decontamination stations are established.

1250 hrs: Background breathing zone level recorded on 4-gas meter: 0 ppm. Drilling at location GST-01 begins.

1255 hrs: CDM H&S performs a comprehensive safety inspection of drilling activities and records the following H&S issue:

- Personnel are without adequate means to decontaminate face and hands. Water is available, but request soap or similar cleansing/disinfecting agent. CDM H&S requests Anchor personnel retrieve cleanser in van. CDH H&S also verifies that investigation-derived waste (IDW) from decontamination activities is to be labeled prior to removal from drilling location and disposal.

CDM Field Safety Report: Gasco/Siltronic Riverbank Soil Sampling: 10/1/10

Drill rig is not observed to be leaking any fluids. CDM H&S observes that drilling crew clothing is free of visible soil contamination. Drilling activities are not generating visible dust or debris.

Backup alarm is observed to be functioning on the Bobcat.

1400 hrs: Drillers move borehole to new location on direction of Anchor foreman (rock interference has compromised integrity of samples). Background breathing zone reading collected on 4-gas meter. Anchor is also collecting readings from the core sample material.

1430 hrs: CDM H&S reviews Anchor's log of breathing zone readings. All readings are below minimum action levels as stated in the Anchor QEA HASP.

CDM H&S requests boot wash water to be changed as present soiled state will prevent proper cleaning. Matt Wilson (Anchor) and John Renda (Anchor) change boot wash water.

1520 hrs: CDM H&S performs a comprehensive safety inspection of drilling activities and records the following issue:

- Hydraulic fluid is leaking from the drill head onto the plastic sheeting beneath the rig. The amount of fluid is estimated to be less than 1 pint, and is fully contained on the plastic. Cascade personnel use the absorbent pads from the spill kit to mop up the fluid (to be placed in the IDW stream).

Drilling is stopped by John Renda (Anchor). The leak source and causes are evaluated by Anchor, Cascade, and CDM personnel. Drilling foreman Jeff Jones (Cascade) explains that in his experience, the drill rig does not typically leak unless operating at slower speeds, such as in this sampling operation. Anchor and CDM personnel explain to Cascade that any leak is unacceptable during site work, and that repairs or modifications must be made before rig is considered project compliant and drilling is able to proceed.

Drilling is discontinued for the day and repairs/modifications to be assessed/completed by Cascade prior to returning on Monday October 4th.

Overall Safety Summary

Based on a review of the Gasco riverbank soil sampling efforts performed by Anchor QEA and their subcontractor Cascade Drilling, all program elements are in place to the degree required by Federal OSHA standards and the project HASP as documented in the safety review inspections.

CDM Field Safety Report: Gasco/Siltronic Riverbank Soil Sampling: 10/1/10

The following are photos from 10/01/10 Area GST-01 riverbank soil sampling activities at Gasco.

1. Cascade drilling crew setting up the Sonic rig for boring at location GST-01



CDM Field Safety Report: Gasco/Siltronic Riverbank Soil Sampling: 10/1/10

2. Anchor personnel's soil characterization and sample prep station



CDM Field Safety Report: Gasco/Siltronic Riverbank Soil Sampling: 10/1/10

3. Anchor personnel characterizing soil (4-gas meter used for air monitoring and readings log on right of table)



CDM Field Safety Report: Gasco/Siltronic Riverbank Soil Sampling: 10/1/10

SafetyNet Inspection Review

The SafetyNet system employs a user-friendly platform to quickly and efficiently record observations of field activities. Checklists are stored on a PDA device and are used by H&S personnel to evaluate work progress and compliance with the September 2010 Revised Final Anchor QEA Health and Safety Plan, Data Gaps QAPP Gasco Sediments Cleanup Action. Observations of activities are objectively treated as either safe or unsafe. Safe observations are uploaded to the server and tracked accordingly. Unsafe observations are treated as an open issue that must be corrected. Information related to the unsafe observation, such as the type and severity of the hazard, recommended corrective action, party responsible for implementing the corrective action, and the timeframe required to complete the corrective action, must be entered. Unsafe observations (i.e., open issues) remain open until a corrective action had been confirmed. The time duration of open issues is also tracked.

The SafetyNet inspections allow for a comprehensive assessment of all program elements required under the HASP.

The following tables provide a summary of the SafetyNet inspections performed by CDM H&S at the Gasco/Siltronic riverbank site on 10/01/10.

CDM Field Safety Report: Gasco/Siltronic Riverbank Soil Sampling: 10/1/10

Inspection Type	Inspections	Observations	Unsafe Conditions	% Safe
Safety	4	223	6	97.3%

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
Administration	Summary	10	0	10	100.0%
	First Aid/CPR trained person	6	0	6	100.0%
	First aid kit available	2	0	2	100.0%
	Safety meetings	2	0	2	100.0%
Drilling Operations	Summary	34	2	32	94.1%
	All guards in place	1	0	1	100.0%
	Atmospheric monitoring	3	0	3	100.0%
	Bore hole secure	1	0	1	100.0%
	Emp aware of med fac locat.	1	0	1	100.0%
	Empl. trained in oper procedures	1	0	1	100.0%
	Equipment clean	2	0	2	100.0%
	Exclusion zone for drill rig	2	0	2	100.0%
	Fluid leaks contained	2	1	1	50.0%
	High voltage lines	1	0	1	100.0%

CDM Field Safety Report: Gasco/Siltronic Riverbank Soil Sampling: 10/1/10

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
	Highwalls, banks, trenches	1	0	1	100.0%
	Hydraulic hose condition	3	1	2	66.7%
	IDW handling/drum lifting	1	0	1	100.0%
	Knowledge of shut down switch	1	0	1	100.0%
	Leaks on rig	1	0	1	100.0%
	Rig set up	3	0	3	100.0%
	Shut down devices	1	0	1	100.0%
	Smoking policy observed	2	0	2	100.0%
	Trip hazards	1	0	1	100.0%
	Underground utilities located	1	0	1	100.0%
	Work area organized	5	0	5	100.0%
Electrical	Summary	1	0	1	100.0%
	GFCI's used	1	0	1	100.0%
Environmental	Summary	6	0	6	100.0%
	Dust Control Adequate	2	0	2	100.0%
	Spill containment adequate	2	0	2	100.0%
	Spill kit available	1	0	1	100.0%
	Vehicle / machinery leaks	1	0	1	100.0%

CDM Field Safety Report: Gasco/Siltronic Riverbank Soil Sampling: 10/1/10

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
Fall Protection	Summary	1	0	1	100.0%
	Fall protection plan	1	0	1	100.0%
Fire Protection	Summary	4	0	4	100.0%
	Ext charged and inspected	1	0	1	100.0%
	Fire suppression equip avail	2	0	2	100.0%
	Proper fuel containers used	1	0	1	100.0%
Hazard Communications	Summary	4	0	4	100.0%
	Employees trained	1	0	1	100.0%
	Proper labels on containers	3	0	3	100.0%
Housekeeping	Summary	5	0	5	100.0%
	Slip, trip, fall hazards	1	0	1	100.0%
	Trash in protected cont	2	0	2	100.0%
	Walkways clear	2	0	2	100.0%
Medical / Emergency	Summary	4	0	4	100.0%
	Eye wash	2	0	2	100.0%
	Map to medical facility	2	0	2	100.0%

CDM Field Safety Report: Gasco/Siltronic Riverbank Soil Sampling: 10/1/10

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
Motorized Equipment	Summary	6	1	5	83.3%
	Back up alarm functioning	2	1	1	50.0%
	Operator appears competent	3	0	3	100.0%
	Seat belts used	1	0	1	100.0%
P.P.E.	Summary	144	2	142	98.6%
	Glasses / face shields	25	0	25	100.0%
	Gloves	25	0	25	100.0%
	Hard Hats	22	2	20	90.9%
	Hearing protection	22	0	22	100.0%
	Proper Clothing	25	0	25	100.0%
	Work Boots	25	0	25	100.0%
Site / Public Protection	Summary	4	1	3	75.0%
	Adequate drinking water	1	0	1	100.0%
	Adequate toilets	1	0	1	100.0%
	Adequate washing facilities	2	1	1	50.0%

OSHA Recordables/Lost Time:10/01/10 = 0

OSHA Recordables/Lost Time To Date = 0

CDM Field Safety Report: Gasco/Siltronic Offshore Sediment Sampling: 10/6/10

Health and Safety Summary

Recorded by: Paul Opem, Certified Safety Professional

10/6/10:

0730 hrs: CDM, Anchor QEA, and Marine Sampling Systems (MSS) personnel meet at the Olympic Tug and Barge floating dock at the Gasco site to prepare for day's sampling activities. Anchor QEA intends to continue with the in-water sediment core collection effort on October 6th.

0745 hrs: Daily tailgate H&S meeting conducted by Dave Gillingham, Anchor QEA supervisor and site safety officer. Present for meeting are: Dale Dickinson (MSS) Bill Jaworski (vessel captain, MSS), Mike Crystal (Anchor QEA), Delaney Peterson (Anchor QEA), and Paul Opem (CDM H&S). Discussed by Anchor QEA were: deck hazards (slips, trips, falls; moving equipment; pinch points; overhead hazards); personal protective equipment (PPE); AED availability, location, and function; air monitoring; hazard communications (including visual communication with captain/operator at all times when on vessel); man overboard procedures; personnel and equipment decontamination; Willamette River biological hazards; spill prevention, reporting, and spill kit location; first aid kit availability; CPR- and AED-trained personnel; and fire extinguisher locations.

CDM H&S powers on AED and verifies functionality of unit.

0815 hrs: Crew prepares equipment and vessel. Anchor personnel then decontaminate sample tubing from previous day's unsuccessful sample attempt. Boat leaves dock en route to sample location.

CDM H&S observes captain without safety glasses, steel-toed shoes, safety vest, and personal flotation device (PFD) - captain dons equipment at request.

0845 hrs: Vessel positioned at DGS-19 sample location for vibracore sampling. CDM H&S inquires as to background reading of photoionization detector (PID) - reading of 0 parts per million (ppm) recorded by Anchor QEA.

0850 hrs: Delaney Peterson reports PID readings of 1.4 ppm in the exclusion zone sustained over 2 minutes. CDM H&S observes readings continue to vary up to 2.1 ppm in the deck worker's breathing zone. Per Anchor QEA's project health and safety plan (HASP) dated September 2010, action level for PID is greater than 1 ppm sustained, and necessitates upgrade to Level C PPE while monitoring for vinyl chloride and benzene. Delaney Peterson states that she is concerned about the validity of the PID's calibration as its readings continue to fluctuate in a stable location.

CDM H&S requests ship crew to upgrade to Level C PPE, including air-purifying respirators. Anchor personnel report to CDM H&S that respirators are not on board for utilization as stated in the Anchor QEA HASP. CDM H&S stops activities on boat, which is still anchored at the dock, while Dave Gillingham and Delaney Peterson retrieve crew respirators onshore. Anchor personnel will also recalibrate the PID while onshore. Crew leaves the vessel's exclusion zone.

CDM Field Safety Report: Gasco/Siltronic Offshore Sediment Sampling: 10/6/10

0900 hrs: Detector tubes used with Drager device indicate no presence of vinyl chloride or benzene in the exclusion zone.

0910 hrs: Delaney Peterson returns to vessel with recalibrated PID and respirators. Air monitoring is performed by Anchor QEA in the exclusion zone and shows no readings above 0 ppm. Anchor QEA collects PID readings of source material in collection tube - PID readings of sediment are between 0 and 1 ppm.

Crew is allowed to return to exclusion zone to continue sediment sampling activities in Level D PPE.

0930 hrs: Anchor QEA and vessel crew continue decontaminating vibracore tubes used in previous day's inadequate sample attempt. All decontamination activities observed to be in compliance with accept H&S protocol and Anchor project HASP. CDM H&S inquires as to source of decontamination water used in hoses on deck; vessel captain states this is sourced from the Willamette River. Although CDM H&S questions its appropriateness, deck personnel are never in dermal contact with water and river material is not leaving the exclusion zone. CDM H&S does not believe use of this decontamination water is presenting a hazard to the crew or otherwise.

Air monitoring with PID continues to show readings of 0 ppm.

1010 hrs: CDM H&S performs a comprehensive safety inspection of sampling activities, and records the following issues:

- The vessel captain is smoking at the rear of the vessel (in the support zone), during a work break. Captain is asked to refrain given the potential flammable materials to be encountered while sampling.
- An Anchor QEA worker in the exclusion zone is handling metal sample tubing while wearing only nitrile gloves for protection. Worker is reminded to wear cut-resistant chemical gloves during such operations.

1040 hrs: CDM H&S expresses concern to captain regarding retrieval of framing system which supports vibracore tubes - when hoisting tubes from water and placing frame in resting position, there is a brief period where the full weight of the tubes/framing reside on a single aluminum saw horse. The saw horse is not anchored to the vessel and could therefore be easily subject to collapse or movement. This presents a potential crushing hazard for personnel if they are in its vicinity while the vessel experiences a large wake or shift. Captain is asked if he is concerned about the system's instability, and he answers in the affirmative, stating it is an imperfect system - the vessel was designed for sample core tubes 15 feet in length or less.

CDM H&S asks if all crew members are aware of this crushing potential and know to stay clear of any lateral movement in the framing. The captain states that all on deck personnel are critically aware of this potential, stay clear of the mechanical equipment during retrieval, and that he will not operate the system if workers are positioned to either side of the machine. CDM H&S observations validate the crew's training and awareness.

CDM Field Safety Report: Gasco/Siltronic Offshore Sediment Sampling: 10/6/10

CDM H&S also observes Dave Gillingham having to lean over the vessel's bow in a prone position to cap the tubes during retrieval. He is without a fall arrest or fall protection system, and doing so in unstable conditions could present a man overboard situation. Crew members are observed in position to support and control Mr. Gillingham in the event of any sliding.

CDM H&S did not consider the above conditions to warrant a stop work order, but expressed concerns to both Bill Jaworski (vessel captain) and Dave Gillingham (Anchor QEA site safety officer). Mr. Gillingham is asked to evaluate and implement the following in the immediate future:

- Means of fall protection (e.g., safety harness) for employee capping sample tube at bow, or more appropriately an alternative method to cap the tube.
- A more permanent and heavier duty system to support the vibracore frame's weight during retrieval. The system should be physically anchored to the vessel's deck.

1145 hrs: Sediment samples are delivered to the core processing station onshore adjacent to the Anchor QEA job trailer. CDM H&S performs a comprehensive H&S inspection of sample processing activities and records the following issues:

- The Anchor QEA employee cutting the metal sample tubing with a powered saw is without adequate face/eye protection. Although he is wearing safety glasses, spraying metal particles are visible during cutting, which could cause an eye or facial injury to the worker. The Anchor QEA employee is asked to don a face shield or similar PPE prior to any more cutting activities.
- The same individual performing the cutting is wearing only nitrile gloves and is therefore without adequate hand protection given the activity. CDM H&S requests that the Anchor employee don cut-resistant gloves with sufficient dexterity to operate the saw and related equipment prior to continuing activities.
- An eye wash is not available at the processing station or nearby. John Renda (Anchor QEA) is asked to provide one.

John Renda supplies the worker with a face-shield and cut-resistant gloves, which are donned when cutting the tubes.

1330 hrs: Anchor QEA employees at the processing station are characterizing and logging sediment samples. Air monitoring results are below action levels as stated in the Anchor QEA project HASP.

Material handling and decontamination (personnel/equipment) activities are observed to be in compliance with the HASP and accepted H&S protocol.

1425 hrs: On board vessel at sample location DGS-08. Sample attempt with insufficient recovery (target recovery is 75%).

1500 hrs: Crew decontaminating 20 foot tube following poor recovery at DGS-08. Personnel are lifting heavy tubing cooperatively and within accepted protocol; remaining clean and without visible signs of sediment or water contamination on clothing.

CDM Field Safety Report: Gasco/Siltronic Offshore Sediment Sampling: 10/6/10

1535 hrs: Vibracore sample collection at location DGS-08. CDM H&S performs a comprehensive H&S inspection of sampling activities. Reiterate above fall protection and vibracore weight support concerns to Dave Gillingham and the need for his crew to remain diligent of the hazards.

1630 hrs: Crew makes 3rd attempt at DGS-08 sediment core collection, stating they have received EPA permission for a maximum of 3 attempts regardless of the recovery percentage.

Air monitoring observed to be in compliance with Anchor project HASP and below stated action levels.

1730 hrs: Vessel arrives at dock and crew wraps up sample collection for day, decontaminating personnel and equipment used in sampling.

Overall Safety Summary

Based on a review of the Gasco in-water sediment core collection effort performed by Anchor QEA and their vessel subcontractor, all program elements are in place to the degree required by Federal OSHA standards and the project HASP as documented in the safety review inspections.

CDM Field Safety Report: Gasco/Siltronic Offshore Sediment Sampling: 10/6/10

The following are photos from 10/06/2010 Gasco/Siltronic offshore sediment sampling.

1. Anchor personnel and member of boat crew retrieving vibracore sampler. Sample tubing being decontaminated as retrieved from the water.



CDM Field Safety Report: Gasco/Siltronic Offshore Sediment Sampling: 10/6/10

2. View from the captain's wheelhouse onboard the sediment sampling vessel. Shows GPS plotting of sample locations and Anchor QEA log of sediment observations.



CDM Field Safety Report: Gasco/Siltronic Offshore Sediment Sampling: 10/6/10

- Anchor personnel cutting sediment core tubes and processing sediment cores. Following this photo and observation, CDM H&S requested that the saw operator don a face shield and cut-resistant work gloves to adequately protect against activity hazards.



CDM Field Safety Report: Gasco/Siltronic Offshore Sediment Sampling: 10/6/10

SafetyNet Inspection Review

The SafetyNet system employs a user-friendly platform to quickly and efficiently record observations of field activities. Checklists are stored on a PDA device and are used by H&S personnel to evaluate work progress and compliance with the September 2010 Revised Final Anchor QEA Health and Safety Plan, Data Gaps QAPP Gasco Sediments Cleanup Action. Observations of activities are objectively treated as either safe or unsafe. Safe observations are uploaded to the server and tracked accordingly. Unsafe observations are treated as an open issue that must be corrected. Information related to the unsafe observation, such as the type and severity of the hazard, recommended corrective action, party responsible for implementing the corrective action, and the timeframe required to complete the corrective action, must be entered. Unsafe observations (i.e., open issues) remain open until a corrective action had been confirmed. The time duration of open issues is also tracked.

The SafetyNet inspections allow for a comprehensive assessment of all program elements required under the HASP.

The following tables provide a summary of the SafetyNet inspections performed by CDM H&S at the Gasco/Siltronic sediment core sampling and processing locations 10/06/10.

CDM Field Safety Report: Gasco/Siltronic Offshore Sediment Sampling: 10/6/10

Inspection Type	Inspections	Observations	Unsafe Conditions	% Safe
Safety	3	140	10	92.9%

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
Administration	Summary	3	0	3	100.0%
	First Aid/CPR trained person	2	0	2	100.0%
	Safety meetings	1	0	1	100.0%
Drilling Operations	Summary	31	3	28	90.3%
	Atmospheric monitoring	4	1	3	75.0%
	Containers labeled/stored	2	0	2	100.0%
	Employee aware of medical facility location	1	0	1	100.0%
	Equipment clean	1	0	1	100.0%
	Exclusion zone for drill rig	2	0	2	100.0%
	Fuel properly labeled	1	0	1	100.0%
	Hydraulic hose condition	2	0	2	100.0%
	IDW handling/drum lifting	2	0	2	100.0%
	Leaks on rig	2	0	2	100.0%
	Material handling	3	0	3	100.0%

CDM Field Safety Report: Gasco/Siltronic Offshore Sediment Sampling: 10/6/10

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
	Rig set up	3	1	2	66.7%
	Smoking policy observed	3	1	2	66.7%
	Struck by hazards	1	0	1	100.0%
	Trip hazards	1	0	1	100.0%
	Work area organized	3	0	3	100.0%
Environmental	Summary	9	0	9	100.0%
	Dust Control Adequate	3	0	3	100.0%
	Spill kit available	2	0	2	100.0%
	Spill response awareness	2	0	2	100.0%
	Vehicle / machinery leaks	2	0	2	100.0%
Fall Protection	Summary	2	1	1	50.0%
	Ext/int guardrails	1	0	1	100.0%
	Safety harness and lanyard	1	1	0	0.0%
Fire Protection	Summary	2	0	2	100.0%
	Extinguisher charged and inspected	1	0	1	100.0%
	Fire suppression equip avail	1	0	1	100.0%
Hand And Power Tools	Summary	3	0	3	100.0%
	Cord in good condition	1	0	1	100.0%
	Guards in place	1	0	1	100.0%
	Proper tool for the job	1	0	1	100.0%

CDM Field Safety Report: Gasco/Siltronic Offshore Sediment Sampling: 10/6/10

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
Hazard Communications	Summary	1	0	1	100.0%
	Employees trained	1	0	1	100.0%
Housekeeping	Summary	8	0	8	100.0%
	Slip, trip, fall hazards	2	0	2	100.0%
	Trash in protected cont	3	0	3	100.0%
	Walkways clear	3	0	3	100.0%
Medical / Emergency	Summary	6	1	5	83.3%
	1st aid kit	2	0	2	100.0%
	Eye wash	2	1	1	50.0%
	Map to medical facility	2	0	2	100.0%
Motorized Equipment	Summary	3	0	3	100.0%
	Operator appears competent	2	0	2	100.0%
	Ventilation -Fumes	1	0	1	100.0%
P.P.E.	Summary	71	5	66	93.0%
	Glasses / face shields	15	2	13	86.7%
	Gloves	11	2	9	81.8%
	Hard Hats	11	0	11	100.0%
	Hearing protection	4	0	4	100.0%
	Proper Clothing	14	0	14	100.0%
	Respirators	2	1	1	50.0%
	Work Boots	14	0	14	100.0%

CDM Field Safety Report: Gasco/Siltronic Offshore Sediment Sampling: 10/6/10

Category	Sub-Category	Observations	Conditions		% Safe
			Unsafe Conditions	Safe Conditions	
Site / Public Protection	Summary	1	0	1	100.0%
	Adequate washing facilities	1	0	1	100.0%

OSHA Recordables/Lost Time:10/06/10 = 0	OSHA Recordables/Lost Time To Date = 0
-----------------------------------------	----------------------------------------

Appendix D

Field Change Requests

Scenario	Response
<i>I. Sediment Core Collection and Processing</i>	
1 The presence of substantial product is identified in a contingency core, and the FSP does not identify an additional contingency core location to bound the substantial presence of product in the location.	(A) Collect an additional contingency core. The core location will be selected in coordination with EPA oversight personnel with the object of creating a perimeter of cores lacking the substantial presence of product.
	(B) The boundary of the Initial Area of Interest has been reached so no additional contingency core will be collected.
2 The presence of substantial product determination is uncertain to Core Processing Team.	(A) Respondent Core Processing Lead and EPA Core Processing Field Oversight Lead will collectively review core based on SOW definitions and agree on presence/absence.
	(B) EPA Core Processing Field Oversight Lead is unavailable during core processing, Core Processing Team will document the core characteristics (including field descriptions, photos, and/or other documentation) and resolve presence/absence with EPA Core Processing Field Oversight Lead at a later time. No contingency cores will be collected to further bound the presence of substantial product until EPA Field Oversight and/or EPA concurrence on presence/absence.
3 Mechanical failure of vessel or coring equipment.	(A) Repair the failure.
	(B) Mobilize/acquire replacement vessel or equipment.
4a Not enough sample volume for analysis (bulk chemistry).	(A) Do not analyze samples for all parameters. Select sample volume for analysis in the following order: <ul style="list-style-type: none"> 1 SVOCs 2 VOCs 3 Diesel range/residual range hydrocarbons 4 Pesticides 5 PCBs 6 Metals 7 Conventionals
4b Not enough sample volume for analysis (TCLP and DRET).	(A) There is insufficient sample for either test (less than 0.3 liters), TCLP and DRET tests will not be conducted.
	(B) There is insufficient volume to run both tests (less than 0.9 liters), the DRET will be conducted.
	(C) There is insufficient volume to run both tests (less than 0.9 liters), the TCLP will be conducted.
5 Insufficient sample volume for archive.	(A) No archive for selected interval.
6 Refusal is encountered at less than 20 feet bml.	(A) Make a second attempt to advance a core to greater than 20 feet bml at the target station. If the second core is less than 20 feet bml, retain the longest core collected.
7 Location positioning: Third attempt fails to locate core at target location.	(B) Locate within 20 feet of target location. For target stations located along the shoreline bank, attempt to relocate slightly upslope or downslope rather than horizontally.
8 Location positioning: River traffic prevents sampling in target location.	(A) Coordinate/reschedule as needed.
	(B) Relocate target station to accessible area that maintains original objective of target station.
	(C) Abandon station.

Scenario	Response
II. Soil Boring Collection and Processing	
1 DNAPL is not observed at a boring location, per the existing agreement with OWRD and DEQ, the soil boring cannot be backfilled with organoclay.	(A) The total depth of the boring is less than 50 feet bgs and there is less than 25 feet of water column, backfill the boring with bentonite chips.
	(B) The boring is greater than 50 feet or the standing water column is greater than 25 feet, backfill the boring with bentonite grout to above water column. Backfill above the water column will be completed with either bentonite grout or chips.
2 EPA oversight is on site, but unavailable at the roto-sonic boring location.	(A) EPA field oversight personnel provide approval to proceed with roto-sonic borings without oversight at the location.
3 Not enough sample volume for analysis.	(A) Do not analyze samples for all parameters. Select sample volume for analysis in the following order: <ul style="list-style-type: none"> 1 SVOCs 2 VOCs 3 Diesel range/residual range hydrocarbons 4 Pesticides 5 PCBs 6 Metals 7 Conventionals
4 Not enough sample volume for archive.	(A) No archive for selected interval.
5 Unable to access a top of bank soil boring location with a roto-sonic rig.	(A) Use a geoprobe rig to advance boring and collect samples.
6 Refusal above target elevation.	(A) Relocate boring within 1 meter of target station, continue at projected intervals.
7 Riverbank slopes are greater than approximately 1:1 and armor rock cannot be safely removed for access to mid-slope boring location.	(A) Substantial product data is currently available at the top and bottom of slope, the mid-slope boring location will be abandoned (GSM-09, GSM-10, GSM-11, and GSM-12).
	(B) No substantial product data is available at the bottom of slope, the mid-slope boring will be located as close as is feasible to the toe of the slope (GSM-13 and GSM-14).
8 Top of bank boring is located on Siltronic property, Siltronic requires hand clearing of boring locations to 10 feet bgs (GST-11 and GST-13).	(A) Soil samples for laboratory analysis (chemistry and geotechnical) will be collected by standard hand-auger methods within the 0-to-10 feet bgs interval.
	(B) SPT testing will not be conducted at the 0-to-1.5 or 5.0-to-6.5 feet bgs intervals. SPT testing will begin at the 10-to-11.5 feet bgs interval.

Scenario	Response
III. Area 1 TZW and Groundwater Sample Collection, Processing, and Handling Procedures	
1 Rig or equipment failure.	(A) Repair the failure. (B) Mobilize/acquire replacement rig or equipment.
2 First tooling refusal.	(A) Relocate boring within 1 meter of position, continue at projected intervals.
3 Second refusal.	(A) Interval not likely transmissive, abandon interval.
4 Water quality parameters indicate surface water infiltration for TZW sample (0 to 0.3 meter bml).	(A) Verify/recalibrate equipment.
	(B) Repair/replace equipment.
	(C) Advance tooling 0.3 meter to obtain deeper TZW.
5 Location positioning: Third attempt fails to locate boring within 1 meter of target station.	(A) Locate within 2 meters of target location.
6 Location positioning: River traffic prevents sampling in navigation channel.	(A) Coordinate/reschedule as needed.
	(B) Abandon location.
7 Groundwater interval not transmissive.	(A) Advance tooling 1 meter; attempt to resample.
	(B) Abandon interval.

**NW Natural and Siltronic Corporation
Gasco Sediments Cleanup Action
Field Change Request Form**

Project Name: Gasco Sediments Cleanup Action **Subconsultant:** Maul Foster Alongi

Field Activity: Groundwater Sampling **Request Number:** 001

To: Sean Sheldrake **Date:** 9/24/2010

Field Change Request (FCR) Title: Boring abandonment

Description: The field sampling plan calls for abandoning in-river borings greater than one foot below mudline with bentonite grout.

Recommended Change: Borings GP-61 and GP-65 were completed to 5 and 3.7 feet below mudline, respectively. The casing was inadvertently withdrawn from these boreholes before bentonite grout was injected. Boring logs for historical sampling conducted in this area were reviewed to evaluate the substrate and the potential for creating a conduit for cross-contamination. Sediment boring logs generally identified sands and silts characteristic of the recent alluvium from the Willamette River. However, of the eight borings reviewed, none of the boring logs showed recovery of any material between zero and three feet below mudline, and only two had recovery between 3 and 5 feet below mudline, indicating very soft and semi-fluid sediment. As a result, the top 3 to 5 feet of sediments are assumed to consist of a soft material that would likely cave in/fill in an opening left by the investigation.

Scout Mauldin



9/23/2010

Respondent Field Coordinator (or Designee)

Signature

Date

Approval:

Madi Novak for James Peale



9/23/2010

Respondent Project Lead

Signature

Date

Distribution List:

Sean Sheldrake, EPA
Sheldrake.Sean@epamail.epa.gov; 206-553-1220

Lance Peterson, Camp Dresser & McKee
PetersonLE@cdm.com; 425-453-8383

Bob Wyatt, NW Natural
rjw@nwnatural.com; 503-226-4211, ext. 5425

Patty Dost, Pearl Legal Group PC
pdost@pearllegalgroup.com; 503-467-4675

Tom McCue, Siltronic
Tom.McCue@Siltronic.com; 503-219-7532

Alan Gladstone, Davis Rothwell Earle and Xochihua
agladstone@davisrothwell.com; 503-222-4422

James Peale, MFA
jpeale@maulfoster.com; 503-501-5218

Carl Stivers, Anchor QEA
cstivers@anchorqea.com; 509-888-2070

Ryan Barth, Anchor QEA
rbarth@anchorqea.com; 206-287-9130, ext. 334

John Edwards, Anchor QEA
jedwards@anchorqea.com; 503-816-6595

Ben Hung, Anchor QEA
bhung@anchorqea.com; 503-688-5057

**NW Natural and Siltronic Corporation
Gasco Sediments Cleanup Action
Field Change Request Form**

Project Name: Gasco Sediments Cleanup Action **Subconsultant:** Anchor QEA

Field Activity: Coring and Boring **Request Number:** 001

To: EPA **Date:** 09/28/2010

Field Change Request (FCR) Title: Additional Sample Collection – Coring and Boring

Description: NW Natural proposes the collection of additional samples beyond those proposed in the Project AIR and Data Gaps QAPP at target in-water coring and riverbank stations to support internal NW Natural data evaluations. This additional data collection will in no way affect the objectives of the EPA-approved data gap sampling and will be dependent on volume availability. The samples will be collected, processed, named, handled, and analyzed using the EPA-approved procedures identified in the Project AIR and Data Gaps QAPP.

Recommended Change: At proposed coring stations DGS-03, DGS-11, DGS-20, and DGS-30, attempt to collect samples from discrete horizons of visually contaminated and intervening layers. At proposed coring stations DGS-36, DGS-07, DGS-08, DGS-19, DGS-22, DGS-24, DGS-26 and DGS-32, attempt to collect samples from apparent contamination only. At proposed riverbank boring stations GST-06, GSM-08, GST-09, GST-11 and/or GST-13, attempt to collect samples within discrete zones of product only. The samples will be submitted for analyses of PAHs and VOCs at Analytical Resources, Inc (laboratory used for remainder of NW Natural data gaps sampling chemical/physical analyses). The additional data results would be included in the EE/CA and Data Report.

<u>Ryan Barth</u>		<u>9/28/2010</u>
Respondent Field Coordinator (or Designee)	Signature	Date

Approval:

<u>Ryan Barth</u>		<u>9/28/2010</u>
Respondent Project Lead	Signature	Date

Distribution List:

Sean Sheldrake, EPA
Sheldrake.Sean@epamail.epa.gov; 206-553-1220

Lance Peterson, Camp Dresser & McKee
PetersonLE@cdm.com; 425-453-8383

Bob Wyatt, NW Natural
rjw@nwnatural.com; 503-226-4211, ext. 5425

James Peale, MFA
jpeale@maulfoster.com; 503-501-5218

Carl Stivers, Anchor QEA
cstivers@anchoragea.com; 509-888-2070

Ryan Barth, Anchor QEA
rbarth@anchoragea.com; 206-287-9130, ext. 334

**NW Natural and Siltronic Corporation
Gasco Sediments Cleanup Action
Field Change Request Form**

Patty Dost, Pearl Legal Group PC
pdost@pearllegalgroup.com; 503-467-4675

Tom McCue, Siltronic
Tom.McCue@Siltronic.com; 503-219-7532

Alan Gladstone, Davis Rothwell Earle and Xochihua
agladstone@davisrothwell.com; 503-222-4422

John Edwards, Anchor QEA
jedwards@anchoragea.com; 503-816-6595

Ben Hung, Anchor QEA
bhung@anchoragea.com; 503-688-5057

**NW Natural and Siltronic Corporation
Gasco Sediments Cleanup Action
Field Change Request Form**

Project Name: Gasco Sediments Cleanup Action **Subconsultant:** Anchor QEA

Field Activity: In-water sediment coring **Request Number:** 002

To: EPA **Date:** October 7, 2010

Field Change Request (FCR) Title: Completion of TCLP/DRET analysis at revised core station

Description: As described in the Final Project AIR and Data Gaps QAPP (AIR), the targeted in-water core locations proposed for TCLP and DRET testing were identified based on existing information providing evidence for the greatest potential for encountering the presence of substantial product and/or elevated chemical mobility. Based on this information, core station DGS-13 was selected for TCLP and DRET analysis. However, core processing at this station did not show the presence of substantial product or visual signs of chemical mobility. Alternatively, the adjacent core station DGS-11, which was not selected for TCLP and DRET analysis in the AIR, showed the presence of substantial product and elevated potential for chemical mobility.

Recommended Change: Due to the above findings, NW Natural proposes the elimination of TCLP and DRET testing on station DGS-13 and completion of this testing at the adjacent DGS-11 station.

Ryan Barth		10/7/2010
Respondent Field Coordinator (or Designee)	Signature	Date

Approval:

Ryan Barth		10/7/2010
Respondent Project Lead	Signature	Date

Distribution List:

Sean Sheldrake, EPA
Sheldrake.Sean@epamail.epa.gov; 206-553-1220

Lance Peterson, Camp Dresser & McKee
PetersonLE@cdm.com; 425-453-8383

Bob Wyatt, NW Natural
rjw@nwnatural.com; 503-226-4211, ext. 5425

Patty Dost, Pearl Legal Group PC
pdost@pearllegalgroup.com; 503-467-4675

Tom McCue, Siltronic
Tom.McCue@Siltronic.com; 503-219-7532

Alan Gladstone, Davis Rothwell Earle and Xochihua
agladstone@davisrothwell.com; 503-222-4422

James Peale, MFA
jpeale@maulfoster.com; 503-501-5218

Carl Stivers, Anchor QEA
cstivers@anchoragea.com; 509-888-2070

Ryan Barth, Anchor QEA
rbarth@anchoragea.com; 206-287-9130, ext. 334

John Edwards, Anchor QEA
jedwards@anchoragea.com; 503-816-6595

Ben Hung, Anchor QEA
bhung@anchoragea.com; 503-688-5057

**NW Natural and Siltronic Corporation
Gasco Sediments Cleanup Action
Field Change Request Form**

Project Name: Gasco Sediments Cleanup Action **Subconsultant:** Anchor QEA

Field Activity: In-water sediment coring **Request Number:** 003

To: EPA **Date:** October 8, 2010

Field Change Request (FCR) Title: Completion of DRET analysis at revised core station

Description: As described in the Final Project AIR and Data Gaps QAPP (AIR), the targeted in-water core locations proposed for DRET testing were identified based on existing information providing evidence for the greatest potential for encountering the presence of substantial product and/or elevated chemical mobility. Based on this information, core station DGS-06 and DGS-23 were selected for TCLP and DRET analysis. However, core processing at these stations did not show the presence of substantial product or visual signs of chemical mobility. Alternatively, contingency core station DGS-18, which was not selected for chemical/physical analysis in the AIR, showed the presence of substantial product and elevated potential for chemical mobility.

Recommended Change: Due to the above findings, NW Natural proposes the elimination of DRET testing on station DGS-06 and DGS-23 and completion of this testing at station DGS-18. In addition, TCLP and SBLT will be conducted at station DGS-18 due to the nature of the material encountered.

<u>Ryan Barth</u>		<u>10/8/2010</u>
Respondent Field Coordinator (or Designee)	Signature	Date

Approval:

<u>Ryan Barth</u>		<u>10/8/2010</u>
Respondent Project Lead	Signature	Date

Distribution List:

Sean Sheldrake, EPA
Sheldrake.Sean@epamail.epa.gov; 206-553-1220

Lance Peterson, Camp Dresser & McKee
PetersonLE@cdm.com; 425-453-8383

Bob Wyatt, NW Natural
rjw@nwnatural.com; 503-226-4211, ext. 5425

Patty Dost, Pearl Legal Group PC
pdost@pearllegalgroup.com; 503-467-4675

Tom McCue, Siltronic
Tom.McCue@Siltronic.com; 503-219-7532

Alan Gladstone, Davis Rothwell Earle and Xochihua
agladstone@davisrothwell.com; 503-222-4422

James Peale, MFA
jpeale@maulfooster.com; 503-501-5218

Carl Stivers, Anchor QEA
cstivers@anchoragea.com; 509-888-2070

Ryan Barth, Anchor QEA
rbarth@anchoragea.com; 206-287-9130, ext. 334

John Edwards, Anchor QEA
jedwards@anchoragea.com; 503-816-6595

Ben Hung, Anchor QEA
bhung@anchoragea.com; 503-688-5057

**NW Natural and Siltronic Corporation
Gasco Sediments Cleanup Action
Field Change Request Form**

Project Name: Gasco Sediments Cleanup Action **Subconsultant:** Anchor QEA

Field Activity: In-water sediment coring **Request Number:** 004

To: EPA **Date:** October 11, 2010

Field Change Request (FCR) Title: Collection of 14-foot cores due to lack of water depths

Description: The Final Project AIR and Data Gaps QAPP (AIR) proposed the collection of 20-foot cores at each target sediment station. In order to collect a 20-foot core the marine contractor needs approximately 10 feet of water depth to have sufficient clearance of the A-frame assembly. The following target stations did not have the required 10 feet of water depth: DGS-07, DGS-22, DGS-24, and DGS-36.

Recommended Change: In order to facilitate core collection in the low water depths encountered at the above stations, the core assembly was converted to a 14-foot collection assembly. This conversion will not affect the data quality objectives identified at these stations.

<u>Ryan Barth</u>		<u>10/11/2010</u>
Respondent Field Coordinator (or Designee)	Signature	Date

Approval:

<u>Ryan Barth</u>		<u>10/11/2010</u>
Respondent Project Lead	Signature	Date

Distribution List:

Sean Sheldrake, EPA
Sheldrake.Sean@epamail.epa.gov; 206-553-1220

Lance Peterson, Camp Dresser & McKee
PetersonLE@cdm.com; 425-453-8383

Bob Wyatt, NW Natural
rjw@nwnatural.com; 503-226-4211, ext. 5425

Patty Dost, Pearl Legal Group PC
pdost@pearllegalgroup.com; 503-467-4675

Tom McCue, Siltronic
Tom.McCue@Siltronic.com; 503-219-7532

Alan Gladstone, Davis Rothwell Earle and Xochihua
agladstone@davisrothwell.com; 503-222-4422

James Peale, MFA
jpeale@maulfoster.com; 503-501-5218

Carl Stivers, Anchor QEA
cstivers@anchoragea.com; 509-888-2070

Ryan Barth, Anchor QEA
rbarth@anchoragea.com; 206-287-9130, ext. 334

John Edwards, Anchor QEA
jedwards@anchoragea.com; 503-816-6595

Ben Hung, Anchor QEA
bhung@anchoragea.com; 503-688-5057

**NW Natural and Siltronic Corporation
Gasco Sediments Cleanup Action
Field Change Request Form**

Project Name: Gasco Sediments Cleanup Action **Subconsultant:** Anchor QEA

Field Activity: In-water sediment coring **Request Number:** 005

To: EPA **Date:** October 11, 2010

Field Change Request (FCR) Title: Collection of additional sediment cores

Description: Substantial product was identified at station DGS-08 so the AIR required the collection of a contingency core channelward of this station to laterally bound the presence of substantial product in this area. A contingency core was not identified in the AIR for this station. No substantial product was identified at stations DGS-28 and DGS-30 so the presence of substantial product was bounded in this area. However, the lateral distance between these stations and the next shoreward station (DGS-31) showing substantial product is approximately 125 feet. NW Natural proposes the collection of an additional core between these stations.

Recommended Change: A contingency core will be collected approximately 60 feet channelward of station DGS-08 and identified as station DGS-44. This core will be visually assessed for the presence of substantial product in accordance with the AIR. An additional core will also be collected approximately 75 feet channelward of station DGS-31 and identified as station DGS-45 to attempt to further refine the channelward extents of substantial product in this area. This core will be visually assessed for the presence of substantial product.

Ryan Barth		10/11/2010
Respondent Field Coordinator (or Designee)	Signature	Date

Approval:

Ryan Barth		10/11/2010
Respondent Project Lead	Signature	Date

Distribution List:

Sean Sheldrake, EPA
Sheldrake.Sean@epamail.epa.gov; 206-553-1220

Lance Peterson, Camp Dresser & McKee
PetersonLE@cdm.com; 425-453-8383

Bob Wyatt, NW Natural
rjw@nwnatural.com; 503-226-4211, ext. 5425

Patty Dost, Pearl Legal Group PC
pdost@pearllegalgroup.com; 503-467-4675

Tom McCue, Siltronic
Tom.McCue@Siltronic.com; 503-219-7532

James Peale, MFA
jpeale@maulfoster.com; 503-501-5218

Carl Stivers, Anchor QEA
cstivers@anchoragea.com; 509-888-2070

Ryan Barth, Anchor QEA
rbarth@anchoragea.com; 206-287-9130, ext. 334

John Edwards, Anchor QEA
jedwards@anchoragea.com; 503-816-6595

Ben Hung, Anchor QEA
bhung@anchoragea.com; 503-688-5057

**NW Natural and Siltronic Corporation
Gasco Sediments Cleanup Action
Field Change Request Form**

Alan Gladstone, Davis Rothwell Earle and Xochihua
agladstone@davisrothwell.com; 503-222-4422