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Columbia River Pore Water Sampling in 100-F Area, February 2011

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788

CH2MHILL
Plateau Remediation Company

P.O. Box 1600
Richland, Washington 99352

Approved for Public Release;
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Executive Summary

During the Hanford Site weapons production mission (1943 to 1989), some contaminants were released to the Columbia River and to the soil. Some contaminants, including hexavalent chromium (Cr(VI)), eventually moved from the soil into the groundwater and then into the Columbia River in places where groundwater seeps up into the river bottom in spaces between rocks and sediment grains. The water in these spaces is termed pore water. This report summarizes pore water sampling activities carried out near 100-F during the winter of 2011. The purpose of this sampling event was to evaluate whether Cr(VI) was present, at detectable levels at each sampling station, and to assess the levels and extent of Cr(VI) and total chromium in the most biologically active region of the river bed near 100-F (upper 30 cm [12 in.] of substrate).

During February 2011, 23 pore water samples were collected near 100-F. Bulk samples of pore water were collected between 28 and 30 cm (11 to 12 in.) below the surface of the river bed using the Trident[1] probe and associated deployment techniques. Filtered samples were analyzed for total chromium, and unfiltered samples were analyzed for Cr(VI). The sampling techniques were similar to those used during previous pore water sampling events.

Pore water samples were collected from one station that was previously sampled during 2009 and 2010. Pore water samples obtained previously from this station had Cr(VI) concentrations between 8 and 20 µg/L. No Cr(VI) was detected at this station in 2011. In addition, 19 stations were sampled along two nearshore transects running parallel to the shoreline but at different distances from shore. Only one of these had detectable Cr(VI), reported at 2.7 µg/L, just slightly above the detection limit (2 µg/L).

Results of this and previous studies indicate that 100-F pore water is not contaminated with Cr(VI) at levels above the ambient water quality standard (10 µg/L). During three sampling events, only one sample had an analytical result above 10 µg/L, and that result is of questionable quality.

[1] Coastal Monitoring Associates (San Diego, California) Trident probe has a patent pending.

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Terms

AWQS	ambient water quality standard
DO	dissolved oxygen
MASS1	Modular Aquatic Simulation System-1D
NTU	Nephelometric Turbidity Units
ORP	oxidation-reduction potential
QC	quality control
RI	remedial investigation

1 Introduction

Between 1943 and 1989, during the Hanford Site weapons production mission, some contaminated materials were discharged to the Columbia River. In addition, waste disposal practices resulted in the release of contaminants to the upland soil. Some of these contaminants migrated from the soil to the groundwater and moved via the groundwater into the river where the groundwater percolates (seeps) up through the river bottom and mixes with river water and riverine sediments. These areas are known as upwellings, and the intersecting waters are referred to as pore water.

This report summarizes pore water sampling activities carried out near 100-F during the winter of 2011 in support of DOE/RL-2009-43, *Sampling and Analysis Plan for the 100-FR-1, 100-FR-2, 100-FR-3, 100-IU-2, and 100-IU-6 Operable Units Remedial Investigation/Feasibility Study*, as revised by the *Tri-Party Agreement Change Notice Form* (TPA-CN-391). Pore water in 100-F was previously sampled in the fall of 2009 and early 2010 (DOE/RL-2008-11, *Remedial Investigation Work Plan for Hanford Site Releases to the Columbia River*). The hexavalent chromium (Cr(VI)) concentration of one pore water sample was above the 10 µg/L ambient water quality standard (AWQS).

Groundwater beneath a portion of 100-F is contaminated with Cr(VI) at concentrations above the AWQS (DOE/RL-2010-11, *Hanford Site Groundwater Monitoring and Performance Report for 2009: Volumes 1 & 2*). Strontium-90, nitrate, and trichloroethene also exceed water quality standards in 100-F groundwater, but concentrations were below levels of concern in pore water samples during a previous sampling event (WCH-398, *Data Summary Report for the Remedial Investigation of Hanford Site Releases to the Columbia River, Hanford Site, Washington*).

The overall goal of the sampling summarized in this document was to provide additional information for estimating the impacts of the 100-F Cr(VI) plume on the Columbia River (Figure 1). These data provide insight regarding Cr(VI) levels potentially entering the river through the hyporheic zone and groundwater/river mixing ratios within the most biologically active zone of the river bed (upper approximately 30 cm [12 in.] of substrate). The pore water sampling scope involved the following work activities:

- Pore water was collected from twenty locations along two nearshore transects, both approximately parallel to the shoreline but at different distances from shore. The transects spanned the width of the groundwater Cr(VI) plume.
- Pore water samples were analyzed for total chromium, Cr(VI), and additional water quality parameters (conductivity, pH, dissolved oxygen [DO], temperature, oxidation-reduction potential [ORP], and turbidity) to define the extent of contamination and support a contaminant transport evaluation.

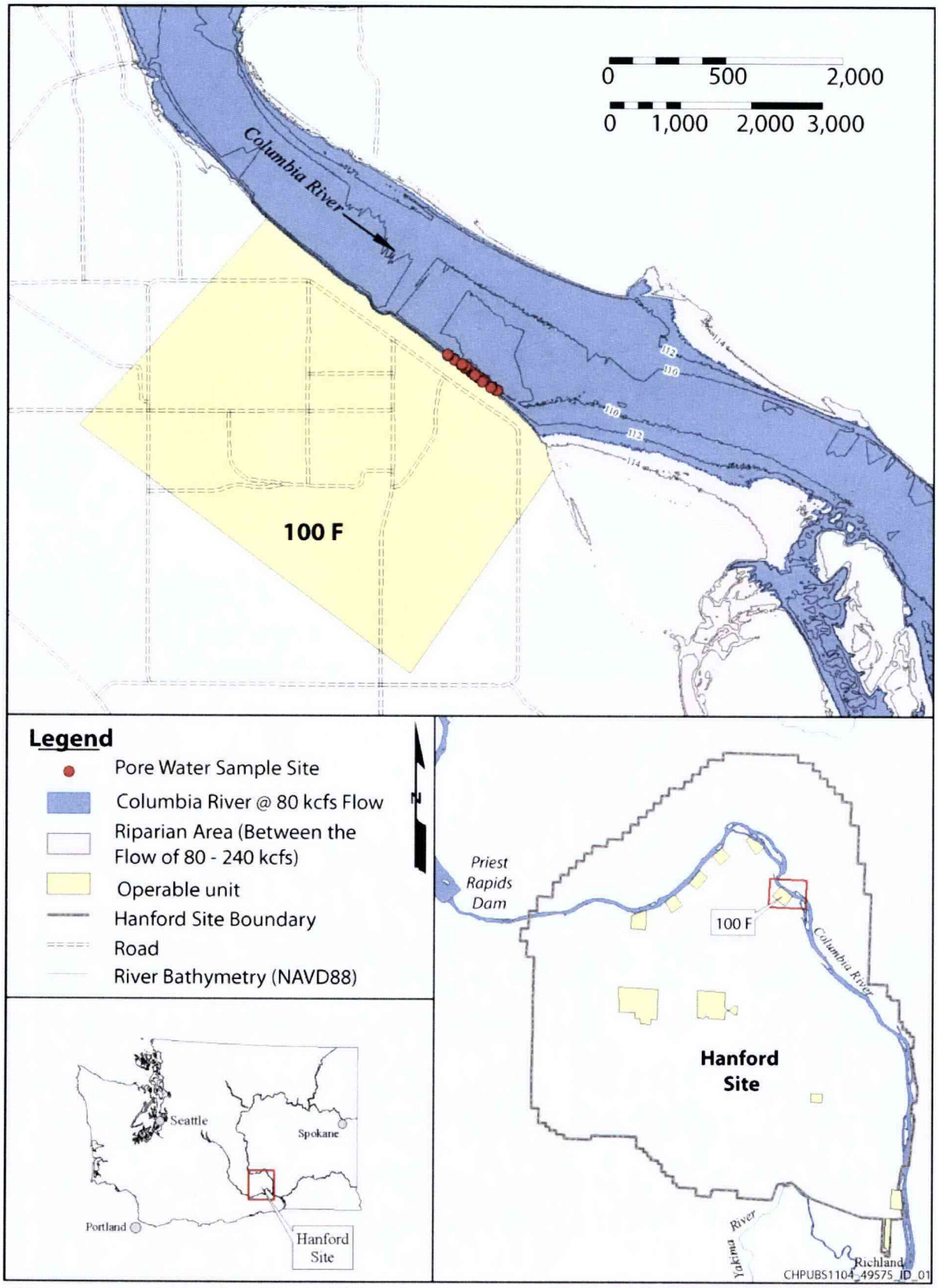

Figure 1. 100-F Pore Water Sample Area, Hanford Site, Washington

2 Methods

Bulk samples of pore water were collected using the Trident[2] probe and associated deployment techniques, shown in Figure 2. Trident is a liquid phase groundwater mapping and sampling tool, designed for sustained use in complex offshore riverine environments. The probe is mounted on a driving frame that allows samples to be collected in turbulent waters and rocky river beds while keeping the probe stable.

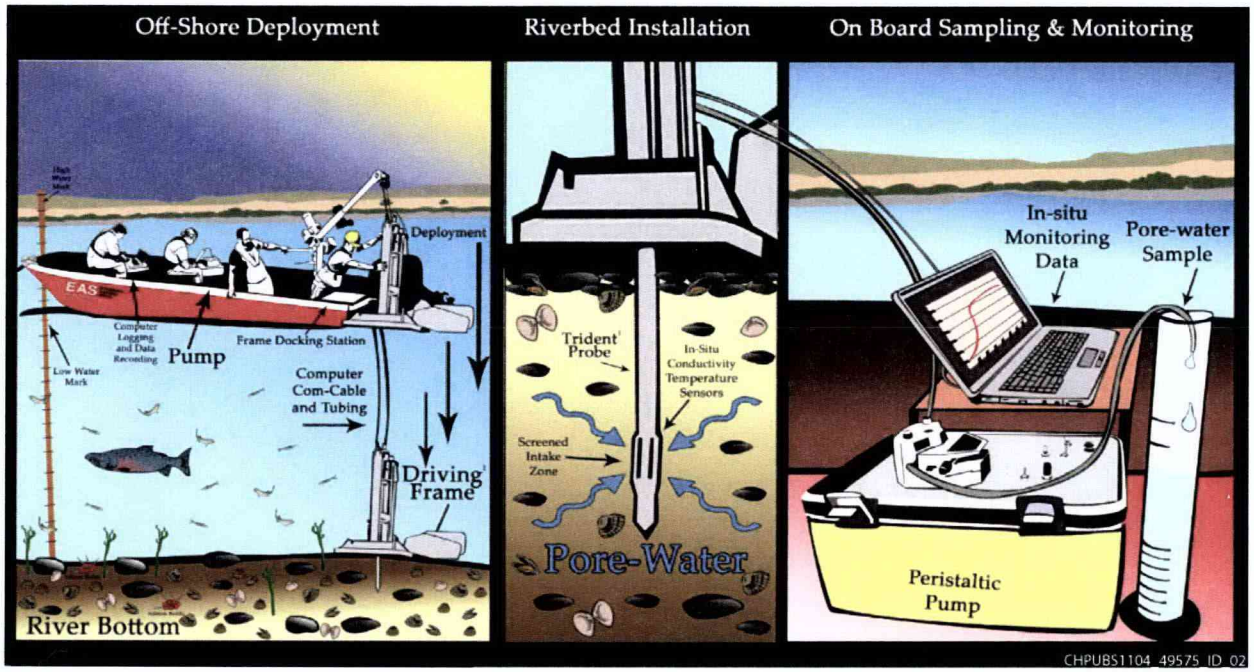

Figure 2. Pore Water Sampling Using the Trident Probe and Associated Deployment Techniques

In general, the field sampling techniques and data collected during this sampling effort were similar to the efforts described in WCH-380, *Field Summary Report for Remedial Investigation of Hanford Site Releases to the Columbia River Hanford Site, Washington: Collection of Surface Water, Pore Water, and Sediment Samples for Characterization of Groundwater Upwelling*, in support of the DOE/RL-2008-11 remedial investigation (RI). The approach was used to detect groundwater upwellings and allowed field teams to collect verifiable pore water samples to be analyzed for the presence of specific groundwater contaminants, such as Cr(VI).

Once the offshore deployment vessel was located over a desired station, the driving frame and Trident probe were deployed to the river bed, and the probe was driven 27 to 30 cm (11 to 12 in.) below the river bed surface. The sampling tube was then purged using a peristaltic pump onboard the vessel. Pore water samples were then drawn to a precleaned bulk sample container.

2.1 Pore Water Sample Collection Guidelines

A great deal of research on the Hanford Site has shown the important role that the Columbia River's stage (river level) has on groundwater discharge patterns and contaminant concentrations. A river-level gauge established near 100-F was measured regularly during the current sampling event to help evaluate the river level before, during, and after sampling. Additionally, changes in pore water conductivity were

[2] Coastal Monitoring Associates (San Diego, California) Trident probe has a patent pending.

monitored using a semipermanent Trident probe tip installed at a single sampling location while river levels fluctuated throughout this sampling event. Sampling was permitted to continue as long as changes in the pore water conductivity at the semipermanent station did not appear to be substantially suppressed during high river flow periods.

River levels encountered during this sampling event were also modeled using the Modular Aquatic Simulation System-1D (MASS1), a one-dimensional unsteady river flow model developed to characterize river stages and discharges encountered during each sampling event (PNNL-15226, *Hydrodynamic Simulation of the Columbia River, Hanford Reach, 1940-2004*). MASS1 simulates unsteady discharge and water surface elevations at each site by solving the one-dimensional equations of mass and momentum conservation (also known as the St. Venant equations). MASS1 was run with real discharge and forebay data when pore water conductivity readings were taken and was used to calculate half-hour river discharge and water surface elevations for transects nearest to the groundwater upwelling sample locations. The river stage conditions encountered during the sampling events were summarized. Sample results were flagged with a project unique qualifier if the river level was >0.8 m (2.6 ft) during the sampling event, or if the sample was collected when pore water conductivity was <90 percent of previous contaminant sampling events carried out there as part of the DOE/RL-2008-11 RI (WCH-380 and WCH-398).

The area sampled was selected as being the most likely spot to detect Cr(VI). The two transects span the portion of shoreline adjacent to the known Cr(VI) plume in groundwater. Groundwater upwelling patterns were determined by measuring pore water conductivity. Higher conductivity indicates a greater percentage of groundwater. The transects (F1 and F2 Transect) were then located along the contours where the highest conductivity measurements were observed.

2.2 Pore Water Sample Collection and Handling

Pore water samples were collected from 27 to 30 cm (11 to 12 in.) below ground surface at each sample station. Before each sample was collected, 100 to 150 mL of water was purged and discarded. Once relatively stable, high in situ pore water conductivity readings were detected, 650 mL of pore water was collected from each station and placed into tamper-proof, amber glass, precleaned containers.

Pore water conductivity was monitored in situ during each sample collection event to help verify that the samples were not artificially diluted or short circuited with surface water as a result of over pumping. Staff also measured and recorded temperature, DO, ORP, and turbidity. Pore water samples were immediately placed into a cooler containing ice until they could be transferred to sampling support staff.

The pore water sampling methods used are provided as Appendix A. All sample results were flagged with project unique qualifiers if significant (>10 percent) changes occurred in the pore water conductivity during any given sample event. Collocated surface water quality data were also obtained at each pore water sample site. The surface water temperature and conductivity were measured using the reference probe positioned 30 cm (12 in.) above the river bed at all stations. A surface water grab sample was taken to measure pH, DO, ORP, and turbidity.

3 Results

During this sampling event, twenty-three pore water samples and one equipment blank were collected from the locations shown in Figure 3. Thirteen samples, including one duplicate sample and two split samples, were collected along a transect near the river's low water mark. Ten samples were collected along a parallel transect in slightly deeper water (~1 to 2 m [3.3 to 6.6 ft] below the low water mark).

Pore water sampling near 100-F began on February 7, 2011 and was completed on February 28, 2011 (Table 1). Quality control (QC) samples consisted of one equipment blank (collected on February 10, 2011), one duplicate sample, and two split samples (Table 1). Water depths at the sampling stations ranged from 1.5 to 3.5 m (5 to 11.7 ft). The probe penetration depth ranged from 27 to 30 cm (11 to 12 in.).

Figure 4 illustrates the river stage fluctuations that occurred during the pore water sampling event near 100-F. River levels typically fluctuated about 1.0 m (3.3 ft) daily, but ranged up to 2.0 m (6.6 ft) on some days (Figure 4). The highest river stages shown in Figure 4 correspond to river discharges of 5.7 million L/sec (200,000 ft^3/sec), and the lowest river stages correspond to river discharges of 2.3 million L/sec (80,000 ft^3/sec). Samples were collected when the river stage was ranged between 2.0 m (6.6 ft) and 3.0 m (9.9 ft) above the low water mark and when river discharges ranged between 3.3 and 4.7 million L/sec (115,000 and 167,000 ft^3/sec) (Table 1 and Figure 4). The decision to continue sampling while river stage was relatively high was based on findings at the 100-F semipermanent pore water monitoring station, which showed only subtle changes in the conductivity while river levels were high or low, as allowed by the sampling and analysis plan. Section 3.3 provides further discussion of these observations.

3.1 Water Quality Results

The water quality field parameter measurements may be related to the following variables: groundwater gradients, river bottom elevation horizons, depth of penetration, river stage, and duration of high flow conditions. These conditions all influence hydraulic heads, gradients and, ultimately, the magnitude and extent of groundwater discharge into the river. To compare the river field parameters with pore water parameters, the variable conditions need to be considered. Appendix B tabulates the water quality results.

Table 2 compares minimum, mean, and maximum water quality measurements within the pore water in the upper 30.5 cm (12 in.). Conductivity of pore water ranged from 143 to 180 µS/cm, while surface water ranged from 139 to 149 µS/cm. Temperature and pH were similar to the surface water measurements at this time of year and were not distinctly different at the sites sampled (Table 2). The ORP of most pore water samples was not appreciably different than surface water, but the minimum pore water ORP was 180 mV, compared to 160 mV for surface water. The DO of pore water was lower than surface water at most stations (Table 2). Turbidity of the surface water was consistently low (range 1 to 3 Nephelometric Turbidity Units [NTU]), while turbidity of pore water samples ranged between 11 and 551 NTU.

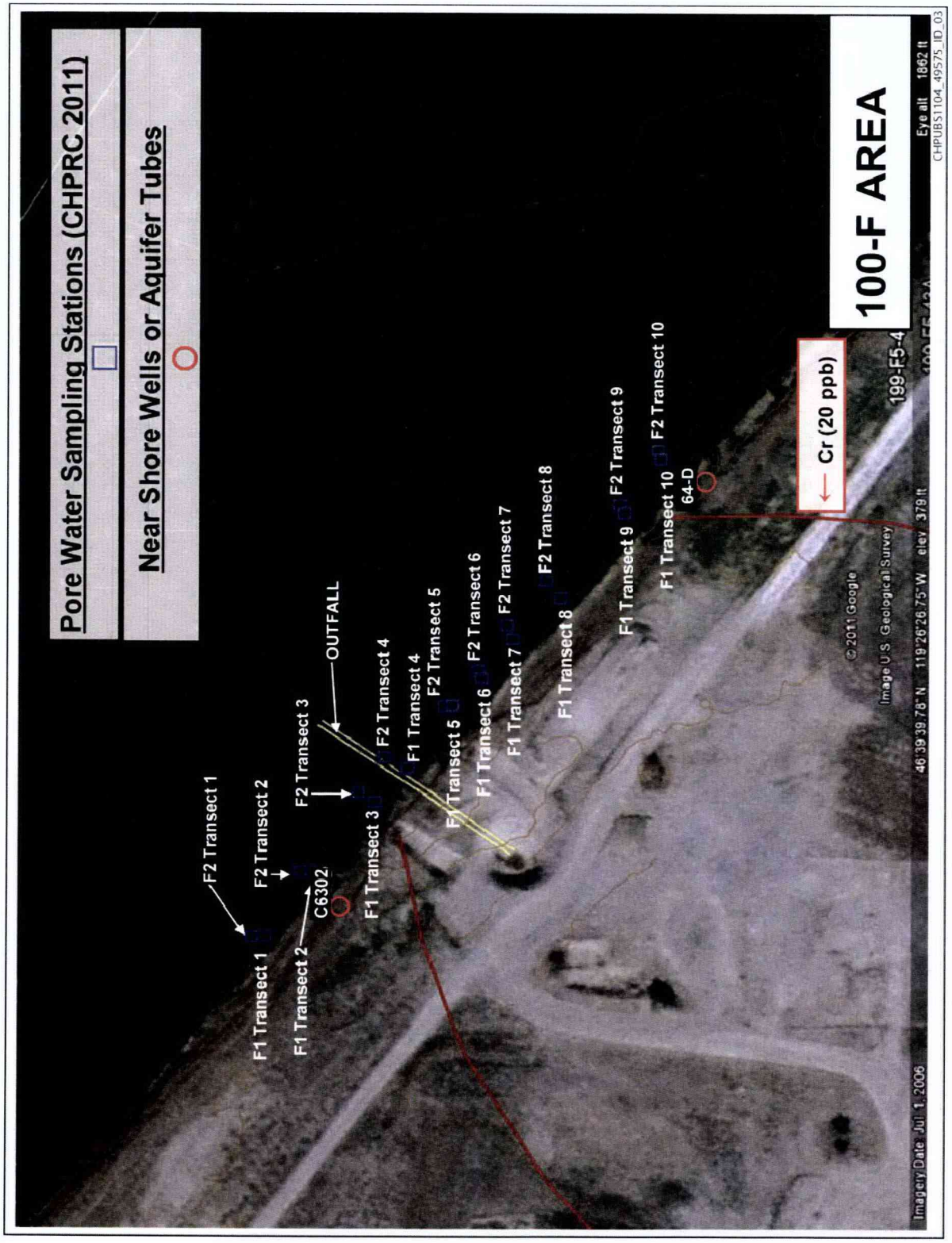

Figure 3. Pore Water Sampling Locations near 100-F

Table 1. Summary of Pore Water Samples Collected at 100-F during February 2011

Station Identification	Sample Date	General Substrate	Vol. (mL)	QC Sample	River Flow at Time of Sampling		River Bed Elevation per NAVD88 (m)	River Depth at Station (m)	Height above Low Water (m)	Pore Water Conductivity (µS/cm)	Field QC Qualifier	Sample Number
					Million L/sec	Kcfs						
F1 Transect 1	2/28/2011	med/lg cobble	1,000	Split	4.46	157.4	112.25	2.0	2.7	162	a	B2BDB3
F1 Transect 2	2/7/2011	med cobble	600	-	3.25	114.9	111.70	1.8	2.0	162	a,b	B2BDB4
F1 Transect 3	2/27/2011	med/sm cobble	600	-	4.21	148.6	112.76	1.3	2.6	158	a	B2BDB5
F1 Transect 4	2/27/2011	med/sm cobble	650	Split	4.74	167.4	112.78	2.2	2.9	168	a	B2BDB6
F1 Transect 5	2/10/2011	med/sm cobble	600	Duplicate	4.26	150.3	111.62	2.6	2.6	158	a	B2BDB8
F1 Transect 5	2/10/2011	med/sm cobble	600	Duplicate	4.26	150.5	111.62	2.6	2.6	165	a	B2BDB9
F1 Transect 6	2/25/2011	med/sm cobble	600	-	4.17	147.1	111.75	2.0	2.5	158	a	B2BDC0
F1 Transect 7	2/23/2011	med cobble	600	-	3.85	135.8	111.48	2.0	2.4	161	a	B2BDC1
F1 Transect 8	2/25/2011	med/sm cobble	600	-	4.13	145.7	112.77	1.5	2.5	156	a	B2BDC2
F1 Transect 9	2/22/2011	med cobble	600	-	3.65	129.0	111.35	2.1	2.2	143	a	B2BDC3
F1 Transect 10	2/18/2010	med/sm cobble	600	-	3.86	136.3	111.13	2.6	2.4	155	a	B2BDC4
F2 Transect 1	2/28/2011	med/lg cobble	620	-	4.08	144.2	110.71	3.1	2.5	163	a	B2BDC5
F2 Transect 2	2/7/2011	med/sm cobble	600	-	3.47	122.5	111.58	3.1	2.1	175	a,b	B2BDC6

Table 1. Summary of Pore Water Samples Collected at 100-F during February 2011

Station Identification	Sample Date	General Substrate	Vol. (mL)	QC Sample	River Flow at Time of Sampling		River Bed Elevation per NAVD88 (m)	River Depth at Station (m)	Height above Low Water (m)	Pore Water Conductivity (µS/cm)	Field QC Qualifier	Sample Number
					Million L/sec	Kcfs						
F2 Transect 3	2/28/2011	med cobble	620	-	4.30	151.7	111.29	3.0	2.6	180	a	B2BDC7
F2 Transect 4	2/27/2011	med/sm cobble	600	-	4.37	154.3	110.61	3.5	2.7	151	a	B2BDC8
F2 Transect 5	2/17/2010	med cobble	600	-	4.53	159.9	110.68	3.4	2.7	163	a	B2BDD0
F2 Transect 6	2/25/2011	med cobble	600	-	4.49	158.7	111.37	3.6	2.7	147	a	B2BDD1
F2 Transect 7	2/23/2011	med cobble	600	-	3.95	139.6	110.12	3.3	2.4	153	a	B2BDD2
F2 Transect 8	2/23/2011	med cobble	600	-	3.99	140.8	110.37	3.5	2.4	152	a	B2BDD3
F2 Transect 9	2/22/2011	med cobble	600	-	3.38	119.5	111.12	3.1	2.1	152	a	B2BDD4
F2 Transect 10	2/18/2010	med/sm cobble	600	-	3.85	136.0	110.97	3.5	2.4	157	a	B2BDD5

Source: NAVD88, *North American Vertical Datum of 1988.*

a. Exceedence of river stage guidelines (>0.8 m) during sampling event.

b. Sample conductivity is <90% of the conductivity reported in WCH-380. Other stations were not previously sampled.

lg = large

med = medium

sm = small

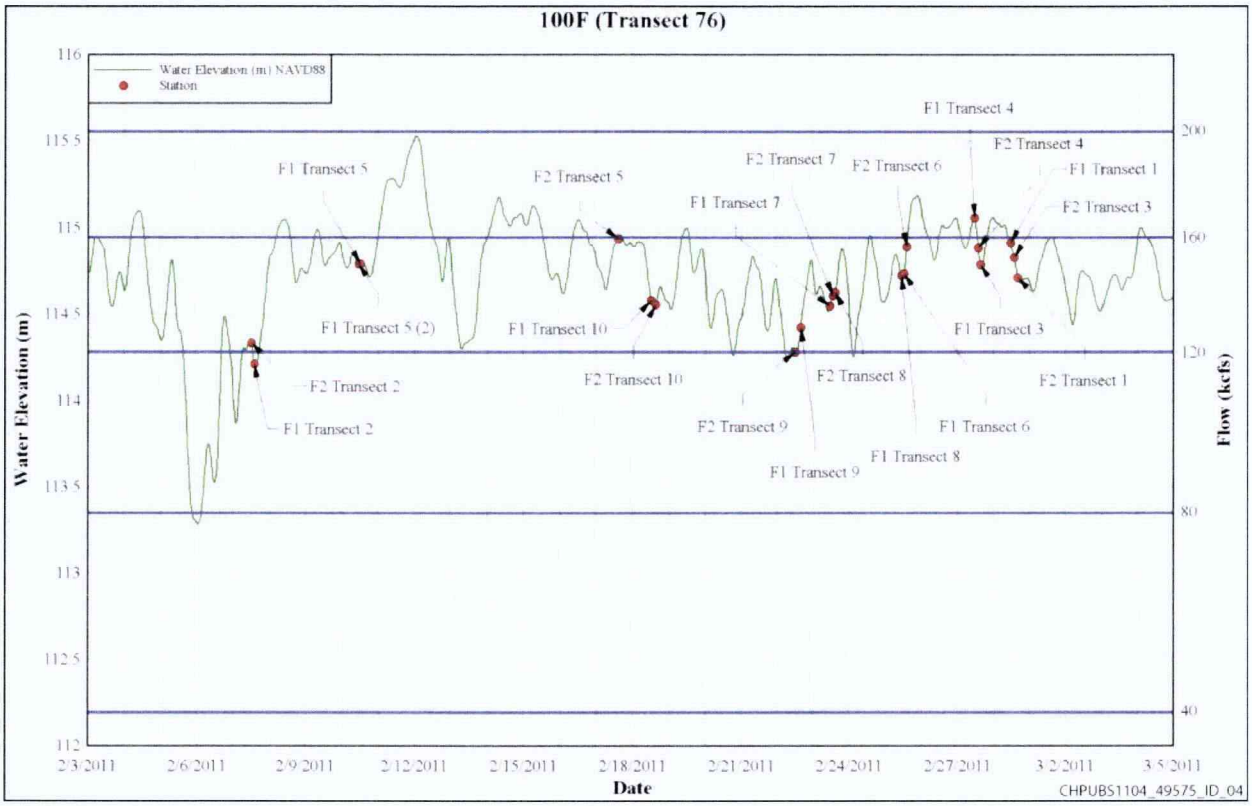

Figure 4. River Level Fluctuations during the 100-F Pore Water Sampling Event

Table 2. Comparison of Selected Water Quality Measurements between Pore Water and Surface Water Samples near 100-F

Parameter	Minimum		Mean		Maximum	
	Pore Water	Surface Water	Pore Water	Surface Water	Pore Water	Surface Water
Conductivity (µS/cm)	142.7	134.0	158.8	138.8	180.1	148.7
Temperature (Degrees Celsius)	2.50	2.34	3.12	2.90	3.52	3.45
pH	7.26	7.33	7.88	7.96	8.30	8.37
ORP (mV)	188	160	247	248	297	310
DO (mg/L)	7.22	11.25	9.42	12.58	11.32	13.19
Turbidity (NTU)	10	1	100	5	551	14

Figure 5 illustrates the pore water composite sample conductivity measurements. Except for Stations F1 Transect 9 and F2 Transect 6, conductivity measured in the pore water samples was greater than 150 µS/cm, indicating the presence of groundwater upwelling. However, most samples exhibited relatively low conductivity (≤200 µS/cm) compared to other reactor areas (WCH-380; WCH-398). Only one station that was sampled previously was sampled again in 2011: previously established station T100F2A (WCH-380) was within 4 m (12 ft) of Stations F1 Transect 2 and F2 Transect 2.

In February 2011, pore water conductivity at F1 Transect 2 and F2 Transect 2 was 162 and 175 µS/cm, respectively. These values were up to 36 percent lower than those measured at Station T100F2A in 2009 (254.3 µS/cm) or 2010 (211.7 µS/cm). The lower conductivity was probably caused by higher river stages in February 2011. Lower river stages were not anticipated until late summer, so waiting for better sampling conditions was not an option. Despite the less than optimal sampling conditions, samples were collected because little to no suppression of the pore water conductivity was measured at the 100-F semipermanent pore water QC station.

3.2 Hexavalent Chromium Concentrations

Figure 6 illustrates the Cr(VI) levels from pore water samples collected near 100-F in February 2011. Only 1 of 22 samples contained detectable Cr(VI) (Table 3): the split sample result from Station F1 Transect 4 (2.7 µg/L) was reported just above the analytical detection limit (2 µg/L). The parent sample at this site had a result below the detection limit. Stations F1 Transect 1 and F2 Transect 2 were within 4 m (12 ft) of a previously established sampling station, Station T100F2A (WCH-380), where Cr(VI) levels of 8 and 20 µg/L were reported in 2009 and 2010 (WCH-380; WCH-398). Neither station had detectable Cr(VI) in February 2011.

3.3 Deviations from the Sampling and Analysis Plan

The sampling and analysis plan (DOE/RL-2009-43, Appendix B) stated that pore water sampling will take place when river levels were <0.8 m (<2.6 ft) above low water level, and river flows are steady for more than 1 hour prior to sampling, or when there are minimal signs of groundwater suppression. Low river stage conditions did not occur during the sampling period and were not anticipated to occur until late summer. However, little to no suppression of pore water conductivity was measured at the 100-F semipermanent pore water QC station, despite these relatively higher and more persistent river stages (Figure 7). Field teams also found that the subtle but persistent groundwater upwellings were prominent in the 100-F river bed areas sampled, despite the relatively high flows. All but two composite pore water samples had conductivity values that exceeded the highest surface water reading (149 µS/cm) measured during this sampling event. These observations led to the decision to collect samples during higher flows.

Figure 7 provides a depiction of the changes in conductivity measured at an established field QC station (T100F2A) near 100-F, while the river levels fluctuated between 2.3 and 4.6 million L/sec (80,000 and 160,000 ft^3/sec) 1 to 2 m (3 to 6 ft) above the low water mark during this sampling event. Conductivity readings appeared to be stable, near 160 µS/cm, despite relatively unstable and high flows encountered during this sampling event (Figure 7).

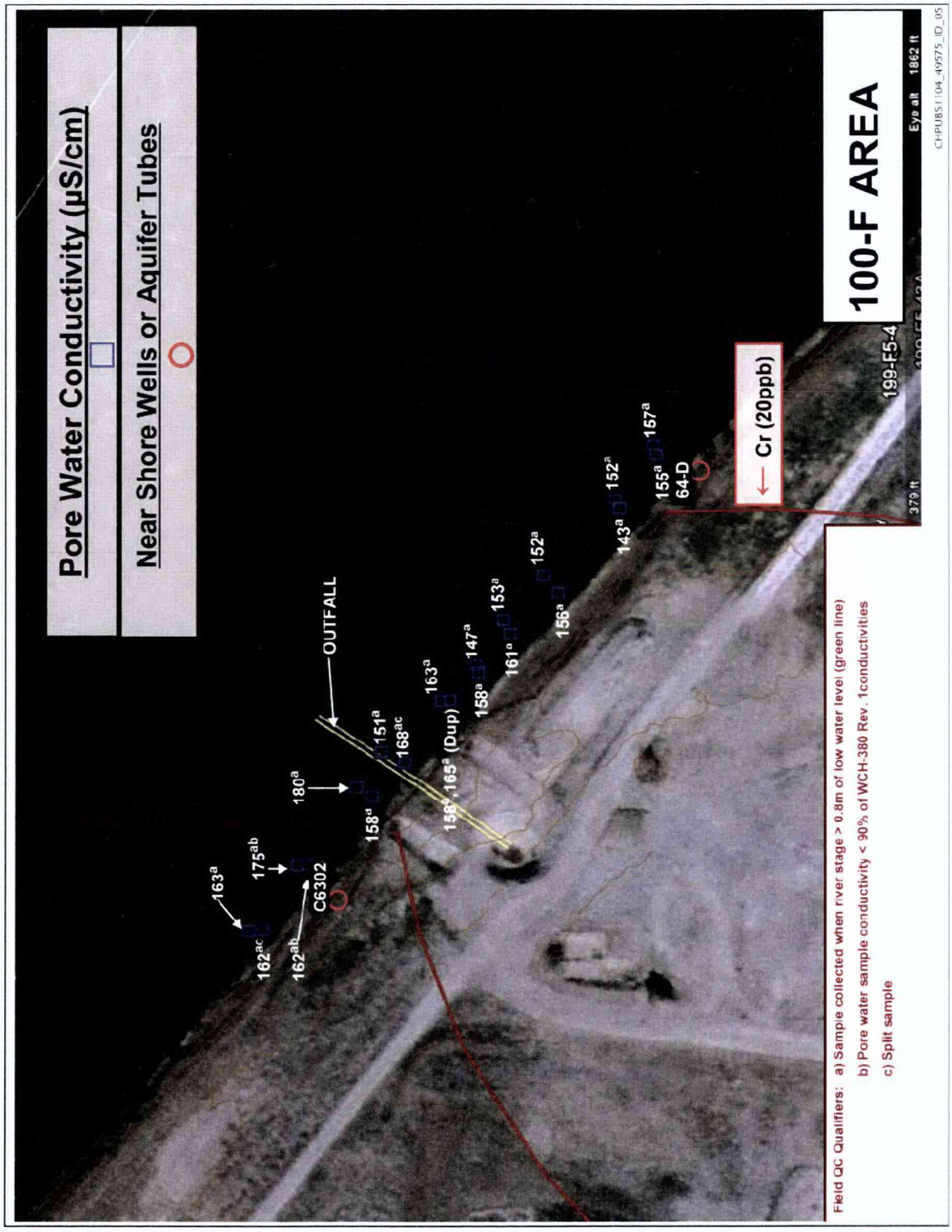

Figure 5. Conductivity (µS/cm) of Pore Water Samples Collected near 100-F, February 2011

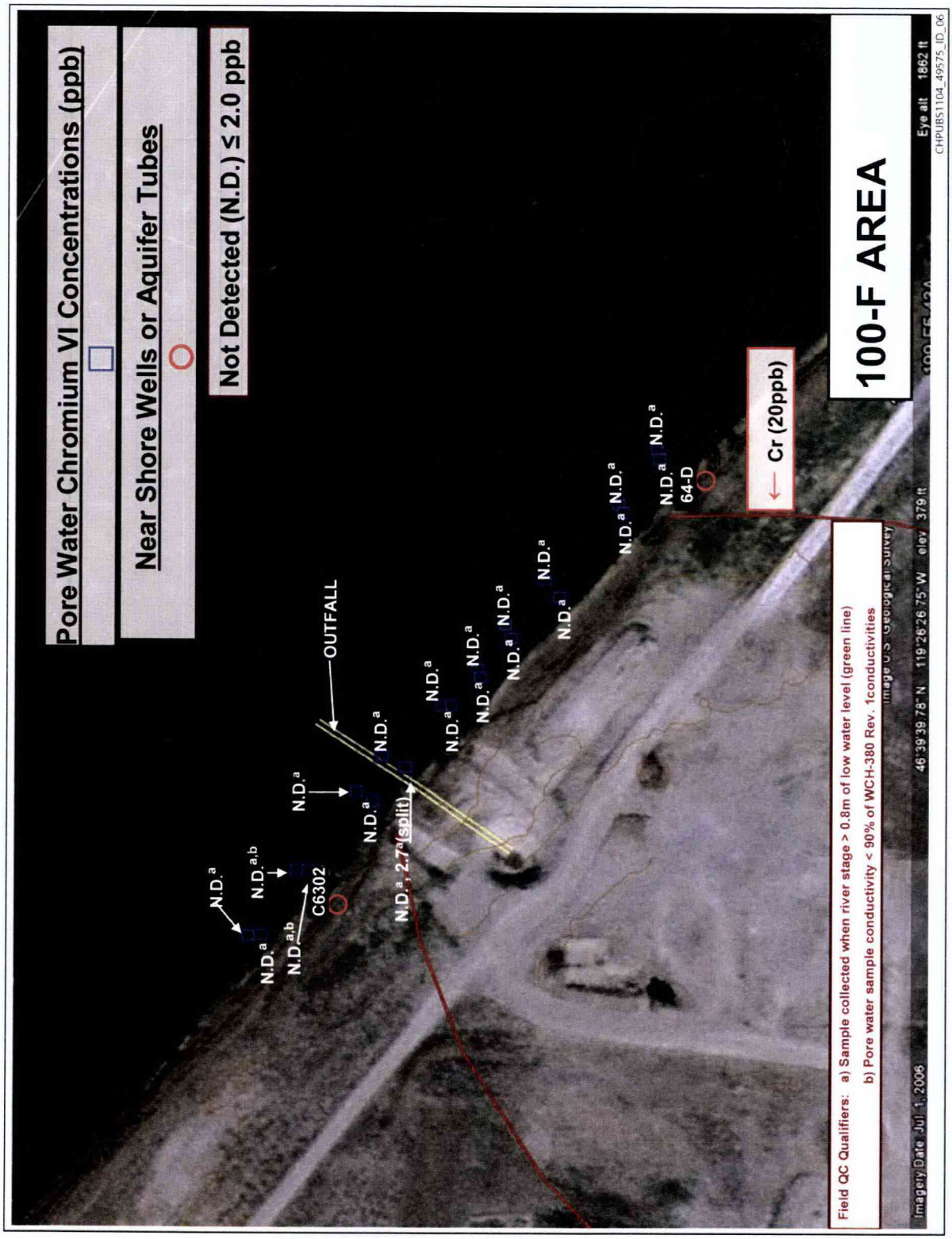

Figure 6. Hexavalent Chromium Levels (µg/L) in Pore Water Samples Collected near 100-F, February 2011

Table 3. Conductivity and Chromium in 100-F Pore Water, February 2011

Station Identification	Date	River Depth at Station (m)	Pore Water Conductivity (µS/cm)	QC Sample	Cr(VI) (µg/L)		Total Cr (µg/L)	
F1 Transect 1	2/28/2011	2.0	162	-	2	U	1	U
F1 Transect 1	2/28/2011	2.0	162	Split	--		10	U
F1 Transect 2	2/7/2011	1.8	162	-	2	U	2.13	B
F1 Transect 3	2/27/2011	1.3	158	-	2	U	1.03	B
F1 Transect 4	2/27/2011	2.2	168	-	2	U	1	U
F1 Transect 4	2/27/2011	2.2	168	Split	2.7		--	
F1 Transect 5	2/10/2011	2.6	158	Duplicate	2	U	1	U
F1 Transect 5	2/10/2011	2.6	165	Duplicate	2	U	1	U
F1 Transect 6	2/25/2011	2.0	158	-	2	U	1	U
F1 Transect 7	2/23/2011	2.0	161	-	2	U	1	U
F1 Transect 8	2/25/2011	1.5	156	-	2	U	1	U
F1 Transect 9	2/22/2011	2.1	143	-	2	U	1	U
F1 Transect 10	2/18/2010	2.6	155	-	2	U	1	U
F2 Transect 1	2/28/2011	3.1	163	-	2	U	1.21	B
F2 Transect 2	2/7/2011	3.1	175	-	2	U	1.12	B
F2 Transect 3	2/28/2011	3.0	180	-	2	U	1	U
F2 Transect 4	2/27/2011	3.5	151	-	2	U	3.86	B
F2 Transect 5	2/17/2010	3.4	163	-	2	U	1	U
F2 Transect 6	2/25/2011	3.6	147	-	2	U	1	U
F2 Transect 7	2/23/2011	3.3	153	-	2	U	1	U
F2 Transect 8	2/23/2011	3.5	152	-	2	U	1	U
F2 Transect 9	2/22/2011	3.1	152	-	2	U	1.6	B
F2 Transect 10	2/18/2010	3.5	157	-	2	U	1.22	B

B = detected at a value less than contract required detection limit but above method detection limit

U = undetected

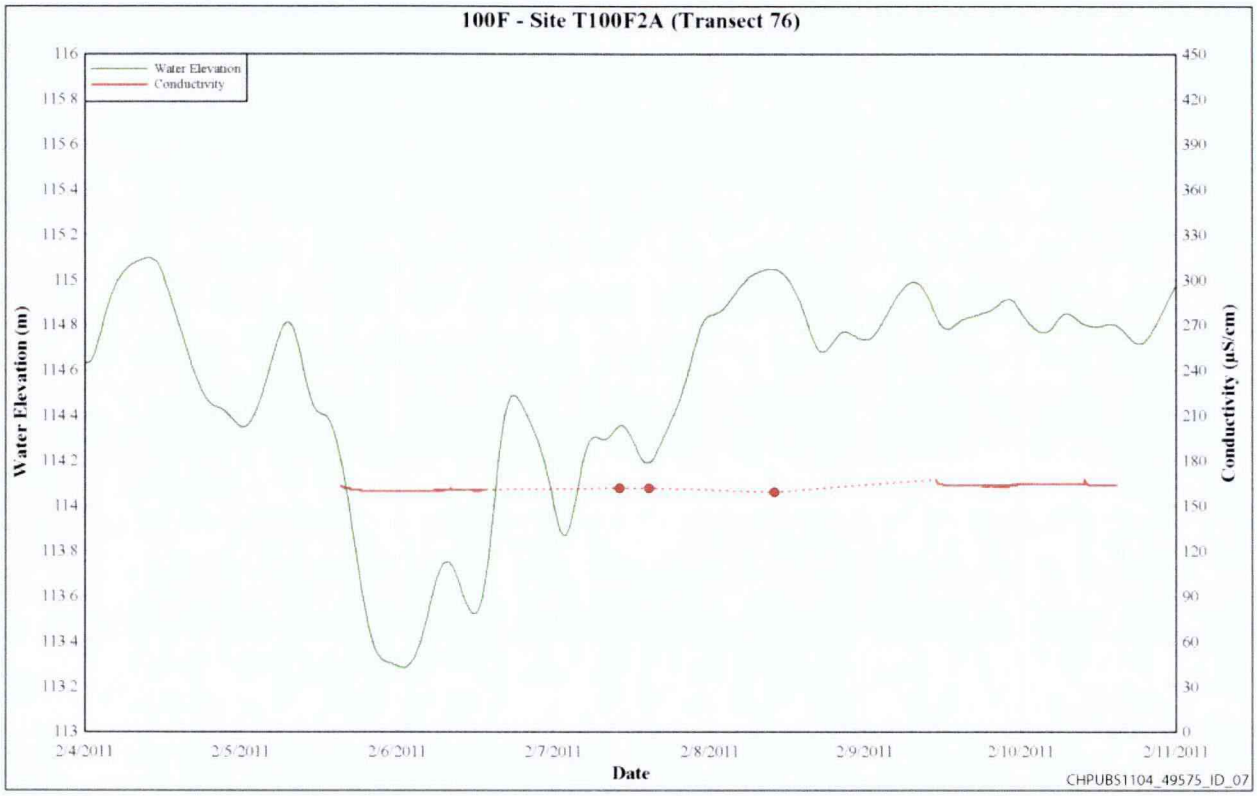

Figure 7. Pore Water Conductivity Monitoring at 100-F QC Station (F2 Transect 2)

3.4 Quality Control

QC samples in February 2011 included a duplicate, two splits (one for Cr(VI) and one for total chromium), and an equipment blank. The equipment blank showed no contamination. The duplicate samples (Table 3) both showed no detectable Cr(VI) or total chromium. The concentration of Cr(VI) in the split sample was slightly higher than in the parent sample (2.7 µg/L compared to <2 µg/L). Using routine groundwater quality control protocol, duplicate or split results are only evaluated when at least one of the results is greater than five times the method detection limit. The analytical precision is lower when results are near detection limits. Because the reported concentration was so close to the detection limit, there was no significant difference between the two results.

Although not intended as QC samples, total chromium results provide an extra check on Cr(VI) data. Dissolved chromium in Hanford Site groundwater is virtually all hexavalent (WHC-SD-EN-TI-302, *Speciation and Transport Characteristics of Chromium in the 100-D/H Areas of the Hanford Site*). Results of filtered total chromium analyses are analogous to Cr(VI) (Appendix C of DOE/RL-2008-01, *Hanford Site Groundwater Monitoring for Fiscal Year 2007*). In February 2011, total chromium and Cr(VI) results were consistent (Table 3).

4 Discussion and Conclusions

This chapter provides interpretation of the 100-F pore water sampling results. It compares the February 2011 results to previous results and evaluates data quality.

Table 4 lists the results of pore water sampling conducted in fall 2009 and early 2010 (WCH-380 and WCH-398). During the first round of sampling, 18 stations were sampled for Cr(VI). Only one station, T100F2A, had a detectable result: 8 µg/L. This station and one other were sampled again in February 2010, and the samples were analyzed for Cr(VI), total chromium, and other contaminants. Station T100F2A again had detectable Cr(VI), this time at 20 µg/L. However, that result includes a data validation flag indicating it was an estimate; a batch duplicate sample exhibited high variability. In addition, the total chromium concentration was just 9.2 µg/L, which brings the Cr(VI) result into question.

Table 4. Chromium Results from Previous Studies

Sampling Site Station Number	November 2010		February 2010			
	Cr(VI) (µg/L)		Cr(VI) (µg/L)		Total Cr, Unfiltered (µg/L)	Total Cr, Filtered (µg/L)
J100F1	3.7	U	-		-	-
J100F2	3.7	U	-		-	-
J100F4	3.7	U	-		-	-
T100F2A*	8.0		20.0	J	9.18	4.01
T100F2C	3.7	U	-		-	-
T100F2D	3.7	U	-		-	-
J100F10	3.7	U	-		-	-
T100F2E	3.7	U	-		-	-
J100F11	3.7	U	7.4	U	34.40	4.81
J100F14	3.7	U	-		-	-
J100F16A	3.7	U	-		-	-
T100F4J1	3.7	U	-		-	-
J100F18	3.7	U	-		-	-
T100F4E	3.7	U	-		-	-
T100F5J1	3.7	U	-		-	-
T100F5E	3.7	U	-		-	-
J100F23	3.7	U	-		-	-
J100F25	3.7	U	-		-	-

Sources:

WCH-380, *Field Summary Report for Remedial Investigation of Hanford Site Releases to the Columbia River, Hanford Site, Washington: Collection of Surface Water, Pore Water, and Sediment Samples for Characterization of Groundwater Upwelling.*

WCH-398, *Data Summary Report for the Remedial Investigation of Hanford Site Releases to the Columbia River, Hanford Site, Washington.*

* Approximately at same location as Station F2 Transect 2 (Table 3).

J = estimated value; high relative percent difference (36.7 percent) on batch duplicate

U = undetected

\- = not sampled

Unlike the previous 100-F pore water sampling efforts, the recent study focused solely on the area most likely to be impacted by the Cr(VI) groundwater plume. In February 2011, river stage was higher and pore water conductivity was lower than during previous sampling events. However, there was clear indication of groundwater upwelling. Sampling results from February 2011 included only one detectable Cr(VI) result (Table 3). This result was very close to the detection limit, and a split sample from the same site contained no detectable Cr(VI). Total chromium results ranged from below the 1 µg/L detection limit up to 3.9 µg/L.

Concentrations of Cr(VI) in the unconfined aquifer at 100-F are >20 µg/L in some wells near the Columbia River. Hexavalent chromium is not detected in most 100-F aquifer sampling tubes, but has been as high as 14.7 µg/L in one deep tube near the groundwater plume (DOE/RL-2010-11). A shallower tube at that location had Cr(VI) concentrations <10 µg/L. Groundwater upwellings have been identified in the Columbia River adjacent to 100-F, but the pore water is not contaminated with Cr(VI) at levels exceeding the 10 µg/L AWQS.

5 References

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Appendix A

Pore Water Sampling Methods

Terms

DI	deionized
DO	dissolved oxygen
ORP	oxidation reduction potential
QC	quality control
SAP	sampling and analysis plan

A1 Introduction

This appendix describes the methods used for pore water sample collection. These activities were performed near or in Hanford Site contaminated groundwater discharge areas within the Columbia River.

Pore water sampling activities were required to evaluate contaminated groundwater discharge zones within the Columbia River adjacent to the 100-BC, 100-F, and 100-N areas of the Hanford Site. A portable conductivity and temperature probe (Trident[1] probe) was inserted into the Columbia River bed to measure the pore water parameters in situ. The probe also had the capability to collect pore water samples, which were analyzed for specific groundwater contaminants. Pore water sampling was performed to support the following sampling and analysis plans (SAPs):

- *Sampling and Analysis Plan for the 100-BC-1, 100-BC-2, and 100-BC-5 Operable Units Remedial Investigation/Feasibility Study*, DOE/RL-2009-44
- *Sampling and Analysis Plan for the 100-FR-1, 100-FR-2, 100-FR-3, 100-IU-2, and 100-IU-6 Operable Units Remedial Investigation/Feasibility Study*, DOE/RL-2009-43
- *Sampling and Analysis Plan for the 100-NR-2 Operable Unit River Pore Water Investigation*, DOE/RL-2010-69

Sampling activities included collection of pore water using the Trident probe or Trident probe/frame. These activities were conducted using a boat as an operation platform. Sampling methods were analogous to those described in DOE/RL-2008-11, *Remedial Investigation Work Plan for Hanford Site Releases to the Columbia River.*

Through previous pore water sampling work, field sampling guidelines were developed to guide decisions on sampling. The guidelines represent the best conditions for sampling. Pore water sample collection should take place when there are minimal signs of dilution from bank recharge from surface water and/or when river levels are <0.8 m (<2.6 ft) above low water level, and the river flow has been relatively stable for more than 1 hour prior to sampling.

A2 Equipment and Materials

The following equipment and materials were used during sample collection:

- Communication devices (e.g., cell phones, two-way radio, and very high frequency)
- Tape measure/river staff gauge
- Davit/Capstan system (mounted on vessel)
- Trident docking station (cradle on vessel)
- Specialized anchoring equipment (as necessary)
- Trident probe deck unit (with push pole assembly, as necessary)
- Trident driving frame
- Trident probe communication cables

[1] Coastal Monitoring Associates (San Diego, California) Trident probe has a patent pending.

- Trident and secondary field global positioning system units
- Trident probe armored tips (with backups, as necessary)
- Field computer (with software installed and operational)
- Peristaltic pump and Masterflex® tubing
- A 12 volt deep cycle battery with 750 watt power inverter
- Water quality measuring equipment capable of measuring the following parameters: pH, temperature, conductivity, dissolved oxygen (DO), and oxidation reduction potential (ORP)
- Polyethylene tubing (18+ m [60+ ft])
- Trident tool box and associated spare parts
- Underwater Aqua-Vu camera (one mounted to the frame and one for recon surveys)
- Digital camera
- A 500 L+ (132+ gal) graduated cylinder
- Field logbook and associated field record forms
- Sample bottle sets and associated sampling forms (including all necessary sample bottles, sample labels, sampling data sheets, and sample chain of custody forms)
- Nitrile gloves
- Deionized (DI) water (typically, 4 to 8 L [1 to 2 gal] is sufficient for one field day)
- One percent Liqui-nox® solution (typically, 1 L [0.25 gal] is sufficient for one field day)
- Decontamination tools (e.g., brushes and towels)
- A 19 L (5 gal) bucket (for capturing decontamination rinsate fluids)
- Precleaned 9.5 L (2.5 gal) cubitainers (one per station)

A3 Methods

The following methods were used for sample collection:

- Sampling activities included boating to location, collecting pore water using the Trident probe or Trident probe/frame, and collecting surface water using a peristaltic pump and tubing.
- Measurements of pore water and surface water were made concurrently at each sample location.
- Chain of custody documentation was maintained for all samples.
- Field decontamination was performed on sampling equipment as needed.

® Masterflex is a registered trademark of Cole-Parmer, Vernon Hills, Illinois.
® Liqui-nox is a registered trademark of Alconox, Inc., White Plains, New York.

- Water quality parameter measurements (i.e., pH, temperature, conductivity, DO, and ORP) were recorded on field paperwork.
- Activities associated with this field work were documented in controlled field logbooks.

A3.1 Pore Water Sampling

Staff performed the following tasks during pore water sampling:

- At the laboratory, all field instruments were calibrated and results were recorded in the field logbook. Trident probe temperature calibration checks were performed monthly. Certificates of analyses and record calibration solution lot numbers and expiration dates were retained in the field logbook.
- At the selected sampling site, decontamination of field sampling equipment was performed by pumping three tube volumes with Liqui-nox solution followed by six volumes of DI water. Decontamination rinsate was discarded in accordance with the applicable operable unit's waste control plan.
- River level, time, and river staff station identification were measured and recorded at the beginning and end of each sampling event. (Note: if river stages were near 0.8 m above the green line or flows were unstable, pore water conductivity was checked and recorded at a nearby pore water baseline sampling station.)
- The Trident pole assembly was pushed or the Trident driving frame was deployed, approximately 6 to 12 in. below the riverbed or until it resisted further insertion. The depth of the unit into the sediment was measured and recorded.
- After the peristaltic pump was turned on according to manufacturer's instructions, the system was slowly purged (6 to10 mL/min) until stable readings were achieved. Typically, approximately 100 mL of fluid purging was needed to remove nonrepresentative water from the tubing. Purge water was discarded in accordance with the applicable waste control plan prior to leaving the sampling location or after that area's sampling event was completed.
- Conductivity readings were recorded intermittently while drawing the sample, and sampling was stopped or slowed temporarily if the conductivity dropped substantially from the initial reading to allow the conductivity to restore to near the starting value. Because of the variability of each location, the time varied from site to site and with river level. A number of observations such as the probe's position/depth, pump rate, river flow cycles, substrate types, and water depth were made to ensure a consistent measurement of the pore water.
- Once stable readings were attained, the pore water and surface water conductivity and temperature were logged using the Trident computer logging feature.
- Volatile organic analyte samples were collected first (where required by the applicable SAP).
- The desired volume of pore water was collected in precleaned containers, and enough water was collected so that minimum sample volumes were attained and final composite sample water quality readings (conductivity, DO, ORP, and pH) could be obtained.
- Sample labels and custody seals were attached, and samples were immediately placed into a chilled cooler. Remaining composite pore water was emptied into a clean, wide-mouth container to allow for measurement of the selected water quality measurements (pH, conductivity, DO, and ORP). (Note: the composite sample temperature was not recorded because this was not representative of the sample

temperature. The temperature logged on the Trident unit was used to represent the sample temperature. These parameters were recorded on field paperwork.)

- Time and river level were recorded at the end of sampling, using the nearby river staff gauge, denoting the river staff identification.
- Riverbed conditions were documented with a digital photograph, using an underwater camera or video recorder.
- A full set of quality control (QC) samples of pore water were collected and one duplicate for every 20 samples was collected, or at least one QC set and one duplicate were collected for fewer than 20 samples.
- The sample tubing was decontaminated by pumping three tubing volumes of Liqui-nox solution, followed by six volumes of DI water, through the sample tubing.
- All decontamination fluids were collected and disposed in accordance with the applicable waste control plan.

A3.2 Waste Disposal

Staff disposed of all waste in accordance with DOE/RL-2004-30, *Waste Control Plan for the 100-BC-5 Operable Unit*; DOE/RL-200-31, *Waste Control Plan for the 100-FR-3 Operable Unit*; or DOE/RL-2000-41, *Interim Action Waste Management Plan for the 100-NR-2 Operable Unit*.

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Appendix B

100-F Pore Water Data Table

Terms

ags	above ground surface
bgs	below ground surface
DO	dissolved oxygen
EAS	Environmental Assessment Services
HEIS	*Hanford Environmental Information System*
N/A	not available
NTU	Nephelometric Turbidity Units
ORP	oxidation reduction potential
QC	quality control

Table B-1A. Site Coordinates, Sample Metadata, and Water Quality Data for 100-F Pore Water Sampling, February 2011

Station Identification	Date	Time (Start)	Time (End)	Latitude[b] (deg)	Longitude[b] (deg)	Easting[f] (m)	Northing[f] (m)	General Substrate	Pore Water EAS HEIS Number	Volume (mL)	QC Sample	QC Tied to	QC Volume (mL)	Number of Bottles
F1 Transect 1	2/28/2011	10:45	12:20	46.66177	-119.44256	580921.51	148198.22	med/lg cobble	B2BDB3	1,000	Split	B2C6J9	1,000	2
F1 Transect 2	2/7/2011	13:20	14:07	46.66161	-119.44219	580950.06	148180.81	med cobble	B2BDB4	600	-	-	-	1
F1 Transect 3	2/27/2011	14:50	15:30	46.66139	-119.44181	580979.47	148156.75	med/sm cobble	B2BDB5	600	-	-	-	1
F1 Transect 4	2/27/2011	11:11	12:35	46.66128	-119.44162	580994.17	148144.72	med/sm cobble	B2BDB6	650	Split	B2BDC9	650	2
F1 Transect 5	2/10/2011	10:50	11:53	46.66112	-119.44128	581020.43	148127.29	med/sm cobble	B2BDB8	600	Duplicate	B2BDB9	600	1
F1 Transect 5	2/10/2011	12:05	13:05	46.66112	-119.44128	581020.43	148127.29	med/sm cobble	B2BDB9	600	Duplicate	B2BDB8	600	1
F1 Transect 6	2/25/2011	11:50	12:40	46.66102	-119.44112	581032.82	148116.34	med/sm cobble	B2BDC0	600	-	-	-	1
F1 Transect 7	2/23/2011	11:00	11:50	46.66092	-119.44090	581049.80	148105.45	med cobble	B2BDC1	600	-	-	-	1
F1 Transect 8	2/25/2011	10:20	11:00	46.66075	-119.44068	581066.89	148086.78	med/sm cobble	B2BDC2	600	-	-	-	1
F1 Transect 9	2/22/2011	15:25	16:15	46.66053	-119.44020	581103.95	148062.82	med cobble	B2BDC3	600	-	-	-	1
F1 Transect 10	2/18/2010	11:45	12:45	46.66041	-119.43990	581127.09	148049.79	med/sm cobble	B2BDC4	600	-	-	-	1
F2 Transect 1	2/28/2011	16:10	16:50	46.66182	-119.44256	580921.43	148203.77	med/lg cobble	B2BDC5	620	-	-	-	1
F2 Transect 2	2/7/2011	11:35	12:18	46.66165	-119.44220	580949.24	148185.25	med/sm cobble	B2BDC6	600	-	-	-	1
F2 Transect 3	2/28/2011	13:15	15:05	46.66145	-119.44176	580983.20	148163.47	med cobble	B2BDC7	620	-	-	-	1
F2 Transect 4	2/27/2011	13:30	14:05	46.66136	-119.44156	580998.64	148153.67	med/sm cobble	B2BDC8	600	-	-	-	1
F2 Transect 5	2/17/2010	14:30	15:45	46.66116	-119.44128	581020.37	148131.73	med cobble	B2BDD0	600	-	-	-	1
F2 Transect 6	2/25/2011	14:07	15:40	46.66103	-119.44108	581035.86	148117.49	med cobble	B2BDD1	600	-	-	-	1
F2 Transect 7	2/23/2011	12:45	13:30	46.66094	-119.44083	581055.13	148107.74	med cobble	B2BDD2	600	-	-	-	1
F2 Transect 8	2/23/2011	14:30	15:25	46.66080	-119.44058	581074.47	148092.44	med cobble	B2BDD3	600	-	-	-	1
F2 Transect 9	2/22/2011	12:04	13:25	46.66055	-119.44016	581106.98	148065.09	med cobble	B2BDD4	600	-	-	-	1
F2 Transect 10	2/18/2010	14:45	16:30	46.66041	-119.43986	581130.15	148049.83	med/sm cobble	B2BDD5	600	-	-	-	1

Table B-1B. Site Coordinates, Sample Metadata, and Water Quality Data for 100-F Pore Water Sampling, February 2011

Station Identification	River Depth at Station (ft)	Stick Reading Before (m)	Stick Reading After (m)	Pore Water Sensor Depth (in. bgs)	Surface Water Sensor Height (in. ags)	Riverbed Elevation[a] (m)	River Flow (Kcfs)	River Level[a] (m)	Nearest Transect	40K Steady State River Elevation[a] at Nearest Transect	Height (m) Above Low-Water	Bottom Photo Filename	Logbook Page Number
F1 Transect 1	6.7	1.0	0.8	12	12	112.25	157.4	114.91	76	112.19	2.7	F1TRANSECT3_02272011.JPG	89
F1 Transect 2	6.0	0.8	0.8	12	12	111.70	114.9	114.21	76	112.19	2.0	F1TRANSECT2_02072011.jpg	51
F1 Transect 3	4.2	0.8	0.8	12	12	112.76	148.6	114.79	76	112.19	2.6	F1TRANSECT3_02272011.JPG	85
F1 Transect 4	7.1	1.1	0.9	12	12	112.78	167.4	115.06	76	112.19	2.9	F1TRANSECT4_02272011.JPG	83
F1 Transect 5	8.6	1.4	1.7	12	12	111.62	150.3	114.79	76	112.19	2.6	F1TRANSECT5_02102011.JPG	56
F1 Transect 5	8.6	1.7	1.7	12	12	111.62	150.5	114.79	76	112.19	2.6	F1TRANSECT5_02102011.JPG	57
F1 Transect 6	6.5	0.7	0.8	11	12	111.75	147.1	114.74	76	112.19	2.5	F1TRANSECT6_02252011.JPG	78
F1 Transect 7	6.4	0.4	0.6	12	12	111.48	135.8	114.39	77	112.03	2.4	F1TRANSECT7_02232011.JPG	70
F1 Transect 8	5.0	0.7	0.7	12	12	112.77	145.7	114.57	77	112.03	2.5	F1TRANSECT8_02252011.JPG	77
F1 Transect 9	6.9	1.3	1.4	12	12	111.35	129.0	114.27	77	112.03	2.2	F1TRANSECT9_02202010.JPG	68
F1 Transect 10	8.6	1.7	1.6	12	12	111.13	136.3	114.43	77	112.03	2.4	F1TRANSECT10_02182011.JPG	63
F2 Transect 1	10.2	0.8	N/A[d]	12	12	110.71	144.2	114.71	76	112.19	2.5	F2TRANSECT1_02282011.JPG	91
F2 Transect 2	10.2	1.1	0.9	12	12	111.58	122.5	114.33	76	112.19	2.1	F2TRANSECT1_02282011.JPG	50
F2 Transect 3	10.0	0.8	0.8	12	12	111.29	151.7	114.83	76	112.19	2.6	F2TRANSECT3_02282011.JPG	90
F2 Transect 4	11.4	0.9	0.8	12	12	110.61	154.3	114.88	76	112.19	2.7	F2TRANSECT4_02272011.JPG	84
F2 Transect 5	11.2	2.0	2.2	12	12	110.68	159.9	114.94	76	112.19	2.7	F2TRANSECT5_02172011.JPG	59
F2 Transect 6	11.7	0.9	1.0	12	12	111.37	158.7	114.89	76	112.19	2.7	F2TRANSECT6_02252011.JPG	80
F2 Transect 7	10.9	0.6	0.6	12	12	110.12	139.6	114.45	77	112.03	2.4	F2TRANSECT7_02232011.JPG	71
F2 Transect 8	11.5	0.6	0.6	12	12	110.37	140.8	114.47	77	112.03	2.4	F2TRANSECT8_02232011.JPG	72
F2 Transect 9	10.1	1.1	1.2	11.5	12	111.12	119.5	114.13	77	112.03	2.1	F2TRANSECT9_02222011.JPG	67
F2 Transect 10	11.5	1.4	1.8	12	12	110.97	136.0	114.40	77	112.03	2.4	F2TRANSECT10_02182011.JPG	64

Table B-1C. Site Coordinates, Sample Metadata, and Water Quality Data for 100-F Pore Water Sampling, February 2011

Station Identification	Composite Pore Water Conductivity (µS/cm)	Trident Sensor Pore Water Temperature (C°)	Composite Pore Water pH	Composite Pore Water ORP (mV)	Composite Pore Water DO (mg/L)	Composite Pore Water Turbidity (NTU)	Surface Water Conductivity (µS/cm)	Trident Sensor Surface Water Temperature (C°)	Surface Water pH	Surface Water ORP (mV)	Surface Water DO (mg/L)	Surface Water Turbidity (NTU)	CHPRC Composite Pore Water Conductivity (µS/cm)	Change in Conductivity Reading During Sample Collection (Percent)	Field QC Qualifier
F1 Transect 1	162	2.8	7.62	287	8.07	10	140	2.6	7.75	310	12.98	11	162	0.0	g
F1 Transect 2	162	3.2	7.46	261	7.89	31	143	3.1	7.50	248	12.15	3	162	-2.4	g, h
F1 Transect 3	158	2.9	7.84	246	9.36	87	137	2.6	7.94	267	13.04	14	158	-0.6	g
F1 Transect 4	168	2.5	7.67	232	9.51	42	136	2.3	7.80	275	12.87	6	168	-0.6	g
F1 Transect 5	158	3.4	7.26	228	9.06	82	143	3.0	7.33	206	12.28	4	158	0.0	g
F1 Transect 5	165	3.2	7.85	199	8.58	31	141	3.1	7.62	222	12.36	6	165	0.0	g
F1 Transect 6	158	2.9	8.04	280	10.57	85	134	2.6	8.25	229	13.19	6	158	2.5	g
F1 Transect 7	161	3.1	7.51	188	9.10	25	140	3.0	8.25	289	12.35	3	161	0.0	g
F1 Transect 8	156	2.8	8.04	255	9.60	89	149	2.5	7.84	277	12.94	3	156	0.6	g
F1 Transect 9	143	3.4	7.27	226	10.99	31	136	3.4	8.22	220	12.78	10	143	2.4	g
F1 Transect 10	155	3.4	7.98	297	9.23	34	137	3.2	8.02	257	12.40	11	155	-0.6	g
F2 Transect 1	163	3.0	8.11	269	8.91	99	136	2.7	8.25	247	12.4	6	163	4.2	g
F2 Transect 2	175	3.4	7.95	240	7.22	95	141	3.0	7.42	226	11.25	1	175	0.0	g, h
F2 Transect 3	180	2.7	8.3	235	7.94	189	139	2.6	7.95	277	12.87	7	180	-5.5	g
F2 Transect 4	151	2.8	8.05	260	9.93	195	138	2.5	8.07	262	12.7	5	151	0.6	g
F2 Transect 5	163	3.5	8.19	211	9.96	52	136	3.2	8.24	160	12.57	1	163	-5.1	g
F2 Transect 6	147	2.9	8.21	241	11.32	83	137	2.7	8.37	241	13.14	6	147	-0.7	g
F2 Transect 7	153	3.3	8.09	249	10.68	72	139	3.1	8.01	242	12.68	2	153	0.6	g
F2 Transect 8	152	3.4	8.20	232	10.54	77	138	3.2	8.12	243	12.57	3	152	0.6	g
F2 Transect 9	152	3.3	7.88	268	9.40	551	137	3.2	8.06	246	12.35	4	152	1.9	g
F2 Transect 10	157	3.4	8.04	278	10.03	144	137	3.4	8.12	270	12.31	2	157	2.5	g

Table B-1C. Site Coordinates, Sample Metadata, and Water Quality Data for 100-F Pore Water Sampling, February 2011

Station Identification	Composite Pore Water Conductivity (µS/cm)	Trident Sensor Pore Water Temperature (C°)	Composite Pore Water pH	Composite Pore Water ORP (mV)	Composite Pore Water DO (mg/L)	Composite Pore Water Turbidity (NTU)	Surface Water Conductivity (µS/cm)	Trident Sensor Surface Water Temperature (C°)	Surface Water pH	Surface Water ORP (mV)	Surface Water DO (mg/L)	Surface Water Turbidity (NTU)	CHPRC Composite Pore Water Conductivity (µS/cm)	Change in Conductivity Reading During Sample Collection (Percent)	Field QC Qualifier

a. Elevations are in NAVD88, *North American Vertical Datum of 1988.*

b. Latitude and longitude are in NAD83, *North American Vertical Datum of 1988.*

c. Probe malfunction; no reading was recorded.

d. Data were not recorded.

e. Recorded with probe held at surface.

f. NAD83 StatePlane Washington South FIPS 4602 Meters.

g. Possible dilution of pore water sample due to exceedence of river stage guidelines during sampling event.

h. Sample conductivity is <90% of Phase IIb or III conductivity.

i. In situ readings dropped >10% during sample collection event.

j. Sample conductivity is <90% of Phase III conductivity.

References

NAD83, 1991, *North American Datum of 1983*, National Geodetic Survey, Federal Geodetic Control Committee, Silver Spring, Maryland, as revised.

NAVD88, 1988, *North American Vertical Datum of 1988*, National Geodetic Survey, Federal Geodetic Control Committee, Silver Spring, Maryland.

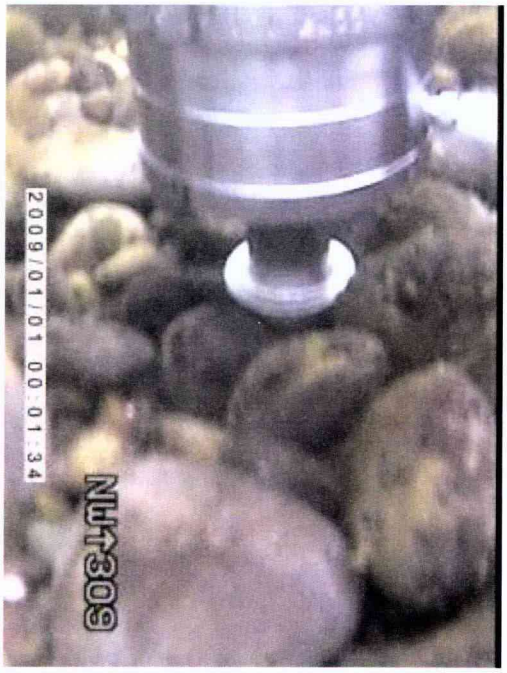
Appendix C

Photographs of River Bed at 100-F Area Pore Water Stations

F1TRANSECT1_02282011.JPG

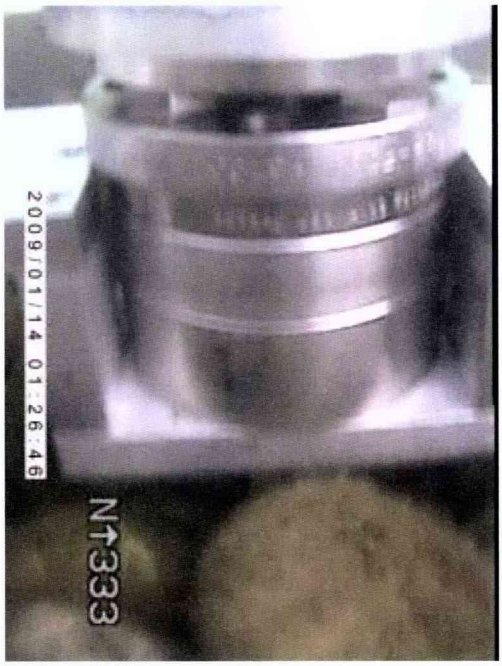
F2TRANSECT1_02282011.JPG

F1TRANSECT2_02072011.jpg

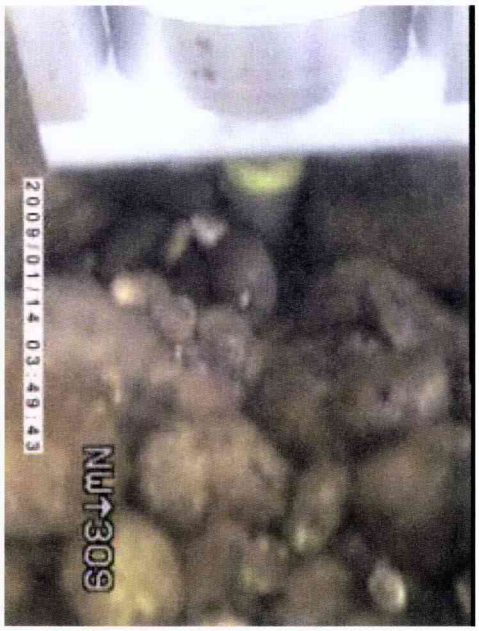


F2TRANSECT2_02072011.jpg

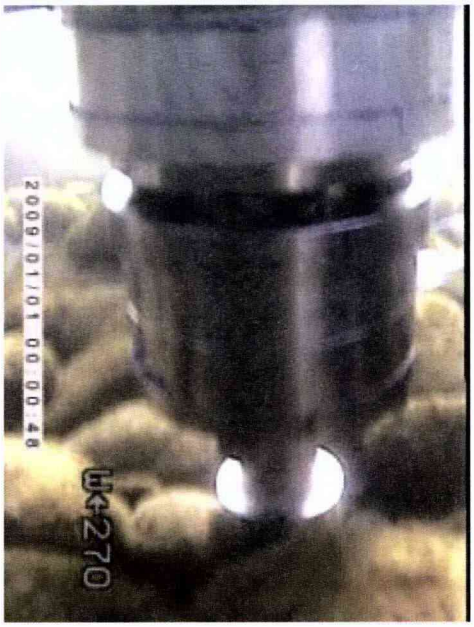
F2TRANSECT3_02282011.JPG



F1TRANSECT4_02272011.JPG



F2TRANSECT4_02272011.JPG

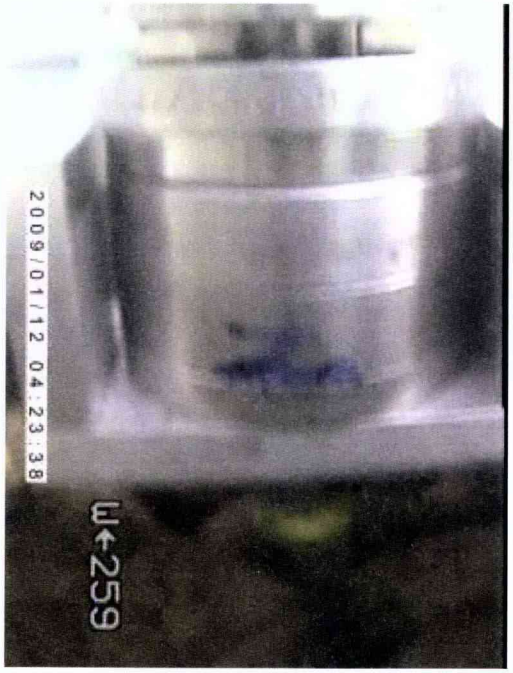


F1TRANSECT5_02102011.JPG

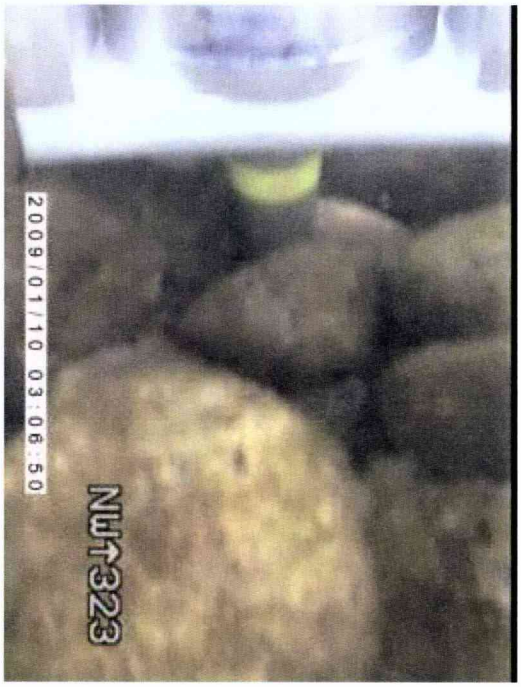
F1TRANSECT6_02252011.JPG

F2TRANSECT5_02172011.JPG

F1TRANSECT7_02232011.JPG

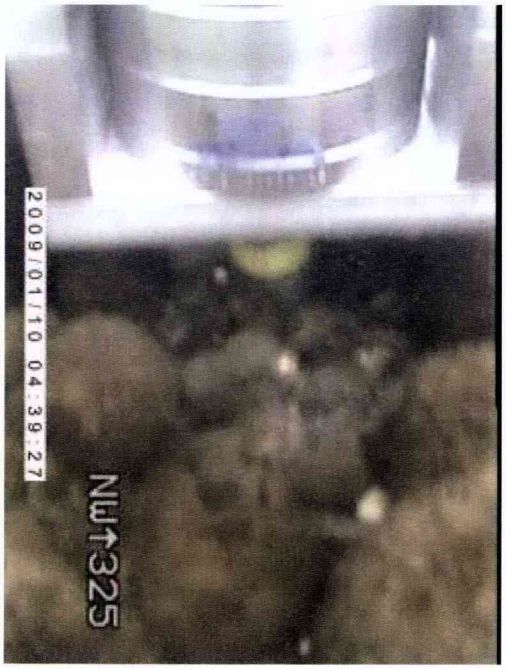


F2TRANSECT6_02252011.JPG



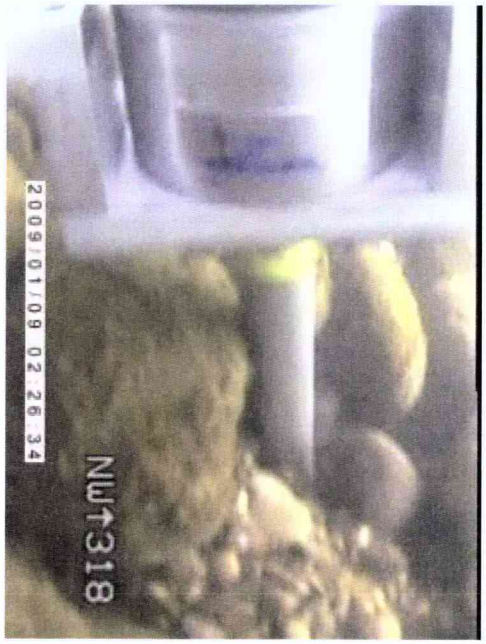
F2TRANSECT7_02232011.JPG

F1TRANSECT8_02252011.JPG



F2TRANSECT8_02232011.JPG

F1TRANSECT9_02202010.JPG



F2TRANSECT9_02222011.JPG

F1TRANSECT10_02182011.JPG

T100F2A_02052011.jpg

Appendix D

Field Logbook Records

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT F Area

TRIDENT GPS 66163

Lat N 46.4[redacted]

Long W 119.4422

~~VESSEL GPS~~ Trimble

Lat N 46.6d[redacted] 65094

Long W 119.44219880

Accuracy (ft) 1.64 PDOP 1.61

TIME (on station) Start 1042

End

BOAT 2

Porewater Sampling Method (Frame) Trident/Handheld, Release Point) FRAME

Station ID F2 Transect 2

SURVEY DATE 2-7-11

PROJECT PHASE

WATER DEPTH [redacted] 10.2'

BOTTOM TYPE

Surface medium/small cobble

Layer

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	12" bsg	12" bsg
Temperature [C]	3.360	2.998
Conductivity [mS/cm]	173	141

Purge the volume of tubing prior to sample collection (circle one) (YES) NO

Porewater Purge Pumping Data

ml	Cond	Temp
0	150	2.918
30	164	3.192
60	169	3.416
90	170	3.511
120	172	3.541
150	172	3.571
180	173	3.576

File Information

CMA Computer # 6

Data file name (.dat)	F2 Transect 2_02072011	Start Time	1132
Station gauge reading	1.1 m Start 0 m End	Averaging Time	60
Field Logbook #		End Time	1133

Pump start time 1135

Pump end time 1218

Picture ID Saved in Folder

Sample time 1135

Sample Number

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turbidity
Composit ~~Sample values~~	7.22	7.95	240	115.2	175.4	94.6
Surface Water	11.25	7.42	226	93.43	141.4	1.37

Comments/Observations

Collecting Sample Initial Pore 6.85 6.91 234 111.4 170.0 522 10.88

Final Pore 6.03 7.92 231 112.4 171.3

Recorder C. Smith

Sample Collector S. Johnson

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit F AREA		Date 2-7-11
Site ID F2 TRANSECT 2		Start Time 1135

Porewater Sampling Data

Time	Volume	Cond	Temp
1135	0	173	3,576
1150	150	175	3,478
1205	400	175	3,575
1220	600	175	3,565
~~1235~~			
~~1250~~			
~~1305~~			

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT F AREA

TRIDENT GPS

Lat N 46.6660

Long W 119.44222

~~VESSEL GPS~~ Trimble

Lat N 46.66161306

Long W 119.44219673 19469

Accuracy (ft) 2.71 POOP 2.24

TIME (on station) Start 1300 End

BOAT 2

Porewater Sampling Method FRAME
(Frame, Trident/Handheld, Release Point)

Station ID F1 Transect 2

SURVEY DATE 2-7-11

PROJECT PHASE

WATER DEPTH 6.0'

BOTTOM TYPE
Surface Medium Cobble

Layer

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	12" bsg	12" bsg
Temperature [C]	3.196	3.083
Conductivity [mS/cm]	166	141

Porewater Purge Pumping Data

ml	Cond	Temp
0	144	3.988
30	152	3.758
60	163	3.347
90	165	3.252
120	166	3.213
150	166	3.189

Purge the volume of tubing prior to sample collection (circle one) YES NO

File Information

CMA Computer # 6

Data file name (.dat)	F1 Transect 2	Start Time	1328
Station gauge reading	0.8 at 1310 0.8 at 1410	Averaging Time	1
Field Logbook #		End Time	1324

Pump start time	1320
Pump end time	1407
Picture ID	SAVED 10

Sample time	1320
Sample Number	

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turbidity
Composit Sample values	7.89	7.46	261	106.3	161.6	31.1
Surface Water	12.15	7.50	248	94.57	142.8	3.02

Comments/Observations

Probe 12"

Initial PW 6.48 6.67 256 105.8 161.3 148

Final PW 7.73 7.24 262 103.2 157.0 6.51

Recorder C. Smith

Sample Collector S. Johnson

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit F AREA		Date 2-7
Site ID F1 Transect 2		Start Time 1320

Porewater Sampling Data

Time	Volume	Cond	Temp
1320	0	166	3,189
1335	125	166	3,176
1350	300	164	3,189
1405	650	162	3,179

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT F Area

TRIDENT GPS

Lat N 46.6613

Long W 119.44127

~~VESSEL GPS~~ Trimble

Lat N 46.6612426

Long W 119.44127614

Accuracy (ft) 1.58 PDOP 1.44

TIME Start 1025 (on station)

End

BOAT 2

Porewater Sampling Method FRAME (Frame, Trident/Handheld, Release Point)

Station ID F~~1~~3 TRANSECT 5 F1

SURVEY DATE 2/10/11

PROJECT PHASE

WATER DEPTH 8.6

BOTTOM TYPE

Surface medium/small cobble

Layer

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	12" bsg	12" bsg
Temperature [C]	3.424	3.033
Conductivity [mS/cm]	164	139

Porewater Purge Pumping Data

ml	Cond	Temp
0	142	3.186
30	162	3.392
60	162	3.393
90	163	3.391
120	163	3.395
150	163	3.413

Purge the volume of tubing prior to sample collection (circle one) YES NO

File Information

CMA Computer # 1

Data file name (.dat)	F1TRANSECT 5_02102011	Start Time	1051
Station gauge reading	1.4 BEGIN 1.7 END	Averaging Time	1
Field Logbook #		End Time	1052

Pump start time	1030	Sample time	1050
Pump end time	1153	Sample Number	
Picture ID	West 270		

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	~~[illegible]~~	Turb
Composite ~~Sample~~ values	9.06	7.26	228	102.9	158.0		82.2
Surface Water	12.28	7.33	206	95.27	143.3	~~12.28~~	4.05

Comments/Observations

Initial PW 9.88 7.51 186 102.6 154.9 378

Final PW 9.12 7.50 220 102.4 157.5 44.9

Recorder CSmith

Sample Collector S Johnson

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit F Area		Date 2-10-11
Site ID F1TRANSECT 5		Start Time 1050

Porewater Sampling Data

Time	Volume	Cond	Temp
1050	0	163	3.413
1105	100	165	3.430
1120	200	165	3.420
1135	400	165	3.425
1150	650	165	3.391

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT F Area

TRIDENT GPS

Lat N 46.66113

Long W 119.44127

VESSEL GPS

Lat N 46.6612426

Long W 119.44127614

Accuracy (ft) 1.58 PDOP 1.44

TIME Start 1200
(on station
End

BOAT 3

Porewater Sampling Method Frame
(Frame, Trident/Handheld, Release Point)

Station ID F1 Transect 5 Duplicate

SURVEY DATE 2-10-11

PROJECT PHASE

WATER DEPTH 9.6

BOTTOM TYPE
Surface medium/small cobble

Layer

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	12" Usg	12" Usg
Temperature [C]	~~3.952~~ 3.218	3.135
Conductivity [mS/cm]	165	139

Purge the volume of tubing prior to sample collection (circle one) YES NO

Porewater Purge Pumping Data

ml	Cond	Temp

File Information

CMA Computer # 1

Data file name (.dat)	F1Transect	Start Time	~~1207~~
Station gauge reading	1.7 Begin	Averaging Time	1
Field Logbook #		End Time	~~1304~~

Pump start time 1205
Pump end time 1305
Picture ID
see orig. picture

Sample time 1205

Sample Number

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turb
Composit ~~Sample values~~	8.58	7.85	199	106.9	164.7	31.1
Surface Water	12.36	7.62	222	91.68	140.5	6.26

Comments/Observations

1 Failed log due to sensor fault

initial PW 8.52 7.63 221 105.0 160.1 36.8

Final PW 8.70 7.74 199 101.5 155.7 19.44

Recorder C. Smith

Sample Collector S. Johnson

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit F Area		Date 2-10-11
Site ID F1 Transect 5 Duplicate		Start Time 1205

Porewater Sampling Data

Time	Volume	Cond	Temp
1205	0	165	3.218
1220	120	166	3.402
1235	220	165	3.410
1250	400	165	3.432
1305	[illegible]	166	3.410
	650		

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100F

TRIDENT GPS

Lat N 46.66117

Long W -119.44128

VESSEL GPS

Lat N 46.66115610

Long W 119.44127949

Accuracy (ft) 2.67'

TIME (on station) Start 1210 End 1630

BOAT Boat 2

Porewater Sampling Method Frame 3
(Frame, Trident/Handheld, Release Point)

Station ID F2 Transect 5

SURVEY DATE 2-17-2011

PROJECT PHASE 100F Comm

WATER DEPTH 11.2

BOTTOM TYPE
Surface medium cobble
Layer

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	12"	12
Temperature [C]	3.520	3.239
Conductivity [mS/cm]	182	137

Purge the volume of tubing prior to sample collection (circle one) YES ~~NO~~

Porewater Purge Pumping Data

ml	Cond	Temp
purge	145	3.802
0	147	3.162
30	157	3.455
60	183	3.494
90	183	3.504
120	182	3.507
150	183	3.519

File Information

Data file name (.dat)	Frame 3_F2TRANSECT_02172011	CMA Computer # CMA5 Start Time	1430
Station gauge reading	2.2	Averaging Time	1
Field Logbook #	HNF-N-701 2	End Time	1431

Pump start time 1402
Pump end time 1545
Picture ID F2TRANSECTS_02172011

Sample time 1430
Sample Number B2B000

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turb
Sample values	9.72	8.27	158	112.7	172.5	235
Surface Water	12.57	8.24	160	89.92	136.4	1.07

Comments/Observations @ 1844.4 River high 2 cond 2.2 m Recorder R Poulson

River Rising

~~Final~~	DO	ph	ORP	TDS	cond	Turb
Final	9.76	8.18	215	105.0	160.7	34.0
Composite	9.96	8.19	211	105.1	162.7	<1.6

Sample Collector Stevenson

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit 100F		Date 2-17-2011
Site ID F2 TRANSECT 5	F2 TRANSECT 5	Start Time 1430

Porewater Sampling Data

Time	Volume	Cond	Temp
1430	0	180	3.493
1445	100	177	3.466
1500	250	175	3.417
1515	350	172	3.409
1530	450	171	3.403
1545	~~450~~ 650	168	3.400

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100 F

TRIDENT GPS

Lat N 46.66042

Long W 119.43993

VESSEL GPS

Lat N 46.66040564

Long W 119.43990361

Accuracy (ft) 2.24

TIME Start 1100 (on station) End 1345

BOAT Boat 2

Porewater Sampling Method Frame 3 (Frame, Trident/Handheld, Release Point)

Station ID F1TRANSECT10

SURVEY DATE 2-18-2011

PROJECT PHASE 100F CHP

WATER DEPTH 8.6

BOTTOM TYPE

Surface sand cobble

Layer sand

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	12" BSB	12"
Temperature [C]	3.411	3.180
Conductivity [mS/cm]	158	137

Purge the volume of tubing prior to sample collection (circle one) YES ~~NO~~

Porewater Purge Pumping Data

ml	Cond	Temp
purge	147	3.146
0	147	3.078
30	158	3.222
60	158	3.367
90	158	3.388
120	158	3.418

File Information

CMA Computer # CMA5

Data file name (.dat)	Frame3_FAREA_02182011	Start Time	1136
Station gauge reading ~ 1.7		Averaging Time	1
Field Logbook # UNF-N-701 2		End Time	1137

Pump start time 1125

Pump end time 1250

Picture ID Frame3_F1TRANSECT10_2182011

Sample time 1145

Sample Number 62BDC4

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turb.
Sample values	9.70	7.65	262	99.02	151.4	17.4
Surface Water	12.108	8.02	257	90.61	137.3	11.10

Comments/Observations

Recorder R Poulsen

Sample Collector Zeke S

Frame @ 30° L

Now Guide on Frame - good performance

	Cond	T	ORP	pH	DO	Turb
Final	151.4	3.36	282	7.86	9.45	37.6

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit 100F		Date 2-18-2011
Site ID F1TRANSECT10		Start Time 1145

Porewater Sampling Data

Time	Volume	Cond	Temp
1145	0	157	3.392
1200	158	158	3.364
1215	300 ~~157~~	157	3.363
1230	450	157	3.367
1245	650	157	3.369

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100 F

TRIDENT GPS

Lat N 46.66042

Long W -119.43987

VESSEL GPS

Lat N 46.66041472

Long W 119.43985726

Accuracy (ft) 2.69

TIME Start 1400
(on station
End 1700

BOAT Boat 3

Porewater Sampling Method Frame 3
(Frame, Trident/Handheld, Release Point)

Station ID F2 TRANSECT 10

SURVEY DATE 02-18-2010

PROJECT PHASE 100F CPZ

WATER DEPTH 11.5

BOTTOM TYPE
Surface mud cobble
Layer hard

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	12" BB	12"
Temperature [C]	3.374	3.366
Conductivity [mS/cm]	160	138

Purge the volume of tubing prior to sample collection (circle one) YES NO

Porewater Purge Pumping Data

ml	Cond	Temp
purge	147	3.386
0	148	3.372
30	157	3.366
60	159	3.369
90	159	3.363
120	160	3.371

File Information

CMA Computer # CMA5

Data file name (.dat)	Frame 3_FAREA_02182011	Start Time	1400
Station gauge reading	1.4	Averaging Time	1
Field Logbook #	HNF-N-701 2	End Time	1441

Pump start time 1426
Pump end time 1630
Picture ID Frame 3_F2 TRANSECT 10_02182011

Sample time 1495

Sample Number B2BDD5

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turb
Sample values	9.47	7.85	272	100.2	154.8	395
Surface Water	12.31	8.12	270	89.88	136.7	1.60

Comments/Observations

Recorder K Parkin

Sample Collector Zeke S

	DO	ph	orp	TDS	cond	Turb
Final	10.22	8.11	266	100.5	153.6	172
Comp	10.03	8.04	278	101.3	157.3	144

slow 1.11 . 1.1

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit 100F		Date 2-18-2011
Site ID F2TRANSECT10		Start Time 1445

Porewater Sampling Data

Time	Volume	Cond	Temp
1445	0	161	3.373
1500	100	163	3.375
1515	200	165	3.358
1530	300	166	3.362
1545	400	166	3.355
1600	500	167	3.349
1615	600	167	3.339
1630	650	167	3.312

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100 F

TRIDENT GPS

Lat N 46.66055

Long W 119.44017

VESSEL GPS

Lat N 46.66054837

Long W 119.44015827

Accuracy (ft) 1.84

TIME (on station) Start 1130 End 1325

BOAT Boat 2

Porewater Sampling Method (Frame, Trident/Handheld, Release Point)

Station ID FZTRANSECT9

SURVEY DATE 2-22-2011

PROJECT PHASE FS 2011 Ch2

WATER DEPTH 10.1

BOTTOM TYPE

Surface Medium cobble

Layer bread

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	11.5	12
Temperature [C]	3.314	3.227
Conductivity [mS/cm]	159	134

Purge the volume of tubing prior to sample collection (circle one) YES ~~NO~~

Porewater Purge Pumping Data

pdcp: 268

ml	Cond	Temp
Purge	143	3.269
0	145	3.162
30	152	3.127
60	157	3.216
90	158	3.268
120	159	3.299

File Information

Data file name (.dat)	Frame3Farm-02222011	CMA Computer # 7	
		Start Time 1200	1204
Station gauge reading	1.2	Averaging Time	1
Field Logbook #	HNF-N-701 2	End Time	1205

Pump start time 1155

Pump end time 1325

Picture ID ~~HNF-N-701~~ FZ TRANSECT9_02222011

Sample time 1204

Sample Number B2BDD4

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turb
Sample values	10.14	8.04	241	98.71	152.1	953
Surface Water	12.35	8.06	246	69.24	137.0	3.50

Comments/Observations

Recorder R Paulson

Sample Collector Sherman

1311 pump reset

	DO	pH	ORP	TDS	cond	Turb
Final	9.56	7.80	251	102.4	158.0	558
composite	9.40	7.88	268	98.14	151.5	551

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit 100F		Date 2-22-2011
Site ID F2 TRANSECT 9		Start Time 1204

Porewater Sampling Data

Time	Volume	Cond	Temp
1204	0	159	3.314
1215	100	159	3.346
1230	250	158	3.191
1245	350	156	3.187
1300	450	158	3.191
1315	500	160	3.279
1330	550	162	3.324

stopped sample 10 min

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100F

TRIDENT GPS

Lat N 46.66053

Long W 119.44020

VESSEL GPS

Lat N 46.66053180

Long W 119.44020319

Accuracy (ft) 2.64

PDOP 4.87

TIME Start 1445
(on station
End

BOAT Boat 2

Porewater Sampling Method Frame 3
(Frame, Trident/Handheld, Release Point)

Station ID F1TRANSECT9

SURVEY DATE 2-22-2011

PROJECT PHASE Feb 2011 Chr

WATER DEPTH 6.9

BOTTOM TYPE
Surface sand cobble
Layer

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	12	12
Temperature [C]	3.449	3.449
Conductivity [mS/cm]	165	135

Purge the volume of tubing prior to sample collection (circle one) YES NO

Porewater Purge Pumping Data

ml	Cond	Temp
Purge 149		
0	150	3.377
30	157	3.402
60	161	3.498
90	162	3.521
120	165	3.476

File Information

CMA Computer # 7

Data file name (.dat)	Frame3 F1tran_02222011	Start Time	1526
Station gauge reading	1.3	Averaging Time	1
Field Logbook #	HNF-N-7012	End Time	1527

Pump start time 1521
Pump end time 1620
Picture ID

F1TRANSECT9_02222011

Sample time 1525

Sample Number ~~B2BD3~~ B2BDC3

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turb
Sample values	8.56	8.16	210	102.4	157.9	2.65
Surface Water	12.78	8.22	220	88.59	136.3	9.73

Comments/Observations

Recorder [illegible]

Sample Collector Shawn Johnson

	DO	pH	ORP	TDS	cond	Turb
Final	10.70	7.73	236	94.27	144.4	9.60
Composite	10.99	7.77	226	92.12	144.7	2.1

Note 5.1H in screen + ICS

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		02/22/2011 25 03/08/2011
Operable Unit 100 F		Date 02-20-2011
Site ID FITRANSECT9		Start Time 1525

Porewater Sampling Data

Time	Volume	Cond	Temp
0			
1525	0	165	3.476
1545	150	168	3.358
1600	300	170	3.359
1615	650	172	3.372

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100F

TRIDENT GPS

Lat N 46.66092

Long W 119.44092

VESSEL GPS

Lat N 46.66091638

Long W 119.44090495

Accuracy (ft) 1.72

PDOP 1.92

TIME (on station) Start 1000 End 1200

BOAT Boat 2

Porewater Sampling Method Frame 3 (Frame, Trident/Handheld, Release Point)

Station ID FITRANSECT7

SURVEY DATE 2-23-2011

PROJECT PHASE Fall CM2

WATER DEPTH ~~4.8"~~ 6.4

BOTTOM TYPE

Surface medium cobble

Layer bed

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	12"	12"
Temperature [C]	3.105	2.960
Conductivity [mS/cm]	162	133

Purge the volume of tubing prior to sample collection (circle one) YES NO

Porewater Purge Pumping Data

ml	Cond	Temp
purge 139		
0	141	~~3.040~~
30	148	~~3.079~~
60	149	~~3.215~~
90	~~150~~	3.281
	No more outward	
purge 143		
0	144	2.862
30	152	2.870
60	160	2.975
90	161	3.051
120	162	3.082

File Information

Data file name (.dat)	Frame 3 FHen 02232011	CMA Computer # 7	
		Start Time	1057
Station gauge reading	.4 .6 end	Averaging Time	1
Field Logbook #	HNF 701 2	End Time	1058

Pump start time 1030

Pump end time 1150

Picture ID FITRANSECT7_02232011

Sample time 1100

Sample Number B2BDC1

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turb
Sample values	8.33	7.90	254	107.0	163.3	148
Surface Water	12.35	8.25	289	91.98	140.3	2.56

Comments/Observations

Recorder R. Poulsen

Sample Collector Shannon Johnson

	DO	pH	ORP	TDS	cond	Turb
Final	8.11	7.64	215	106.0	161.6	10.67
Composite	9.10	7.51	188	[illegible]	[illegible]	[illegible]

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit 100F		Date 2-23-2011
Site ID FITRANSECT7		Start Time 1100

Porewater Sampling Data

Time	Volume	Cond	Temp	
1100	0	162	3.123	
1115	150	166	3.156	161
1130	350	167	3.162	
1145	650	166	3.151	

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100F

TRIDENT GPS

Lat N 46.66093

Long W 119.44083

VESSEL GPS

Lat N 46.66093728

Long W 119.44082802

Accuracy (ft) 1.48

Prop 1.61

TIME (on station) Start 1222 End 1400

BOAT Boat 12

Porewater Sampling Method Frame 3 (Frame, Trident/Handheld, Release Point)

Station ID F2TRANSECT 7

SURVEY DATE 2-23-2011

PROJECT PHASE Fall 2011 Ch2

WATER DEPTH 10.9

BOTTOM TYPE

Surface Medium Cobble

Layer hard

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	~12"	12"
Temperature [C]	3.289	3.055
Conductivity [mS/cm]	153	133

Purge the volume of tubing prior to sample collection (circle one) YES NO

Porewater Purge Pumping Data

ml	Cond	Temp
Purge	137	
0	139	3.095
30	151	3.141
60	151	3.182
90	152	3.216
120	153	3.240

File Information

CMA Computer # 6

Data file name (.dat)	Frame3Fall2011-02232011	Start Time	1244
Station gauge reading	0.6 0.6 end	Averaging Time	1
Field Logbook #	HNF-701 2	End Time	1245

Pump start time 1240

Pump end time 1330

Picture ID F2TRANSECT7_02232011

Sample time 1245

Sample Number B2BDD2

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turb
Sample values	10.08	8.03	252	98.43	149.9	4.12
Surface Water	12.68	8.01	242	91.32	139.8	2.02

Comments/Observations

Recorder [illegible]

Sample Collector Jason Johnson

	DO	pH	orp	TDS	Turb	Cond
Final	10.37	8.10	249	98.57	26.3	150.8
Composite	10.68	8.10	216	[illegible]	22.	[illegible]

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit 100F		Date 2-23-2011
Site ID F2TRANSECT7		Start Time 1245

Porewater Sampling Data

Time	Volume	Cond	Temp	
1245	0	153	3.290	
1300	150	155	3.263	1145
1315	350	156	3.279	
1330	650	156	3.255	

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100 F

TRIDENT GPS

Lat N 46.66080

Long W 119.44060

VESSEL GPS

Lat N 46.66080088

Long W 119.44058042

Accuracy (ft) 1.96

POOP 1.78

TIME (on station) Start 1415 End 1600

BOAT Boat 2

Porewater Sampling Method Frame 3
(Frame, Trident/Handheld, Release Point)

Station ID F2TRANSECT8

SURVEY DATE 2-23-2011

PROJECT PHASE Feb 2011 CH2

WATER DEPTH 10.5 RP 11.5

BOTTOM TYPE
Surface medium cobble
Layer hard

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	-12"	12"
Temperature [C]	3.436	3.153
Conductivity [mS/cm]	155	134

Purge the volume of tubing prior to sample collection (circle one) YES NO

Porewater Purge Pumping Data

ml	Cond	Temp
Purge 137		
0	140	3.317
30	146	3.333
60	153	3.423
90	155	3.425
120	156	3.444

File Information

CMA Computer # 6

Data file name (.dat)	Frame 3 Farm_02232011	Start Time	1426
Station gauge reading	0.6 0.7 end	Averaging Time	1
Field Logbook #	HNF-701 2	End Time	1427

Pump start time 1420
Pump end time 1525
Picture ID F2TRANSECT8_02232011

Sample time 1430

Sample Number B2BD03

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turb
Sample values	10.29	8.12	247	99.29	151.7	516
Surface Water	12.57	8.12	243	90.16	137.6	2.73

Comments/Observations

Recorder R Paulsen

Sample Collector Shannon Johnson

	DO	ph	orp	TDS	cond	Turb
Final	10.14	8.18	237	96.09	147.5	21.6
Composite	10.54	8.20	[illegible]	[illegible]	[illegible]	[illegible]

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit 100F		Date 02-23-2011
Site ID F2 TRANSECT 8		Start Time 1430

Porewater Sampling Data

Time	Volume	Cond	Temp
1430	0	156	3.440
1445	150	158	3.436
1500	~~159~~ 450	159	3.418
1515	550	159	3.347
1525	650	159	3.360

151

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100F

TRIDENT GPS

Lat N 46.66075

Long W 119.44072

VESSEL GPS

Lat N 46.66074952

Long W 119.44067572

Accuracy (ft) 1.67

Prop 2.10

TIME (on station) Start 10 06 End 11 10

BOAT Boat 2

Porewater Sampling Method Frame 3 (Frame, Trident/Handheld, Release Point)

Station ID FITRANSECT8

SURVEY DATE 02-25-2011

PROJECT PHASE Feb 2011 Ch2

WATER DEPTH 5.0

BOTTOM TYPE

Surface medium cobble

Layer bed

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	12"	12"
Temperature [C]	2.793	2.459
Conductivity [mS/cm]	157	132

Purge the volume of tubing prior to sample collection (circle one) YES NO

Porewater Purge Pumping Data

ml	Cond	Temp
Purge	143	
0	144	2.356
30	152	2.371
60	156	2.644
90	156	2.767
120	158	2.823

File Information

CMA Computer # 7

Data file name (.dat)	Frame3FAll_02252011	Start Time	1017
Station gauge reading	0.7	Averaging Time	1
Field Logbook #	HNF-701-2	End Time	1018

Pump start time 1010

Pump end time

Picture ID FITRANSECT8_02252011

Sample time 1020

Sample Number B2B2DC2

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turb
Sample values	8.43	7.71	248	117.3	177.6	203
Surface Water	12.94	7.84	277	98.62	148.7	2.96

Comments/Observations 6°C - cold lines freezing

Recorder [illegible]

Sample Collector Zeke

	DO	pH	ORP	TDS	cond	Turb
Final	8.76	7.97	243	98.76	149.9	9.80
Composite	9.60	8.04	[illegible]	[illegible]	[illegible]	[illegible]

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit 100F		Date 02252011
Site ID FLTRANSECT E		Start Time 1020

Porewater Sampling Data

Time	Volume	Cond	Temp
1020	~~158~~ 150	158	2.813
1035	200	159	2.817
1045	400	159	2.847
1100	650	160	2.856

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100 F

TRIDENT GPS

Lat N 46.66120

Long W 119.44115

VESSEL GPS

Lat N 46.66102397

Long W 119.44112121

Accuracy (ft) 1.84

PDOP 1.92

TIME (on station) Start 1125 End 1255

BOAT Boat 2

Porewater Sampling Method Frame 3
(Frame, Trident/Handheld, Release Point)

Station ID FITRANSECT6

SURVEY DATE 02 25 2011

PROJECT PHASE Feb 2011 CH2

WATER DEPTH 6.5

BOTTOM TYPE
Surface medium cobble
Layer hard

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	11"	12
Temperature [C]	2.926	2.580
Conductivity [mS/cm]	157	132

Purge the volume of tubing prior to sample collection (circle one) YES NO

Porewater Purge Pumping Data

ml	Cond	Temp
Purge	144	
0	145	2.522
30	154	2.692
60	156	2.792
90	157	2.901
120	157	2.975

File Information

CMA Computer # 7

Data file name (.dat)	Frame 3 FA Icu-02252011	Start Time	1150
Station gauge reading	0.7 0.8 end	Averaging Time	1
Field Logbook #	HNF-N-701-2	End Time	1151

Pump start time 1145
Pump end time 1240
Picture ID FITRANSECT6_02252011

Sample time 1150

Sample Number B2BDC0

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	
Sample values	9.58	8.07	245	101.3	151.8	Turb 473
Surface Water	13.19	8.25	229	89.11	134.0	5.55

Comments/Observations

Recorder R Kaufman

Sample Collector Zeke

	DO	pH	ORP	TDS	COND	TURB
Final	9.12	8.01	276	103.4	155.4	24.4
Composite	10.57	8.04	290	105.	157.0	0.1

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit 100F		Date 02252011
Site ID FITRANSECT6		Start Time 1150

Porewater Sampling Data

Time	Volume	Cond	Temp
1150	0	157	2.932
1200	100	160	3.019
1215	300	163	3.000
1230	550	164	2.931
1240	650	164	2.932

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100F

TRIDENT GPS

Lat N 46.66103

Long W 119.44108

VESSEL GPS

Lat N 46.66103273

Long W 119.44107904

Accuracy (ft) 3.75

PDOP 4.87

TIME (on station) Start 1330 End 1600

BOAT Boat 2

Porewater Sampling Method Frame 3
(Frame, Trident/Handheld, Release Point)

Station ID F2 TRANSECT 6

SURVEY DATE 2-25-2011

PROJECT PHASE F-6 2011 CH2

WATER DEPTH ~~11.3~~ 11.7

BOTTOM TYPE

Surface medium cobble

Layer 1 hard

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	-12"	12"
Temperature [C]	2.909	2.688
Conductivity [mS/cm]	151	133

Purge the volume of tubing prior to sample collection (circle one) YES NO

Porewater Purge Pumping Data

ml	Cond	Temp
purge	141	
0	145	2.816
30	154	2.850
60	153	2.881
90	152	2.900
120	151	2.906

File Information

CMA Computer # 7

Data file name (.dat)	Frame 3 FAm-02252011	Start Time	1404
Station gauge reading	0.90 1.0 end	Averaging Time	1
Field Logbook #	HNF-IN-701 2	End Time	1405

Pump start time 1352

Pump end time 1540

Picture ID F2TRANSECT6-02252011

Sample time 1407

Sample Number B2BD01

DO & Ultrameter

	DO	pH @ 33	ORP	TDS	Conductivity	
Sample values	9.75	~~8.22~~	263	156.1	149.5	Turb 796
Surface Water	13.14	8.37	274	91.72	137.4	5.62

Comments/Observations 10" very cold instruments issues

Recorder K Poulsen

Sample Collector Zeke

	DO	pH	ORP	TDS	Cond	TURB
Final	11.33	pH 8.22 ~~7.52~~	245	93.49	139.2	22.9
Composite	11.27	8.21	7.41	00.in	1111	0-1

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit 100F		Date 02-25-2011
Site ID F2TRANSECT6		Start Time 1407

Porewater Sampling Data

Time	Volume	Cond	Temp
1407	0	151	2.914
1415	50	150	2.873
1430	100	150	2.811
1445	200	150	2.783
1500	300	151	2.776
1515	400	150	2.762
1530	500	150	2.757
1540	650	149	2.752

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100F

TRIDENT GPS

Lat N 46. 66128

Long W 119 44162

VESSEL GPS

Lat N 46.

Long W 119.

Accuracy (ft)

TIME Start 1020
(on station
End

BOAT Boat2

Porewater Sampling Method Flame 3
(Frame, Trident/Handheld, Release Point)

Station ID F1TRANSECT4

SURVEY DATE 2-27-2011

PROJECT PHASE Feb2011 CH2

WATER DEPTH 8.1

BOTTOM TYPE
Surface medium cobble
Layer

N.S.

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	12"	12"
Temperature [C]		
Conductivity [mS/cm]		

Purge the volume of tubing prior to sample collection (circle one) YES NO

Porewater Purge Pumping Data

ml	Cond	Temp
	purge 139	
0	141	3.458
30	145	3.233
60	148	2.774
90	148	2.639
	Low Signal	AG
	purge 143	
0	144	2.294
30	148	2.299
60	157	2.366
90		

157

File Information

CMA Computer # 7

Data file name (.dat)	Frame 3 F1 Rep	Start Time	
Station gauge reading		Averaging Time	
Field Logbook #		End Time	

Pump start time ~~1028~~ 1105
Pump end time
Picture ID

Sample time
Sample Number

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity
Sample values					
Surface Water					

Comments/Observations

Recorder R Paulsen

Sample Collector Zeke

Low Signal Site Abandon
Re Anchor

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100F

TRIDENT GPS

Lat N 46.66127

Long W 119.44165

VESSEL GPS

Lat N 46.66128029

Long W 119.44162281

Accuracy (ft) 1.73

PROP 208

TIME Start 1020
(on station
End 1245

BOAT Boat 2

Porewater Sampling Method Frame 3
(Frame, Trident/Handheld, Release Point)

Station ID F1TRANSECT4

SURVEY DATE 2-27-2011

PROJECT PHASE Feb 2011 CH2

WATER DEPTH 7.1

BOTTOM TYPE

Surface medium cobble

Layer

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	12"	12"
Temperature [C]	2.502	2.343
Conductivity [mS/cm]	166	132

Purge the volume of tubing prior to sample collection (circle one) YES NO

Porewater Purge Pumping Data

min	Cond	Temp
purge	143	
0	144	2.294
30	148	2.299
60	157	2.366
90	162	2.422

File Information

CMA Computer # 7

Data file name (.dat)	Frame3 FA 02272011	Start Time	1112
Station gauge reading	1.1 0.9 end	Averaging Time	1
Field Logbook #	HNF-N-701 2	End Time	1113

Pump start time 1107

Pump end time 1240

Picture ID $FITRANSECT4_02272011

Sample time 1111

Sample Number B2BDB6

B2BDC9

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	
Sample values	9.66	7.68	273	106.6	160.7	Turb 407
Surface Water	12.87	7.80	275	90.06	136.1	6.14

Comments/Observations SPLIT Sample Site

Recorder [illegible]

Sample Collector Zeke

	DO	pH	ORP	TDS	Cond	Turb
Final	8.46	7.88	238	106.6	161.3	7.68
Composite	9.51	7.67	227	[illegible]	167.0	402

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit 100 F	spill sample site	Date 02-27-2011
Site ID FITRANSECT 4		Start Time 1111

Porewater Sampling Data

Time	Volume	Cond	Temp
1111	0	166	2.433
1130	200	171	2.616
1145	400	172	2.638
1155	650	171	2.648
1215	850	171	2.666
1230	1150	170	2.672
1240	1300	170	2.662

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Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100F

TRIDENT GPS

Lat N 46. 66135

Long W 119. 44160

VESSEL GPS

Lat N 46. 66136025

Long W 119. 4415626

Accuracy (ft) 2.26

POOP 247

TIME Start 1315 (on station) End 1420

BOAT Boat 2

Porewater Sampling Method Frame 3 (Frame, Trident/Handheld, Release Point)

Station ID F2TRANSECT4

SURVEY DATE 2-27-2011

PROJECT PHASE Feb 2011 CH2

WATER DEPTH 11.4

BOTTOM TYPE

Surface Medium Cobble

Layer 1 Hard

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	12"	12"
Temperature [C]	2.806	2.485
Conductivity [mS/cm]	155	132

Purge the volume of tubing prior to sample collection (circle one) YES NO

Porewater Purge Pumping Data

ml	Cond	Temp
Purge 139		
0	142	2.713
30	152	2.690
60	154	2.710
90	154	2.742

146

File Information

CMA Computer # 7

Data file name {.dat}	Frame3FAlgn_02272011	Start Time	1330
Station gauge reading	0.9	Averaging Time	1
Field Logbook #	HNFN-701 2	End Time	1331

Pump start time 1320

Pump end time 1410

Picture ID G F2TRANSECT4_02272011

Sample time 1330

Sample Number B2BDC8

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turb
Sample values	10.26	7.85	260	97.00	148.4	749
Surface Water	12.70	8.07	262	90.66	137.9	456

Comments/Observations windy

Recorder R Poulsen

Sample Collector Zeke

	DO	pH	ORP	TDS	Cond	Turb
Final	9.73	7.99	263	97.94	149.2	48.5
Composite	9.92	8.06	260	[illegible]	[illegible]	195

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit 100F		Date 2-27-2011
Site ID F2 TRANSECT 4		Start Time 1330

Porewater Sampling Data

Time	Volume	Cond	Temp
1330 ~~0~~ cc	0 ~~154~~ cc	154	2.742
1345	250	156	2.845
1400	550	157	2.877
1410	650	157	2.884

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100F

TRIDENT GPS

Lat N 46.66137

Long W 119.44183

VESSEL GPS

Lat N 46.66139250

Long W 119.44181295

Accuracy (ft) 1.96

PDOP 1.78

TIME Start 1430
(on station
End 1545

BOAT Boat 2

Porewater Sampling Method Frame 3
(Frame, Trident/Handheld, Release Point)

Station ID FITRANSECT 3

SURVEY DATE 2-27-2011

PROJECT PHASE Feb 2011 CH2

WATER DEPTH 4.2

BOTTOM TYPE
Surface medium cobble
Layer hard

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	-12"	12"
Temperature [C]	2.929	2.631
Conductivity [mS/cm]	158	132

Purge the volume of tubing prior to sample collection (circle one) YES ~~NO~~

Porewater Purge Pumping Data

ml	Cond	Temp
purge 135		
0	135	3.025
30	149	2.949
60	151	2.936
90	154	2.913
120	155	2.913

File Information

CMA Computer # 7

Data file name (.dat)	Frame 3 FAra_02272011	Start Time	1450
Station gauge reading	0.80 +0.80 end	Averaging Time	1
Field Logbook #	HNF-N-701 2	End Time	1451

Pump start time 1442
Pump end time 1530
Picture ID FITRANSECT3.02272011

Sample time 1450

Sample Number B2B0Q5

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turb
Sample values	9.49	7.81	268	99.59	151.0	575
Surface Water	13.04	7.94	267	91.06	137.3	13.90

Comments/Observations near cement spillway

Recorder R Paulsen

Sample Collector Zeke S

	DO	pH	ORP	TDS	cond	Turb
Final	8.74	7.60	253	100.1	152.5	22.0
Composite	9.36	7.94	268	[illegible]	[illegible]	[illegible]

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit 100F		Date 02-27-2011
Site ID F1TRANSECT3		Start Time 1450

Porewater Sampling Data

Time	Volume	Cond	Temp
1450	0	158	2.898
1500	150	159	2.933
1515	400 ~~158~~	158	2.936
1530	650	158	2.929

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100F

TRIDENT GPS

Lat N 46.66175

Long W 119.44258

VESSEL GPS

Lat N 46.66177271

Long W 119.44255764

Accuracy (ft) 1.71

Post 2DS

TIME (on station) Start 1015 End 1240

BOAT Boat 2

Porewater Sampling Method FRAME 3
(Frame, Trident/Handheld, Release Point)

Station ID F1TRANSECT1

SURVEY DATE 2-28-2011

PROJECT PHASE F-62011 CM2

WATER DEPTH 6.7

BOTTOM TYPE
Surface medium cobble
Layer hard

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	-12"	12"
Temperature [C]	2.838	2.563
Conductivity [mS/cm]	164	133

Purge the volume of tubing prior to sample collection (circle one) YES NO

Porewater Purge Pumping Data

	ml	Cond	Temp	
	Purge 141			
	0	143	2.710	
1	30	152	2.661	
2	60	154	2.582	144
	90	154	2.611	146
	Purge 1115			
	0	145	2.504	
	30	152	2.546	
	60	158	2.693	1537
	90	161	2.788	

File Information

CMA Computer # 7

Data file name (.dat)	FRAME3FAREA_02282011	Start Time	1015
Station gauge reading	1.0 0.80 end	Averaging Time	1
Field Logbook #	HNF-N-701 2	End Time	1016

Pump start time 1015
Pump end time 1225
Picture ID F1TRANSECT1_02282011

Sample time 1045

Sample Number B2RDB3
B2C6J9

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turb
Sample values	7.30	7.34	220	104.7	157.4	150
Surface Water	12.98	7.75	310	93.41	139.9	10.90

Comments/Observations 200 SMT SAMPLE SITE 2000 ml collected

Recorder R Poulson

Sample Collector Zeke S

	DO	pH	ORP	TDS	COND	TURB
Final	5.61	7.58	290	105.0	158.8	1.54
Control	9.07	[illegible]	287	106.0	111.7	[illegible]

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit 100F		Date 2-28-2011
Site ID FLTRANSECT1	split #2	Start Time 1045

Porewater Sampling Data

	Time	Volume	Cond	Temp	
	1045	0	164	2.838	
	1100	200	166	2.848	156.3
	1115	400	166	2.833	
	1130	800	166	2.832	
B1	1140	1000	165	2.819	
	1200	1400	166	2.815	
	1215	1700	166	2.809	
	1225	2000	166	2.810	

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100E

TRIDENT GPS

Lat N 46.66145

Long W 119.44175

VESSEL GPS

Lat N 46.66144837

Long W 119.44176214

Accuracy (ft) 2.08

Poor 2.30

TIME (on station) Start 1255 End 1525

BOAT Boat 2

Porewater Sampling Method FRAME 3
(Frame, Trident/Handheld, Release Point)

Station ID F2TRANSECT3

SURVEY DATE 2-28-2011

PROJECT PHASE FE62011 CH2

WATER DEPTH 10.0

BOTTOM TYPE

Surface Mud cobble

Layer clay?

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	12"	12"
Temperature [C]	2.731	2.607
Conductivity [mS/cm]	183	133

Purge the volume of tubing prior to sample collection (circle one) YES NO

Porewater Purge Pumping Data

ml	Cond	Temp
	purge 144	
0	144	2.648
30	144	2.608
60	152	2.591
90	170	2.639
120	178	2.691

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File Information

CMA Computer # 7

Data file name (.dat)	FRAME3FAREA_02282011	Start Time	1320
Station gauge reading	0.80	Averaging Time	1
Field Logbook #	HNF-N-701 2	End Time	1321

Pump start time 1300

Pump end time 1510

Picture ID F2TRANSECT3-02282011

Sample time 1315

Sample Number B2BDC7

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turb
Sample values	8.44	8.04	280	119	180.6	521
Surface Water	12.87	7.95	277	92.23	138.6	6.68

Comments/Observations

Recorder R Fulton

Sample Collector Zak S.

	DO	pH	ORP	TDS	Cond	Turb
Final	6.79	8.52	237	114.5	173.2	120
Compleil	7.911	[illegible]	225	186.19	[illegible]	[illegible]

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit 100 F		Date 2-28-2011
Site ID F2 TRANSECT 3		Start Time 1315

Porewater Sampling Data

Time	Volume	Cond	Temp
1315	0	183	2.730
1330	100	183	2.739
1345	200	181	2.756
1400	250	179	2.764
1415	300	179	2.765
1430	400	178	2.766
1445	500	175	2.766
1500	600	174	2.765
1505	650	173	2.746

1505

Porewater Sampling Data

Time	Volume	Cond	Temp

COASTAL MONITORING ASSOCIATES POREWATER FIELD LOG SHEET

SITE: Hanford, Washington

OPERABLE UNIT 100 F

TRIDENT GPS

Lat N 46.66182

Long W 119.44258

VESSEL GPS

Lat N 46.66181864

Long W 119.44256410

Accuracy (ft) 2.63

PDOP 2.91

TIME (on station) Start 1530 End 1710

BOAT Boat 2

Porewater Sampling Method Frame 3
(Frame, Trident/Handheld, Release Point)

Station ID F2TRANSECT1

SURVEY DATE 2-28-2011

PROJECT PHASE Feb 2011 CH2

WATER DEPTH 10.2

BOTTOM TYPE
Surface Medium Cobble
Layer U-hard

Survey Data Table

	TRIDENT PROBE	REFERENCE PROBE
Sensor Depth [in]	-12"	12"
Temperature [C]	2.982	2.678
Conductivity [mS/cm]	163	133

Purge the volume of tubing prior to sample collection (circle one) YES NO

Porewater Purge Pumping Data

ml	Cond	Temp
purge 139		
0	144	2.595
30	150	2.609
60	162	2.887
90	161	2.948
120	162	2.969

File Information

CMA Computer # 7

Data file name {.dat}	Frame3FAro_02282011	Start Time	1612
Station gauge reading	0-80	Averaging Time	1
Field Logbook #	HNF-701 2	End Time	1613

Pump start time 1600
Pump end time 1655
Picture ID F2TRANSECT1_02282011

Sample time 1610

Sample Number B2BDC5

DO & Ultrameter

	DO	pH	ORP	TDS	Conductivity	Turb
Sample values	9.72	8.10	243	103.7	156.6	658
Surface Water	12.40	8.25	247	90.02	135.8	5.58

Comments/Observations

Recorder R Paulsen

Sample Collector Zeke S.

	DO	pH	ORP	TDS	cond	Turb
Final	7.39	8.09	269	109.2	164.3	29.9
composite	8.91	8.11	269	100.[illegible]	112.[illegible]	0.[illegible]

Coastal Monitoring Assosciates Porewater Sampling Sheet		page 2
Hanford Site		
Operable Unit 100F		Date 02-28-2011
Site ID F2TRANSECT1		Start Time 1610

Porewater Sampling Data

Time	Volume	Cond	Temp
1610	0	162	2.972
1630	200	165	2.969
1645	500	171	2.941
1650	650	172	2.930

Porewater Sampling Data

Time	Volume	Cond	Temp

Appendix E

Trident System Field Record Log Sheets

36

Book No. HNF-N-7012

Title: PORE WATER SAMPLING

Project No. 41274/216575

Project Task No. NA

Friday 02/04/2011 Zeke Simmons (EAS) Zeke Simmons - Technician, Niel Sullivan (EAS) - vessel Captain, Chris Smith (CMA) - Lead, Mark Biser (CMA) - Technician to be on EAS vessel 2 participating in Survey (data mapping) activities.
07:30 hrs: Tailgate meeting (POD) held at Apel. Discussed perpendicular transect surveys intersecting with F1 TRANSECT & F2 TRANSECT. Discussed using PPE (ie hard hats).
Decon per SAI at 07:45 hrs

Logbook entries beginning on this page and continuing from page 36 to 100 planned to document all field activity records pertinent to the following SAPs, in support of measuring and collecting samples of pore water: - SAP for the 100-FR-1, 100-FR-2, 100 FR-3, 100-IU-2, and 100-IU-6 Operable Units Remedial Investigation/Feasibility Study, DOE/RL-2009-43, Rev. 0

Zeke Simmons

CHPRC 2011 100F — Date: 2-4-11

Trident Probe Conductivity Calibration Check					
Standard	Mfr.	Lot #	Expiration Date	Porewater Probe	Surface Probe
99.9 uS	Cole Parmer	CC8596	09/03/11	103	105
447	Oakton	205259	05/31/11	455	435

Myron L Ultrameter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
pH*	7	Myron L Company	1001397 EB	09/09/11	7.01
	4	Myron L Company	2003077 JM	08/03/11	4.10
Cond. (uS)	99.9	Cole Parmer	CC8596	09/03/11	101.1
	447	Oakton	205259	05/31/11	451

*ORP is calibrated using results of pH cal. Check

YSI Dissolved Oxygen Meter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
D.O.	Zero	Hanna	1427	March of 2014	0.08

OAKTON Turbitity Meter Calibration Check: SN 623329					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
Turbidity(NTU)	0.02	OAKTON	470/1	9/30/2011	0.00
Turbidity(NTU)	20	OAKTON	470/1	9/30/2011	19.09
Turbidity(NTU)	100	OAKTON	470/1	9/30/2011	95.8
Turbidity(NTU)	800	OAKTON	470/1	9/30/2011	750

DI Water from Apel Lab 151/153			
Property of	Mfr.	Model	megohm-cm
Applied Process Engineering Laboratory	Barnstead	E-Pure	16.0

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Zeke Simmons	02/04/2011	Anna Marie Radloff	30 MARCH 2011

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PORE WATER SAMPLING 4/274/216575

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River Flow: (Priest Rapids Dam)

Time	KCFS
0100	181
0200	171
0300	171
0400	171
0500	171
0600	171
0700	171
0800	171
0900	164
1000	139

Weather: Mostly sunny w/ partial clouds. Slight breeze with mild temperatures ranging from ~35°F (AM) - 50°F.

ZS 02/04/2011

F3TRANSECTØ Survey Start Time 12:15 hrs.
Coordinates: -119.44222063 46.66158836 Accuracy 1.84 ft.
Depth at Station: 6.5 ft. Probe Tip Depth: 11 inches BSG
Substrate: Small/Medium cobble
Surfacewater Readings from Trident Reference Probe
Conductivity: 141 uS/cm Temperature: 2.913 C°
Porewater Readings from Trident Probe BSG
Conductivity: 157 uS/cm Temp.: 3.053 C°

ml	Cond. (uS/cm)	Temp. (C°)
0	137	3.973
30	153	3.764
60	157	3.388
90	158	3.156
120	158	3.110
150	157	3.053

ZS 02/04/2011

To Page No. 38

SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Pete Simonson	02/04/2011	Anna M Radloff	03/30/2011

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4/274/216575

PORE WATER SAMPLING

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F3TRANSECT-1 Survey Start Time 12:35 hrs.
Coordinates: -119.44219228 46.66155021 Accuracy 1.82 ft
Depth at Station: 3.6 ft Probe Tip Depth: 12 inches BSG
Substrate: Small/Medium Cobble
Surfacewater Readings from Trident Reference Probe
Cond.: 140 uS/cm Temp.: 2.911 C°
Porewater Readings from Trident Probe BSG
Cond.: 147 uS/cm Temp: 3.201 C°

ZS 02/04/2011

ml	Cond (uS/cm)	Temp (C°)
0	149	2.944
30	150	2.969
60	149	3.105
90	148	3.153
120	148	3.176
150	147	3.201

ZS 02/04/2011

F3TRANSECT 3 Survey Start Time 13:21 hrs.
Coordinates: -119.44215613 46.66166114 Accuracy 1.93 ft
Depth at Station: 14.3 ft Probe Tip Depth: 12 inches BSG
Substrate: Small/Medium Cobble
Surfacewater Readings from Trident Reference Probe
Cond.: 140 uS/cm Temp.: 2.944
Porewater Readings from Trident Probe BSG
Cond.: 182 uS/cm Temp.: 3.384 C°

ml	Cond (uS/cm)	Temp (C°)
0	149	3.067
30	163	3.092
60	173	3.217
90	176	3.290
120	177	3.322
150	182	3.384

02/04/2011

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Zac Simmons 02/04/2011 Erica Van Radcliff 03/30/2011

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PORE WATER SAMPLING 41214/216575

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F3TRANSECT2 Survey Start Time 13:53 hrs.
Coordinates: -119.44218079 46.66164065 Accuracy 1.52 ft.
Depth at Station: 11.5 ft Probe Tip Depth: 12 inches BSG
Substrate: Small/Medium Cobble
Surfacewater Readings from Trident Reference Probe
Cond: 140 uS/cm Temp.: 2.955 C°
Porewater Readings from Trident Probe BSG
Cond.: 173 uS/cm Temp.: 3.625 C°

ZS 02/04/2011

ml	Cond (uS/cm)	Temp (c°)
0	149	2.960
30	158	3.019
60	169	3.354
90	NA	NA
120	173	3.583
150	173	3.625

ZS 02/04/2011

F3TRANSECT1 Survey Start Time 14:15 hrs
Coordinates: -119.44220481 46.66163173 Accuracy 1.48 ft.
Depth at Station: 9.1 ft. Probe Tip Depth: 12 inches BSG
Substrate: Small/Medium Cobble
Surfacewater Readings from Trident Reference Probe
Cond.: 141 uS/cm Temp.: 2.972 C°
Porewater Readings from Trident Probe BSG
Cond.: 157 uS/cm Temp.: 3.417 C°

ml	Cond (uS/cm)	Temp (c°)
0	150	3.029
30	153	3.137
60	155	3.293
90	156	3.371
120	157	3.397
150	157	3.417

ZS 02/04/2011

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Zeke Simmons	02/04/2011	Anna Umkadloff	03/30/2011

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4/274/216575

PORE WATER SAMPLING

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F3TRANSECT4 Survey Start Time 14:46 hrs.
zs 02/04/2011 ~~Coordinates~~ Coordinates: -119.44211464 46.66171626 Accuracy 3.65 ft.
Depth at Station: 19.5 ft Probe Tip Depth: 12 inches BSG
Substrate: Small/Medium Cobble
Surfacewater Readings from Trident Reference Probe
Cond.: 140 uS/cm Temp.: 2.984 C°
Porewater Readings from Trident Probe BSG
Cond.: 155 uS/cm Temp.: 3.485 C°

zs 02/04/2011

ml	Cond(uS/cm)	Temp.(C°)
0	150	2.986
30	155	3.151
60	155	3.260
90	156	3.356
120	155	3.436
150	155	3.485

zs 02/04/2011

T100F2A Survey Start Time 15:21 hrs.
Coordinates: -119.44220188 46.66166129 Accuracy 2.52 ft
Depth at Station: 11.8 ft. Probe Tip Depth: 12 inches BSG
Substrate: Small/Medium Cobble
Surfacewater Readings from Trident Reference Probe
Cond.: 140 uS/cm Temp.: 3.003 C°
Porewater Readings from Trident Probe BSG
Cond.: 178 uS/cm Temp.: 3.780

zs 02/04/2011

ml	Cond(uS/cm)	Temp.(C°)	
0	150	3.124	
30	171	3.500	
60	173	3.666	
90	175	3.742	
120	176	3.773	
150	177	3.780	1600 hrs: decon in field per SAI
180	177	3.781	
210	178	3.780	

NA

SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
[signature]	02/04/2011	[signature]	03/30/2011

PORE WATER SAMPLING

HNF-N-7012
41274/216575

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NA

Saturday, 02/05/2011 Zeke Simmons (EAS) Zeke Simmons - Technician/ ~~Niel Sullivan~~ ZS 02/05/11 Pilot boat Captain, Adam Predmore(EAS) Technician/ Pilot boat deckhand to be on EAS vessel 1.

Niel Sullivan (EAS) - Vessel 2 captain, Chris Smith (CMA) - Lead, Mark Biser (CMA) - Technician to be on EAS Vessel 2. ZS 02/04/2011

09:00 hrs: Decon per SAI.

09:45 hrs: Tailgate meeting (PoD) held at Apel. Discussed plan to install equipment at QC Station to collect continuous survey data over a period of ~24 hours. This QC Station will be at/near T100F2A.

River Flow:

Time	KCFS
0100	NA
0200	164
0300	170
0400	163
0500	158
0600	121
0700	86
0800	98
0900	NA

Weather: Partly cloudy with slight breeze & mild temperatures.

Release probe for QC Station ~24 hr deployment

CHPRC 2011 100F				Date: 2-5-11	
Trident Probe Conductivity Calibration Check					
Standard	Mfr.	Lot #	Expiration Date	Porewater Probe	Surface Probe
99.9 uS	Cole Parmer	CC8596	09/03/11	106	NA
447	Oakton	205259	05/31/11	460	NA

Myron L Ultrameter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
pH*	7	Myron L Company	1001397 EB	09/09/11	7.08
	4	Myron L Company	2003077 JM	08/03/11	4.11
Cond. (uS)	99.9	Cole Parmer	CC8596	09/03/11	102.5
	447	Oakton	205259	05/31/11	457.1

*ORP is calibrated using results of pH cal. Check

ZS

YSI Dissolved Oxygen Meter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
D.O.	Zero	Hanna	1427	March of 2014	NA

OAKTON Turbitity Meter Calibration Check: SN 623329					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
Turbidity(NTU)	0.02	OAKTON	470/1	9/30/2011	NA
Turbidity(NTU)	20	OAKTON	470/1	9/30/2011	NA
Turbidity(NTU)	100	OAKTON	470/1	9/30/2011	NA
Turbidity(NTU)	800	OAKTON	470/1	9/30/2011	NA

DI Water from Apel Lab 151/153			
Property of	Mfr.	Model	megohm-cm
Applied Process Engineering Laboratory	Barnstead	E-Pure	16

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Zeke Simmons	02/05/2011	[illegible]	03/30/2011

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HNF-N-7012
41274/216575

PORE WATER SAMPLING

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1400 hrs: Deployed/installed Release Probe for QC Station ~24 hr survey-data collection. Coordinates: -119.44217897
46.66164106 Accuracy 1.57ft

PURGE/Initial PW Readings

ml	Cond(uS/cm)	Temp
0	152	2.951
30	161	3.179
60	161	3.219
90	162	3.422
120	162	3.474
150	162	3.500

Surface Water Readings from Trident Reference Probe:
Cond(uS/cm): 141 Temp: 3.001C°

Depth at Station: 10.1 ft
Probe Tip Depth: 12 inches BSG

1430 hrs: Positioned data feed wire & teflon sampling tube on land above high water line. Connected data feed wire & teflon tubing to other equipment on land including the following equipment:
- Deck box = weather proof box - laptop computer - power inverter
- 12 volt batteries - pump

The equipment listed above & below will collect/record continuous data (survey) over an elapsed time period of ~24 hours.
- barometric pressure recorder/sensor
- Water level/pressure recorder/sensor

ZS 02/05/2011

NK

SIGNATURE DATE WITNESSED UNDER OATH DATE
02/05/2011 03/20/2011

CONFIDENTIAL

HNF-N-701 2 43

PORE WATER SAMPLING 41274/216575

NA

Sunday 02/06/2011 Zeke Simmons (EAS) Zeke Simmons - Technician / Pilot Boat Captain, Adam Predmore (EAS) - Technician / Pilot Boat Deckhand to be on EAS vessel 1.

Neil Sullivan (EAS) - Vessel 2 captain, Chris Smith (CMA) - Lead, Mark Biser (CMA) - Technician to be on EAS vessel 2

0600 hrs: Decon per SAI
06:45 hrs: Tailgate meeting (POD) held at Apel.

River Flow:

Time	KCFS
0100	95
0200	111
0300	111
0400	106
0500	86

CHPRC 2011 100F Date: 2-6-11

Trident Probe Conductivity Calibration Check

Standard	Mfr.	Lot #	Expiration Date	Porewater Probe	Surface Probe
99.9 uS	Cole Parmer	CC8596	09/03/11	105	109
447	Oakton	205259	05/31/11	451	442

Myron L Ultrameter Calibration Check: SN

	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
pH*	7	Myron L Company	1001397 EB	09/09/11	7.04
	4	Myron L Company	2003077 JM	08/03/11	4.09
Cond. (uS)	99.9	Cole Parmer	CC8596	09/03/11	103.9
	447	Oakton	205259	05/31/11	458.3

*ORP is calibrated using results of pH cal. Check

YSI Dissolved Oxygen Meter Calibration Check: SN

	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
D.O.	Zero	Hanna	1427	March of 2014	0.08

Zeke Simmons

OAKTON Turbitity Meter Calibration Check: SN 623329

	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
Turbidity(NTU)	0.02	OAKTON	470/1	9/30/2011	0.05
Turbidity(NTU)	20	OAKTON	470/1	9/30/2011	20.1
Turbidity(NTU)	100	OAKTON	470/1	9/30/2011	100
Turbidity(NTU)	800	OAKTON	470/1	9/30/2011	795

DI Water from Apel Lab 151/153

Property of	Mfr.	Model	megohm-cm
Applied Process Engineering Laboratory	Barnstead	E-Pure	14.1

Discussion at tailgate meeting mentioned above included plans to install a new staff gauge for river level readings at F. Safety topic: Importance of continuous communication between vessels including the use of hand held radios.

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Zeke Simmons	02/06/2011	[illegible]	05/20/2011

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PORE WATER SAMPLING

HNF-N-7012
41214/216575

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0805 hrs: Z. Simmons & A. Predmore installed a staff guage for river level readings at 100F. The Ø m mark was Calibrated for elevation = to the green line on the Substrate of the river bed.

ZS 02/06/2011

0815 hrs: EAS vessel 2 personnel changed the batteries powering the ~24 hr. Survey-data collection equipment.

ZS 02/06/2011

F3TRANSECT4 Survey Start Time 08.54 hrs.
Coordinates: -119.44210973 46.66170987 Accuracy 1.58 ft.
Depth at Station: 18.5 ft. Probe Tip Depth: 12 inches BSG
Substrate: Small/Medium Cobble
Surfacewater Readings from Trident Reference Probe
Cond: 142 uS/cm Temp.: 2.978 C°
PURGE/Initial PW Readings

ml	Cond(uS/cm)	Temp (C°)
0	152	3.263
30	159	3.022

Lost water flow = Pump Rate dropped to Ø ml/min after 30 ml of purging ~~Sam~~ ZS 02/06/11 teflon tube.
Myron Surfacewater Readings

ORP	pH	TDS	Cond (uS/cm)
189	7.19	97.76	151.3

F3TRANSECT-1 Survey Start Time 10:10 hrs.

ml	Cond. (uS/cm)	Temp. (C°)
0	149	3.320
30	151	3.015
60	162	3.001
90	157	3.005
120	154	3.009
150	153	3.004

NOTE: Station Survey data continued on page 45.

Zac Simmons 02/06/2011 [illegible] 03/30/2011

PORE WATER SAMPLING

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F3TRANSECT-1 Survey Start Time 10:10 hrs.
Coordinates: -119.44223344 46.66164142 Accuracy 1.97 ft.
Depth at Station: 3.8 ft Probe Tip Depth: 11 inches BSG
Substrate: Small/Medium Cobble with PREDOMINANTLY LARGE COBBLE
Surfacewater Readings from Trident Reference Probe
Cond: 141 uS/cm Temp.: 2.992

Myron Surfacewater Readings					Myron Initial Porewater Readings				
ORP	pH	TDS	Cond. (uS/cm)	DO	ORP	pH	TDS	Cond (uS/cm)	DO
182	7.52	94.39	146.3	12.05 YSI	181	7.28	94.27	147.8	8.42 YSI

Turbidity: Surfacewater 3.59 NTU | Porewater (PW) 160 NTU

Logged Values:	Trident Ref. Probe (Surfacewater)	Trident Probe BSG (Porewater)
Cond (uS/cm)	141	150
Temp. (C°)	3.025	2.949

F3TRANSECTØ Survey Start Time 1050 hrs.
Coordinates: -119.44219141 46.66165698 Accuracy 2.33 ft.
Depth at Station: 6.3 ft. Probe Tip Depth: 12 inches BSG
Substrate: Large/Medium cobble

ml	Cond (uS/cm)	Temp (C°)
0	150	2.950
30	153	3.006
60	155	3.028
90	156	3.077
120	156	3.097
150	156	3.029

Myron	pH	ORP	Cond (uS/cm)
Surfacewater	7.77	206	146.7
Initial PW	7.71	206	154.8

OAKTON Turbidity		YSI	DO
Surfacewater	5.14 NTU	SW	12.11
Initial PW	668 NTU	PW	10.36

Logged Values:	Trident Ref. Probe (Surfacewater)	Trident Probe BSG (Porewater)
Cond (uS/cm)	141	156
Temp. (C°)	3.046	3.103

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SIGNATURE: Zee Simons DATE: 02/06/2011 WITNESSED & UNDERSTOOD BY: Dawn M Radcliff DATE: 03/30/2011

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41274/216575

PORE WATER SAMPLING

45

F3TRANSECT1 Survey Start Time 11:34 hrs.
Coordinates: -119.44218721 46.66165370 Accuracy 1.66 ft.
Depth at Station: 8.0 ft Probe Tip Depth: 12 inches BSG
Substrate: Large/Medium Cobble

ml	Cond(uS/cm)	Temp(c°)	Myron	pH	ORP	Cond(uS/cm)
0	151	2.973	Surfacewater	7.81	198	147.1
30	157	3.051	Initial PW	7.72	193	174.1
60	160	3.225				
90	161	3.323				
120	163	3.384				
150	164	3.414				

OAKTON	Turbidity	YSI	DO
Surfacewater	15.03 NTU	SW	12.31
Initial PW	643 NTU	PW	8.97

Logged Values:

	Trident Ref. Probe (Surfacewater)	Trident Probe BSG (Porewater)
Cond(uS/cm)	~~163~~ 141	~~163~~ 163
Temp (C°)	~~3.398~~ 3.056	~~3.056~~ 3.398

F3TRANSECT2 Survey Start Time: 12:04 hrs Substrate: Medium Cobble
Coordinates: -119.44212750 46.66167988 Accuracy 1.71 ft.
Depth at Station: 12.1 ft Probe Tip Depth: 12 inches BSG

ml	Cond(uS/cm)	Temp(c°)	Myron	pH	ORP	Cond(uS/cm)
0	151	3.004	Surfacewater	7.96	224	147.9
30	164	3.140	Porewater (Initial)	7.98	223	179.8
60	166	3.189				
90	168	3.272				
120	171	3.311				
150	173	3.354				

OAKTON	Turbidity	YSI	DO
Surfacewater	4.11 NTU		12.20
Initial PW	222 NTU		7.16

Logged Values:

	Trident Ref. Probe (SW)	Trident Probe BSG (PW)
Cond(uS/cm)	141	175
Temp (C°)	3.063	3.357

ZS 02/06/2011

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SIGNATURE DATE MEMORANDUM NUMBER
02/06/2011 03/30/2011

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PORE WATER SAMPLING

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41274/216575

From Page No.

F4TRANSECT1 Survey Start Time 12:42 hrs
Coordinates: -119.44121134 46.66115977 Accuracy 1.72 ft,
Depth at Station: 10.0 ft. Probe Tip Depth: 12 inches BSG
Substrate: Medium/Small Cobble
PURGE/Initial PW Readings

ml	Cond(uS/cm)	Temp(C°)	Myron	pH	ORP	Cond(uS/cm)
0	151	3.042	SW	8.00	231	147.6
30	154	3.009	Initial PW	8.08	229	160.9
60	162	3.529				
90	162	3.611				
120	161	3.706				
150	161	3.780				

	OAKTON	Turbidity	YSI	DO
SW		29.6NTU		12.26
Initial PW		>800NTU		9.42

Logged Values:	Trident Ref Probe (SW)	Trident Probe BSG (PW)
Cond(uS/cm)	141	161
Temp. (C°)	3.097	3.726

F4TRANSECT2 Survey Start Time 13:09 hrs.
Coordinates: -119.44117030 46.66116777 Accuracy 1.83 ft
Depth at Station: 12.4 ft. Probe Tip Depth: 12 inches BSG
Substrate: Medium/Small Cobble
PURGE/Initial PW Readings

ml	Cond(uS/cm)	Temp(C°)	Myron	pH	ORP	Cond(uS/cm)
0	151	3.049	SW	7.96	245	147.2
30	153	3.064	Initial PW	7.97	245	159.5
60	158	3.284				
90	158	3.339				
120	158	3.447				
~~150~~ 75 02/06/2011						

	OAKTON	Turbidity	YSI	DO
SW		10.03		12.29
Initial PW		928		9.96

Logged Values:	Trident Ref. Probe (SW)	Trident Probe BSG (PW)
Cond(uS/cm)	141	158
Temp (C°)	3.106	3.477

13:45 hrs.: Decon in field per SAI

To Page No. NA

SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
[signature]	02/06/2011	[signature]	05/20/2011

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41214/216575

PORE WATER SAMPLING

UA

Monday 02/07/11 Shannan Johnson (EAS) technician, Neil Sullivan (EAS) - Vessel #2 boat captain, Chris Smith (CMA) - lead and Mark Biser (CMA) technician to be on Vessel #2

Zeke Simmons (EAS) Vessel #1 boat captain and Adam Predmore (EAS) Technician / Pilot Boat Deckhand.

0600 hrs: Decon per SAI

River Flow Time	KCFS
0100	133
0200	148
0300	131
0400	111
0500	95
0600	132

CHPRC 2011 100F — Date: 2-7-2011

Trident Probe Conductivity Calibration Check

Standard	Mfr.	Lot #	Expiration Date	Porewater Probe	Surface Probe
99.9 uS	Cole Parmer	CC8596	09/03/11	106	105
447	Oakton	205259	05/31/11	450	442

Myron L Ultrameter Calibration Check: SN

	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
pH*	7	Myron L Company	1001397 EB	09/09/11	7.06
	4	Myron L Company	2003077 JM	08/03/11	4.23
Cond. (uS)	99.9	Cole Parmer	CC8596	09/03/11	106.2
	447	Oakton	205259	05/31/11	447.2

*ORP is calibrated using results of pH cal. Check

YSI Dissolved Oxygen Meter Calibration Check: SN

	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
D.O.	Zero	Hanna	1427	March of 2014	0.13

OAKTON Turbidity Meter Calibration Check: SN 623329

	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
Turbidity(NTU)	0.02	OAKTON	470/1	9/30/2011	0.05
Turbidity(NTU)	20	OAKTON	470/1	9/30/2011	20.2
Turbidity(NTU)	100	OAKTON	470/1	9/30/2011	100
Turbidity(NTU)	800	OAKTON	470/1	9/30/2011	798

DI Water from Apel Lab 151/153

Property of	Mfr.	Model	megohm-cm
Applied Process Engineering Laboratory	Barnstead	E-Pure	15.6

02/07/11

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SIGNATURE	DATE	ATTENDED & EMPIRICAL BY	DATE
	02/07/11		03/30/2011

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41274/216575

PORE WATER SAMPLING

48

0700 Meeting @ APEL
Determination of transects and where to sample were covered.

Safety topic: walking up and down hills

POD - pick up the 24hr recording system, the barometric pressure recorder, and the water level recorder; check staff gauge the communicate with Brett to determine whether to sample or map conductivity

0930 launched from ferry landing

0945 picked up barometric pressure reader and 24-hr recording system

1010 T100F2A - QC conductivity @ 162.2

1020 Comm from Brett - take sample

1035 Retrieved water level recorder

1042 On station F2 Transect 2

Water depth at first attempt: 9.7ft

SJ 02/07/11

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
	02/07/11	Anna Ann Radcliff	05/20/2011

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PORE WATER SAMPLING
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HNF-N-7012
41274/216575

INITIAL Porewater Readings Date: 02/07/11

Water quality results (after purge water)				
Conductivity (µS/cm)[b] 173	Temp (C°)[b] 3.576	ORP[b]	pH[a]	D.O.[c]
~~170.0~~ 02/14/11	~~3.360~~ 02/14/11	234	6.91	6.85
Turbidity[d] 532 NTU				

SurfacewaterReadings

Water quality results (after purge water)				
Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
141.4	2.978	226	7.42	11.25
Turbidity[d] 1.37		TDS 93.43		

COMPOSITE Porewater Sample

Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coprdinates (deg.deg)NAD83	
F2 Transect2	F11-017-DM	before: 1.1 after: .9	Start: 11.35 End: 12:18	E 119.4421988	N 46.66165

Probe Tip Depth (Inches) (6"-12") 12"

Depth at station: 10.2 ft

Water quality results (Composite) P-DOP 1.61				
Conductivity (µS/cm)[a]	Temp (C°)[b] 3.360	ORP[a]	pH[a]	D.O.[c]
175.4	~~3.565~~ 02/14/11	247	7.95	7.22
Turbidity[d] 94.6 NTU		TDS 115.2		

HEIS Sample No.(s)	Volume (mL)	Duplicate? Tied To:	# Bottles/Notes:
B2BDC6	600	NO	N/A

FINAL Porewater Readings

Water quality results				
Conductivity (µS/cm)[a]	Temp (C°)[b] 3.565	ORP[a]	pH[a]	D.O.[c]
171.3	~~3.373~~ 02/14/11	231	7.92	6.08
Turbidity[d] 10.88		TDS 112.4		

a) Myron
b) Trident
c) YSI
d) ~~Hanna Meter~~ 3) 02/21/11 CALIBD

Substrate. med/sm cobble

02/07/11

13:00 On station F1 Transect2

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02/07/11 03/30/2011

PORE WATER SAMPLING

5D

HNF-N-7012
41274/216575

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INITIAL Porewater Readings Date: 2/7/11

Water quality results (after purge water)				
Conductivity (µS/cm)[b] 161	Temp (C°)[b] 3.189	ORP[a]	pH[a]	D.O.[c]
~~161.38~~	~~3.196~~ 02/2/11	256	6.67	6.48
Turbidity[a] ~~1248~~ NTU		TDS 105.8		

SurfacewaterReadings

Water quality results (after purge water)				
Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
142.8	3.083	248	7.50	12.75
Turbidity[a] 3.02 NTU		TDS 94.57		

COMPOSITE Porewater Sample

Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates (deg.deg)NAD83	
F1 Transect2	F11-017-002	before: .8 after: .8	Start: 1320 End: 1407	W 2/7/11 E-119.44219469	N 46.66161366

2.71 ft Accuracy 2.24 ppm

Probe Tip Depth (Inches) (6"-12") Depth at station 6.0 ft

12" pss

Water quality results (Composite)				
Conductivity (µS/cm)[a]	Temp (C°)[b] 3.196	ORP[a]	pH[a]	D.O.[c]
161.6	~~3.179~~ 02/2/11	261	7.46	7.89
Turbidity[a] 31.1 NTU		TDS 106.3		

HEIS Sample No.(s)	Volume (mL)	Duplicate? Tied To:	# Bottles/Notes:
B2B0B4	~~650~~ 600 2/7/11	NO	N/A

FINAL Porewater Readings

Water quality results				
Conductivity (µS/cm)[a]	Temp (C°)[b] 3.179	ORP[a]	pH[a]	D.O.[c]
157.0	~~3.147~~ 02/2/11	262	7.24	7.73
Turbidity[a] 6.51 NTU		TDS 103.2		

a) Myron
b) Trident
c) YSI
d) ~~Hanna Meter~~ 02/2/11

Substrate: - med cobble
Oakley
02/07/11

1445 T100F2A-QC @ 162.2
Decon in field per SAI.
1600 Relinquished samples to CHPRC personnel near ferry landing

To Page No. N/A

SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
	02/07/11	Dana M Radloff	03/30/2011

CONFIDENTIAL

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HNF-N-701 2
~~41274~~ 41274/216575

PORE WATER SAMPLING

N/A 02/08/11 Shannan Johnson (EAS) [signature] Techician, Zeke Simmons (EAS) - vessel captian, Chris Smith (CMA) - Lead, Mark Biser (CMA) - techician to be on EAS Vessel 2 for field sampling activities 0800hrs - tailgate meeting at APEL discussed preventing cuts and scrapes by ~~where~~ wearing proper PPE when working with anchor line and other equipment on boat

Time	KCFS
0100	167
0200	169
0300	170
0400	169
0500	168
0600	165
0700	167

Weather. windy, mostly sunny 20s (F°)

Decon per SAI @ 0730.

CHPRC 2011 100F				Date: 02-8-11	
Trident Probe Conductivity Calibration Check					
Standard	Mfr.	Lot #	Expiration Date	Porewater Probe	Surface Probe
99.9 uS	Cole Parmer	CC8596	09/03/11	107	105
447	Oakton	205259	05/31/11	460	445

Myron L Ultrameter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
pH*	7	Myron L Company	1001397 EB	09/09/11	7.03
	4	Myron L Company	2003077 JM	08/03/11	4.07
Cond. (uS)	99.9	Cole Parmer	CC8596	09/03/11	103.7
	447	Oakton	205259	05/31/11	447.2

*ORP is calibrated using results of pH cal. Check

[signature] 02/08/11

YSI Dissolved Oxygen Meter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
D.O.	Zero	Hanna	1427	March of 2014	0.09

[signature] 02/08/11

OAKTON Turbitity Meter Calibration Check: SN 623329					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
Turbidity(NTU)	0.02	OAKTON	470/1	9/30/2011	0.05
Turbidity(NTU)	20	OAKTON	470/1	9/30/2011	20.2
Turbidity(NTU)	100	OAKTON	470/1	9/30/2011	99.7
Turbidity(NTU)	800	OAKTON	470/1	9/30/2011	797

DI Water from Apel Lab 151/153			
Property of	Mfr.	Model	megohm-cm
Applied Process Engineering Laboratory	Barnstead	E-Pure	15.6

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[signature] 02/08/11 [signature] 03/30/2011

PORE WATER SAMPLING

HWF-N-701 2 53
41274/216575

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1100 F2A-DC Station reading taken @ 1000 at 159.3

Staff guage needs to be fixed. It is damaged and unreadable.

1010 text and call placed to Brett to relay results and confirm POD.

1015 received confirmation from Brett to relay conductivity reading before sampling. Arrived at F1 Transect 5 @ 1030.

1100 It was determined not to be safe for sampling due to high flows, fast current, and high wind.

1344 Chris and Mark go to set up 24 hr recording system

Decon of equipment in field per SAI.

SJ 02/08/11

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
[signature]	02/08/11	[signature]	05/30/2014

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PORE WATER SAMPLING

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HNF-N-7012
41274/216575

CHPRC 2011 100F				Date: 2-9-11	
Trident Probe Conductivity Calibration Check					
Standard	Mfr.	Lot #	Expiration Date	Porewater Probe	Surface Probe
99.9 uS	Cole Parmer	CC8596	09/03/11		
447	Oakton	205259	05/31/11		

NA

04/01/11

Myron L Ultrameter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
pH*	7	Myron L Company	1001397 EB	09/09/11	7.07
	4	Myron L Company	2003077 JM	08/03/11	4.07
Cond. (uS)	99.9	Cole Parmer	CC8596	09/03/11	103.7
	447	Oakton	205259	05/31/11	447.6

*ORP is calibrated using results of pH cal. Check

YSI Dissolved Oxygen Meter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
D.O.	Zero	Hanna	1427	March of 2014	0.09

OAKTON Turbidity Meter Calibration Check: SN 623329					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
Turbidity(NTU)	0.02	OAKTON	470/1	9/30/2011	0.06
Turbidity(NTU)	20	OAKTON	470/1	9/30/2011	20.7
Turbidity(NTU)	100	OAKTON	470/1	9/30/2011	99.9
Turbidity(NTU)	800	OAKTON	470/1	9/30/2011	799

DI Water from Apel Lab 151/153			
Property of	Mfr.	Model	megohm-cm
Applied Process Engineering Laboratory	Barnstead	E-Pure	15.9

02/08/11

PW - Conductivity 160.7
SW - Conductivity 140.8

1429 24-hr deployment of recorder begins.

02/08/11

N/A

02/08/11

03/30/2011

Pore Water Sampling

HNF-N-7012 55
41274/216575

NIA 02/10/11 Shannon Johnson (EAS) - technician; Neil Sullivan (EAS) - boat captain; Chris Smith (CMA) - head; Mark Biser (CMA) - technician on Vessel #2
Zeke Simmons (EAS) - boat ~~captain~~ 02/10/11 captain & Adam Predmore (EAS) - deckhand/technician on Pilot Boat.

River Flows KCFS	Time
147	~~0100~~ 02/10/11 0100
150	0200
167	0300
171	0400
143	0500
142	0600

Weather: mostly sunny, calm low 20's (F°)

Decon per SAI @0600
Cal check time 0630

CHPRC 2011 100F				Date: 2-10-11	
Trident Probe Conductivity Calibration Check					
Standard	Mfr.	Lot #	Expiration Date	Porewater Probe	Surface Probe
99.9 uS	Cole Parmer	CC8596	09/03/11	108	107
447	Oakton	205259	05/31/11	452	444

Myron L Ultrameter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
pH*	7	Myron L Company	1001397 EB	09/09/11	7.01
	4	Myron L Company	2003077 JM	08/03/11	4.06
Cond. (uS)	99.9	Cole Parmer	CC8596	09/03/11	99.96
	447	Oakton	205259	05/31/11	447.6

*ORP is calibrated using results of pH cal. Check

02/10/11

YSI Dissolved Oxygen Meter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
D.O.	Zero	Hanna	1427	March of 2014	0.09

OAKTON Turbitity Meter Calibration Check: SN 623329					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
Turbidity(NTU)	0.02	OAKTON	470/1	9/30/2011	0.04
Turbidity(NTU)	20	OAKTON	470/1	9/30/2011	20.2
Turbidity(NTU)	100	OAKTON	470/1	9/30/2011	99.5
Turbidity(NTU)	800	OAKTON	470/1	9/30/2011	794

DI Water from Apel Lab 151/153			
Property of	Mfr.	Model	megohm-cm
Applied Process Engineering Laboratory	Barnstead	E-Pure	17.5

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PORE WATER SAMPLING

HNF-N-701 2
41274/214575

55

0915 Tailgate mtg @ ferry landing
Safety topic - slips & trips on icy dest's 02/10/11 deck

POD - check QC station & confer with Brett.

T100F2A - QC 0955 165.3 cond. confirmed to sample

1025 arrived at ~~F2~~ F1 Transect 5 02/10/11

INITIAL Porewater Readings				Date: 02/10/11
Water quality results (after purge water)				
Conductivity (µS/cm)[b] 163	Temp (C°)[b] 3.413	ORP[a]	pH[a]	D.O.[c]
~~154.9~~ 02/10/11	~~3.424~~ 02/10/11	186	7.51	9.88
Turbidity[d] 378 NTU		TDS - 102.6		

SurfacewaterReadings				
Water quality results (after purge water)				
Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
143.3	3.033	206	7.33	12.28
Turbidity[d] 4.03 NTU		TDS - 95.27		

COMPOSITE Porewater Sample					
Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates (deg.deg)NAD83	1.58 ft acc. 1.44 P DOP
F1 Transect 5	F11-017-006	before: 1.4 after: 1.1	Start: 1050 End: 1153	E -119.44127614	N46.6412426
Probe Tip Depth (Inches) (6"-12")	Water depth 8.6 ft				
	Water quality results (Composite)				
12"	Conductivity (µS/cm)[a]	Temp (C°)[b] 3.424	ORP[a]	pH[a]	D.O.[c]
bsg	158.0	~~3.391~~ 02/10/11	228	7.26	9.06
	Turbidity[d] 82.2 NTU		TDS - 102.9		
HEIS Sample No.(s)	Volume (mL)		Duplicate? Tied To:	# Bottles/Notes:	
B2BDB9	~600 mL		Yes B28DB9	1	

FINAL Porewater Readings				
Water quality results				
Conductivity (µS/cm)[a]	Temp (C°)[b] 3.391	ORP[a]	pH[a]	D.O.[c]
157.5	~~3.375~~ 02/10/11	220	7.50	9.12
Turbidity[d] 44.9 NTU		TDS 102.4		

a) Myron
b) Trident
c) YSI
d) ~~Hanna Meter~~ Calton 02/10/11

Substrate med/sm cobble

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02/10/11 03/30/2011

PORE Water SAMPLING
Eo

HNF-N-701 2 57
41274/216575
02/10/11

INITIAL Porewater Readings Date: 02/10/11

Water quality results (after purge water)

Conductivity (µS/cm)[b] SJ 02/4/11	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c] SJ 02/4
166.7	3.218	221	7.63	~~12.36~~ 8.52
Turbidity[d] 36.8 NTU		TDS-105.0		

SurfacewaterReadings

Water quality results (after purge water)

Conductivity (µS/cm)[a]	Temp (C°)[b] SJ 02/4/11	ORP[a]	pH[a]	D.O.[c] SJ 02/10/11
140.5	~~3.132~~ 3.125	222	7.62	~~12.2~~ 12.36
Turbidity[d] 6.26 NTU		TDS-91.68		

DUP

COMPOSITE Porewater Sample

Station ID:	SAF#	Staff Guage (m) SJ 02/10/11	Sample Time	Coordinates (deg.deg)NAD83	
F1 Transect 5	F11-017-007	before: 1.4 after: 1.7	Start: 1205 End: 1305	E-119.44127614	N 46.66124426

1.5 ft aft
1.4 ft port

Probe Tip Depth (Inches) (6"-12"): 12"

Water depth 8.6 ft

Water quality results (Composite)

Conductivity (µS/cm)[a]	Temp (C°)[b] 3.218	ORP[a]	pH[a]	D.O.[c]
164.7	~~3.410~~ SJ 02/4/11	199	7.85	8.58
Turbidity[d] 31.1 NTU		TDS-106.9		

HEIS Sample No.(s)	Volume (mL)	Duplicate? Tied To:	# Bottles/Notes:
B2BDB9	~600mL	Yes B2BDB8	1

FINAL Porewater Readings

Water quality results

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
155.7	3.410	199	7.74	8.70
Turbidity[d] 19.44 NTU		TDS-101.5		

a) Myron
b) Trident
c) YSI
d) ~~Hanna Meter~~ Oakton SJ 02/2/11

Substrate: med/sm cobble

Decon in Field per SAI.
1330 T100F2A-QC @ 158
Returning to ferry landing per Brett.
1412 Relinquished samples to CH PRC.
1500 Retrieved 24-hr deployment recording device.
1600 End of day

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HNF-N-7012
41274/216575

PORE WATER SAMPLING

NA 02/17/11 Shannan Johnson (EAS) - Technician, Neil Sullivan (EAS) - Vessel 2 boat captain; George Paulsen (CMA) - technician; Ron Paulsen (CMA) - head scientist all on Vessel 2. Zeke Simmons (EAS) - Vessel 1 boat captain, Adam Predmore (EAS) - deck hand, technician on Vessel 1.

0930 Tailgate mtg at APEL. Safety topic - being alert and aware of ones surroundings.

PDD - QC check; EQ Blank; and 1 sample

Cal check @ 0900.

Weather - mostly sunny - upper 40's (F)

River Flows

Time	KCFS
0100	141
0200	129
0300	131
0400	138
0500	166
0600	163

CHPRC 2011 100F					Date: 2 17 2011
Trident Probe Conductivity Calibration Check					
Standard	Mfr.	Lot #	Expiration Date	Porewater Probe	Surface Probe
99.9 uS	Cole Parmer	CC8596	09/03/11	110	101
447	Oakton	205259	05/31/11	444	417

Myron L Ultrameter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
pH*	7	Myron L Company	1001397 EB	09/09/11	7.04
	4	Myron L Company	2003077 JM	08/03/11	4.05
Cond. (uS)	99.9	Cole Parmer	CC8596	09/03/11	106.8
	447	Oakton	205259	05/31/11	451.1

02/17/11

*ORP is calibrated using results of pH cal. Check

YSI Dissolved Oxygen Meter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
D.O.	Zero	Hanna	1427	March of 2014	0.08

OAKTON Turbitity Meter Calibration Check: SN 623329					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
Turbidity(NTU)	0.02	OAKTON	470/1	9/30/2011	0.07
Turbidity(NTU)	20	OAKTON	470/1	9/30/2011	20.1
Turbidity(NTU)	100	OAKTON	470/1	9/30/2011	99.2
Turbidity(NTU)	800	OAKTON	470/1	9/30/2011	792

DI Water from Apel Lab 151/153			
Property of	Mfr.	Model	megohm-cm
Applied Process Engineering Laboratory	Barnstead	E-Pure	17.92

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02/17/11

03/30/2011

PORE WATER SAMPLING
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HNF-U-7012 59
41274/216675

QC @ TIDDF2A - 184.8 1112

Decon in field per SAI.
1250 SJ 02/17/11
1450 SJ EQ Blank taken ~600 mL sample No. B2BDB7
SAF# F11-017-005

INITIAL Porewater Readings Date: 02/17/11

Water quality results (after purge water)				
Conductivity (µS/cm)[a] 163	Temp (C°)[b] 3.519 SJ 02/17/11	ORP[a]	pH[a]	D.O.[c]
172.5	3.520	158	8.27	9.72
Turbidity[d] 235		TDS - 112.7		

SurfacewaterReadings

Water quality results (after purge water)				
Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
136.4	3.239	160	8.24	12.57
Turbidity[d] 1.07		TDS - 89.92		

COMPOSITE Porewater Sample Acq 2.67 ft

Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates (deg.deg)NAD83	
F2Transect5	F11-017-08	before 2.0 after 2.2	Start: 1430 End: 1545	W 119.44127949	N 46.66115610

Probe Tip Depth (Inches) (6"-12"): 12" BSG

Depth @ station: 11.2 ft

Water quality results (Composite)				
Conductivity (µS/cm)[a]	Temp (C°)[b] 3.520 SJ 02/17/11	ORP[a]	pH[a]	D.O.[c]
163.2	3.225	211	8.19	9.96
Turbidity[d] 51.6		TDS - 106.6		

HEIS Sample No.(s)	Volume (mL)	Duplicate? Tied To:	# Bottles/Notes:
B2BDD0	~600 mL	NO	1

FINAL Porewater Readings

Water quality results				
Conductivity (µS/cm)[a]	Temp (C°)[b] 3.400 SJ 02/17/11	ORP[a]	pH[a]	D.O.[c]
160.7	3.390	215	8.18	9.76
Turbidity[d] 34.0		TDS - 105.0		

a) Myron
b) Trident
c) YSI
d) ~~Hanna Meter~~ Oakton 362/2/1/11

Substrate: med cobble

02/17/11

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	02/17/11	Anna M Radcliff	03/30/2011

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PORE WATER SAMPLING

41274/216575

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QC @ 1630 T100F2A - 172 Cond.

1650 relinquished samples to CHRPC

Decon in field per SAI.

End of day

02/17/11

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PORE WATER SAMPLING 41274/216575

NA

Friday 02/18/2011 Zeke Simmons (EAS) Zeke Simmons - Technician, Niel Sullivan (EAS) - Captain, Ron Paulsen (CMA) - Lead, George Paulsen (CMA) - Technician to be on EAS vessel 2 participating in sampling activities.

0730 hrs.: Tailgate meeting (POD) held at Apel. Discussed plans to collect 2 PW samples along FTRANSECT 1. Discussed re-torque of ball nut on the ball mount of EAS Ford F-250.

River Flow:

Time	KCFS
0100	164
0200	148
0300	156
0400	166
0500	155
0600	118
0700	126

Decon per SAI at 0740 hrs.

Weather AM: Sunshine with very slight breeze. Temperatures in low 30's - ~ Mid. 40's F°

CHPRC 2011 100F Date: 02-18-2011

Trident Probe Conductivity Calibration Check					
Standard	Mfr.	Lot #	Expiration Date	Porewater Probe	Surface Probe
99.9 uS	Cole Parmer	CC8596	09/03/11	102	96
447	Oakton	205259	05/31/11	446	440

Myron L Ultrameter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
pH*	7	Myron L Company	1001397 EB	09/09/11	6.99
	4	Myron L Company	2003077 JM	08/03/11	4.06
Cond. (uS)	99.9	Cole Parmer	CC8596	09/03/11	96.6
	447	Oakton	205259	05/31/11	446.1

*ORP is calibrated using results of pH cal. Check

YSI Dissolved Oxygen Meter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
D.O.	Zero	Hanna	1427	March of 2014	0.08

Zeke Simmons

OAKTON Turbidity Meter Calibration Check: SN 623329					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
Turbidity(NTU)	0.02	OAKTON	470/1	9/30/2011	0.07
Turbidity(NTU)	20	OAKTON	470/1	9/30/2011	20.2
Turbidity(NTU)	100	OAKTON	470/1	9/30/2011	99.7
Turbidity(NTU)	800	OAKTON	470/1	9/30/2011	797

DI Water from Apel Lab 151/153			
Property of	Mfr.	Model	megohm-cm
Applied Process Engineering Laboratory	Barnstead	E-Pure	15.9

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Zeke Simmons	02/18/2011	[illegible]	03/30/2011

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41274/214675

PORE WATER SAMPLING

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10:40 hrs. F QC Station. Check/Survey
Staff guage: ~1.7m Conductivity: 175 uS/cm

F/ Transect 10 Water depth at Station: 8.6 ft
PURGE/Initial PW Readings Substrate: Medium/Small cobble

mL	Cond (uS/cm)	Temp (C°)
0	147	3.078
30	158	3.222
60	158	3.367
90	158	3.388
120	158	3.410

TS 02/18/2011

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Pete Simmons	02/18/2011	Dana Umhadeff	03/30/2011

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PORE WATER SAMPLING

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41274/216575

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Myron Cond. 151.4	INITIAL Porewater Readings			Date: 02/18/2011	
	Water quality results (after purge water)				
	Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
	158	3.410	262	7.65	9.70
	Turbidity[c] 174 NTU				

SurfacewaterReadings				
Water quality results (after purge water)				
Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
137.3	3.180	257	8.02	12.40
Turbidity[c] 11.10 NTU				

COMPOSITE Porewater Sample					
Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates (deg.deg)NAD83 Accuracy 2.24 ft	
F1 Transect 10	F11-017	before ~1.7 after 1.6	Start: 11:45 End: 12:45	E-119.43990361	N46.66004564
Probe Tip Depth (Inches) (6"-12") 12 inches BSG	Lot No. 1LAG 042207				
	Water quality results (Composite)				
	Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
	154.7	3.411	297	7.98	9.23
	Turbidity[c] 33.8 NTU				

HEIS Sample No.(s)	Volume (mL)	Duplicate? Tied To:	# Bottles/Notes:
B2BDC4	~600	NA	1LAG

FINAL Porewater Readings				
Water quality results				
Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
151.4	3.368	282	7.86	9.45
Turbidity[c] 37.6 NTU				

a) Myron
b) Trident
c) YSI ES 02/18/11
d) ~~Hanna Meter~~ OAKTON

Decon in field per SAI at 13:00hrs.
Cell phone call to Brett Tiller (EAS) at 1334 hrs. He instructed me to call Anna Radloff (CHPRC) concerning absence of certification sheet in new box of 1LAG bottles (Lot No. 043672).
1336 hrs. Cell phone call to A. Radloff. She instructed me to use these bottles (Lot No. 043672) as we previously collected samples into 1LAG bottles with the same Lot. No. which came from a box that did contain a certification sheet.

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Luke Simons	02/18/2011	Anna Radloff	05/20/2011

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41274/216575

PORE WATER SAMPLING

63 1334 hrs. Cell phone call to Roy Plunkett (CHPRC): Status/update

F2 Transect 10 Water depth at Station 11.5 ft.

PURGE/Initial PW Readings

mL	Cond (uS/cm)	Temp (C°)
0	148	3.342
30	157	3.366
60	159	3.369
90	159	3.363
120	160	3.371

Substrate: Medium/Small Cobble

INITIAL Porewater Readings				Date: 02/18/2011
Water quality results (after purge water)				
Conductivity (µS/cm)[b]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
160	3.371	272	7.85	9.47
Turbidity[d] 305 NTU				

Myron Cond. 154.8

SurfacewaterReadings				
Water quality results (after purge water)				
Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
136.7	3.366	270	8.12	12.31
Turbidity[d] 1.6 NTU				

COMPOSITE Porewater Sample					
Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates (deg.deg)NAD83 Accuracy 2.69 ft.	
F2 Transect 10	F11-017	before ~1.4 after ~1.8	Start: 14:45 End: 16:30	E-119.43985726	N46.6[illegible]41472
Probe Tip Depth (Inches) (6"-12") 12 inches BSG	1 LAG Lot No. 043672				
	Water quality results (Composite)				
	Conductivity (µS/cm)[a] 157.3 ~~3.374~~	Temp (C°)[b] 3.374	ORP[a] 278	pH[a] 8.04	D.O.[c] 16.03
	Turbidity[d] 144 NTU				
HEIS Sample No.(s)	Volume (mL)			Duplicate? Tied To:	# Bottles/Notes:
B2BDD5	~600			NA	01/1 LAG

FINAL Porewater Readings				
Water quality results				
Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
153.6	3.312	266	8.11	10.22
Turbidity[d] 172 NTU				

a) Myron
b) Trident
c) YSI
d) ~~Hanna Meter~~ ZS 02/18/11 OAKTON

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Pete Simmons 02/18/2011 [illegible] 03/20/2011

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PORE WATER SAMPLING 41274/214575

64 15:17 hrs: Cell phone communication with Karl Hulse (CHPRC): Status/update
1700 hrs. F QC Station Check/Survey
Stuff guage: ~ 1.75m Conductivity (uS/cm) : 172.1

1705 hrs.: Decon per SAI

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
[signature]	02/18/2011	[signature]	03/30/2011

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ADF-N-7012
41274/216575

PORE WATER SAMPLING

N/A Shannan Johnson (EAS) - Technician; 02/21/11 Neil Sullivan (EAS) boat captian Vessel #1; Ron Paulsen (CMA) - lead scientist; Mark Biser (CMA) - technician; Zeke Simmons (EAS) - boat captain Vessel #1, Adam Predmore (EAS) - boat deck hand / technician

Weather - partly cloudy, breezy, upper 30s °F

0945 Tailgate mtg at ferry launch
Safety topic - being extra careful
~~transferry~~ ~~transferring~~ transfering between boats.
P.D.D. take samples from Transect 9

Decon per SAI @ 0800.

River Flows

Time	KCFS
0100	118
0200	105
0300	97
0400	115
0500	136
0600	133

CHPRC 2011 100F				Date: 2-22-2011	
Trident Probe Conductivity Calibration Check					
Standard	Mfr.	Lot #	Expiration Date	Porewater Probe	Surface Probe
99.9 uS	Cole Parmer	CC8596	09/03/11	107	102
447	Oakton	205259	05/31/11	445	438

Myron L Ultrameter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
pH*	7	Myron L Company	1001397 EB	09/09/11	6.99
	4	Myron L Company	2003077 JM	08/03/11	4.09
Cond. (uS)	99.9	Cole Parmer	CC8596	09/03/11	97.20
	447	Oakton	205259	05/31/11	445.8

*ORP is calibrated using results of pH cal. Check

YSI Dissolved Oxygen Meter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
D.O.	Zero	Hanna	1427	March of 2014	0.09

OAKTON Turbidity Meter Calibration Check: SN 623329					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
Turbidity(NTU)	0.02	OAKTON	470/1	9/30/2011	0.08
Turbidity(NTU)	20	OAKTON	470/1	9/30/2011	20.1
Turbidity(NTU)	100	OAKTON	470/1	9/30/2011	99.3
Turbidity(NTU)	800	OAKTON	470/1	9/30/2011	795

DI Water from Apel Lab 151/153			
Property of	Mfr.	Model	megohm-cm
Applied Process Engineering Laboratory	Barnstead	E-Pure	15.9

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PORE WATER SAMPLING 412714/216575

QA - 02/23/11 T100F2A @ 1010 at 170.8 cond.
1011 at 185.4 cond.
1012 at 191.1 cond.
1013 at 191.7 cond.

1045 - Anchor came loose; re-anchored (1st deployment)
1100 - Anchor again came loose; went back to get larger anchor
1130 - 2nd deployment 145 conduct.

INITIAL Porewater Readings	Date: 02/23/11				
Myron 152.1	Water quality results (after purge water)				
	Conductivity (µS/cm)*	Temp (C°)*	ORP*	pH*	D.O.*
	159	3.299	241	8.04	10.14
	Turbidity* 953 NTU				

Surfacewater Readings					
	Water quality results (after purge water)				
	Conductivity (µS/cm)*	Temp (C°)*	ORP*	pH*	D.O.*
	137.0	3.227	240	8.06	12.05
	Turbidity* 3.50 NTU				

COMPOSITE Porewater Sample					
Station ID:	SAF#	Staff Guage (m/m)	Sample Time	Coordinates (deg.deg)NAD83	
B2Transect9	F11-017-022	before: 1.2 after: 1.2	Start: 1204 End: 1325	W 119.4401 5827	N 46.6605 4857
Probe Tip Depth (Inches) (6"-12")	Water depth 10.14				
11.5" BSG	Water quality results (Composite)				
	Conductivity (µS/cm)*	Temp (C°)*	ORP*	pH*	D.O.*
	151.5	3.314	268	7.88	9.20
	Turbidity* 551 NTU				

HEIS Sample No.(s)	Volume (mL)	Duplicate? Tied To:	# Bottles/Notes:
B2BDD4	~600 mL	NO	1

FINAL Porewater Readings					
	Water quality results				
	Conductivity (µS/cm)*	Temp (C°)*	ORP*	pH*	D.O.*
	156.0	3.324	251	7.80	9.56
	Turbidity* 558 NTU				

a) Myron
b) Trident
c) YSI
d) OAKTON

Substrate: med cobble w/ hard layer

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
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PORE WATER SAMPLING

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Decon in field per SAI

HNF-N-7012
41274/216575

INITIAL Porewater Readings					Date: 02/21/11
Myron 157.9	Water quality results (after purge water)				
	Conductivity (µS/cm)[b]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
	165	3.476	210	8.16	8.56
	Turbidity[d] 265 NTU				

SurfacewaterReadings				
Water quality results (after purge water)				
Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
136.3	3.449	220	8.22	12.78
Turbidity[d] 9.73 NTU				

COMPOSITE Porewater Sample					
Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates (deg/dec)	
FI Transect 9	F11-017-011	before: 1.3 after: 1.4	Start: 1525 End: 1615	2-119.4402319	N46.66053846
Probe Tip Depth (Inches) (6"-12")	Water depth: 6.9 ft				
12" bsg	Water quality results (Composite)				
	Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
	142.7	3.449	226	7.27	10.99
	Turbidity[d] 31.3 NTU				

HEIS Sample No.(s)	Volume (mL)	Duplicate? Tied To:	# Bottles/Notes:
B2BDC3	~600mL	ND	1

FINAL Porewater Readings				
Water quality results				
Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
144.4	3.476	236	7.73	10.10
Turbidity[d] 9.60				

a) Myron
b) Trident
c) YSI
d) OAKTON

Substrate: med cobble

QC @ T100F2A @ 1700 @ 185.6 conductivity
Decon in field per SAI
1734 relinquished samples to CHPRC.
End of day.

SIGNATURE: 02/23/11 DATE: 02/23/11 WITNESSED & UNDERSTOOD BY: DATE: 05/20/2011

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Pole Water Sampling 41274/216575

U/A 02/23/11 Shannan Johnson (EAS) technician, Zeke Simmons (EAS) Vessel #2 boat captain; Ron Paulsen (CMA) - lead scientist; Mark Biser (CMA) technician on EAS Vessel #2

River Flows

Time	Kcfs
0100	164
0200	150
0300	120
0400	134
0500	135
0600	126

Weather: Mostly Cloudy, breezy, 20s F
Safety Topic: adjusting to changes in the weather - wear layers; keep warm
at 0810 @ APEL bldg

POD · attempt to collect 3 samples including split sample dep on weather
0945 launched from ferry landing

CHPRC 2011 100F				Date: 2-23-2011	
Trident Probe Conductivity Calibration Check					
Standard	Mfr.	Lot #	Expiration Date	Porewater Probe	Surface Probe
99.9 uS	Cole Parmer	CC8596	09/03/11	~~441~~ 109	97
447	Oakton	205259	05/31/11	461	441

Decon per SAT @ 0745 at APEL bldg.

Myron L Ultrameter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
pH*	7	Myron L Company	1001397 EB	09/09/11	7.12
	4	Myron L Company	2003077 JM	08/03/11	4.11
Cond. (uS)	99.9	Cole Parmer	CC8596	09/03/11	98.77
	447	Oakton	205259	05/31/11	448.3

*ORP is calibrated using results of pH cal. Check

YSI Dissolved Oxygen Meter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
D.O.	Zero	Hanna	1427	March of 2014	0.08

OAKTON Turbidity Meter Calibration Check: SN 623329					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
Turbidity(NTU)	0.02	OAKTON	470/1	9/30/2011	0.07
Turbidity(NTU)	20	OAKTON	470/1	9/30/2011	20.2
Turbidity(NTU)	100	OAKTON	470/1	9/30/2011	99.1
Turbidity(NTU)	800	OAKTON	470/1	9/30/2011	796

DI Water from Apel Lab 151/153			
Property of	Mfr.	Model	megohm-cm
Applied Process Engineering Laboratory	Barnstead	E-Pure	15.4

02/23/11

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
	02/23/11	Anna-Lisa Radloff	03/30/2011

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HNF-D 701 2
41274/216575

PORE WATER SAMPLING

69
0950 - based upon weather forcasted tomorrow, Samples will be attempted to be collected from Transects 7 & 8 today.

0955 QC - T100F2A @ 09 S 02/23/11 182.2

1st attempt @ 4.8ft unsuccessful.

02/23/11

Myron 163.3	INITIAL Porewater Readings			Date: 02/23/11	
	Water quality results (after purge water)				
	Conductivity (µS/cm)[b]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
	162	3.08 ~~2.960~~ S 02/23/11	254	7.90	8.33
	Turbidity[d] 148 NTU				

	SurfacewaterReadings				
	Water quality results (after purge water)				
	Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
	140.3	2.960	289	8.25	12.35
	Turbidity[d] 2.56 NTU				

COMPOSITE Porewater Sample					
Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates (deg.deg)NAD83 A ac. ± 1.724	
F1 Transect 7	F11-017-009	before: .4 after: .6	Start: 1100 End: 1150	E -114.4469 0495 W S 02/23/11	N 46.6609 1638
Probe Tip Depth (Inches) (6"-12") 12" bsg	Water depth: ~~4.8~~ ft S 02/23/11 6.4 ft				
	Water quality results (Composite)				
	Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
	160.5	3.105	188	7.51	9.10
	Turbidity[d] 24.5 NTU				
HEIS Sample No.(s)	Volume (mL)			Duplicate? Tied To:	# Bottles/Notes:
B2BDC1	~600 mL			No	1

FINAL Porewater Readings				
Water quality results				
Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
161.6	3.161	215	7.64	8.11
Turbidity[d] 10.67 NTU				

a) Myron
b) Trident
c) YSI
d) OAKTON

Substrate: med cobble

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02/23/11 Anna Lamkadiff 03/30/2011

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PORE WATER SAMPLING 41274/216575

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1155 Decon in field per SAI.

INITIAL Porewater Readings					Date: 02/23/11
Myron 149.9	Water quality results (after purge water)				
	Conductivity (µS/cm)[b]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
	153	3.240	252	8.03	10.68
	Turbidity[c] 412 NTU				

SurfacewaterReadings				
Water quality results (after purge water)				
Conductivity (µS/cm)[c]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
139.0	3.055	242	8.01	12.68
Turbidity[c] 2.02 NTU				

COMPOSITE Porewater Sample					
Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates Acc. ±1.48 FT (deg.deg)NAD83	
F2 Transect 17	F11-017-020	before: 0.6 after: 0.6	Start: 1245 End: 1330	E-119.44083802	N46.46093128
Probe Tip Depth (Inches) (6"-12")	Water depth 10.9 ft				
12" bsg	Water quality results (Composite)				
	Conductivity (µS/cm)[c]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
	152.7	3.289	249	8.09	10.68
	Turbidity[c] 72.1 NTU				

HEIS Sample No.(s)	Volume (mL)	Duplicate? Tied To:	# Bottles/Notes:
B2BDD2	~600mL	NO	1

FINAL Porewater Readings				
Water quality results				
Conductivity (µS/cm)[c]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
150.9	3.255	249	8.10	10.37
Turbidity[c] 26.3 NTU				

a) Myron
b) Trident
c) YSI
d) OAKTON

Substrate: med cobble

02/23/11

1335 Decon in field per SAI.

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
	02/23/11		03/30/2011

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PORE WATER SAMPLING
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41274/216575

INITIAL Porewater Readings				Date: 02/23/11
Water quality results (after purge water)				
Conductivity (µS/cm)[b]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
156	3.444	247	8.12	10.29
Turbidity[d] 516 NTU				

Myron, 151.7

SurfacewaterReadings				
Water quality results (after purge water)				
Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
137.6	3.153	243	8.12	12.57
Turbidity[d] 2.73 NTU				

COMPOSITE Porewater Sample					
Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates (deg.deg)NAD83 ACC ±1.96ft	
F2transect8	F11-017-021	before: 0.6 after: 0.6	Start: 1430 End: 1525	E(-)119.44058042	N46.66080088
Probe Tip Depth (Inches) (6"-12")	Water Depth 11.5ft				
	Water quality results (Composite)				
	Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
12"	152.2	3.436	232	8.20	10.54
659	Turbidity[d] 75.4 NTU 77.4				
HEIS Sample No.(s)	Volume (mL)		Duplicate? Tied To:	# Bottles/Notes:	
B2BDD3	~600 ml		NO	1	

FINAL Porewater Readings				
Water quality results				
Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
147.5	3.360	237	8.18	10.14
Turbidity[d] 21.6 NTU				

a) Myron
b) Trident
c) YSI
d) OAKTON

Substrate: med cobble

1530 Decon in field per SAI
1600 staff gauge @ .7
1605 QA - T100F2A @ 178.6 conduct.
1700 Relinquished samples to CHRPC
End of day

02/23/11

N/A

SIGNATURE | DATE 02/23/11 | WITNESSED & UNDERSTOOD BY Dana M Radloff | DATE 03/30/2011

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PORE WATER SAMPLING 41274/216575

NA

Thursday 02/24/2011 Zeke Simmons (EAS) Zeke Simmons - Technician, Neil Sullivan (EAS) - Captain, Ron Paulsen (CMA) - Lead, Mark Biser (CMA) - Technician to be on EAS Vessel 2 participating in Sampling activities.

0730 hrs.: Tailgate meeting (PoD) held at Apel. Discussed plans to collect 3 PW Samples. Discussed the winter weather advisory predicting decreasing temperatures, winds 10-30 mph, & light snow fall. Safety topics discussed related to weather included icy roadways & slips, trips, & falls.

River Flow:

Time	KCFS
0100	152
0200	NA
0300	154
0400	119
0500	143
0600	155
0700	158

Decon per SAI at 0745 hrs.

Weather AM: Mostly cloudy with a slight breeze

CHPRC 2011 100F				Date: 2-24-2011	
Trident Probe Conductivity Calibration Check					
Standard	Mfr.	Lot #	Expiration Date	Porewater Probe	Surface Probe
99.9 uS	Cole Parmer	CC8596	09/03/11	99	98
447	Oakton	205259	05/31/11	456	440

Myron L Ultrameter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
pH*	7	Myron L Company	1001397 EB	09/09/11	7.03
	4	Myron L Company	2003077 JM	08/03/11	4.02
Cond. (uS)	99.9	Cole Parmer	CC8596	09/03/11	97.86
	447	Oakton	205259	05/31/11	445.2

*ORP is calibrated using results of pH cal. Check

Zeke Simmons

YSI Dissolved Oxygen Meter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
D.O.	Zero	Hanna	1427	March of 2014	0.10

OAKTON Turbidity Meter Calibration Check: SN 623329					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
Turbidity(NTU)	0.02	OAKTON	470/1	9/30/2011	0.02
Turbidity(NTU)	20	OAKTON	470/1	9/30/2011	20
Turbidity(NTU)	100	OAKTON	470/1	9/30/2011	99.9
Turbidity(NTU)	800	OAKTON	470/1	9/30/2011	791

DI Water from Apel Lab 151/153			
Property of	Mfr.	Model	megohm-cm
Applied Process Engineering Laboratory	Barnstead	E-Pure	15.4

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Zeke Simmons	02/24/2011	[illegible]	03/30/2011

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PORE WATER SAMPLING

HNF-10-7012
41274/216575

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0900 hrs: Arrived at Ferry Landing boat launch just upstream off 100 F ~ 1/4 mile.
Weather: Partly cloudy with sustained winds of ~20 MPH; Sustained winds predicted to increase throughout the day. Wind gusts of ~ 30 MPH observed while at launch.
0930 hrs: The decision was made not to launch the boat due to extreme weather conditions. No Sampling activities will be performed.

TS 02/24/2011

NA

Pete Simmons 02/24/2011 [illegible] 03/30/2011

Title: Pore Water Sampling

Project No: HNF-N-701 2 75

Project No: 41274/216575

Dock Page No: NA

Friday 02/25/2011 Zeke Simmons (EAS) Zeke Simmons - Technician, Neil Sullivan (EAS) - Captain, Ron Paulsen (CMA) - Lead, Mark Biser (CMA) - Technician to be on EAS Vessel 2 participating in sampling activities.

0730 hrs: Tailgate meeting (POD) held at Apel. Discussed plans to collect 3 PW Samples. Safety topic was pinch points specifically regarding fingers.

River Flow:

Time	KcFS
0100	157
0200	165
0300	168
0400	151
0500	145
0600	147

Decon per SAI at 0735 hrs.

Weather AM: Clear skies. Cold temperatures below 30F°.

CHPRC 2011 100F				Date: 2-25-2011	
Trident Probe Conductivity Calibration Check					
Standard	Mfr.	Lot #	Expiration Date	Porewater Probe	Surface Probe
99.9 uS	Cole Parmer	CC8596	09/03/11	102	100
447	Oakton	205259	05/31/11	449	439

Myron L Ultrameter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
pH*	7	Myron L Company	1001397 EB	09/09/11	7.11
	4	Myron L Company	2003077 JM	08/03/11	4.10
Cond. (uS)	99.9	Cole Parmer	CC8596	09/03/11	98.44
	447	Oakton	205259	05/31/11	445.9

*ORP is calibrated using results of pH cal. Check

Zeke

YSI Dissolved Oxygen Meter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
D.O.	Zero	Hanna	1427	March of 2014	0.10

OAKTON Turbitity Meter Calibration Check: SN 623329					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
Turbidity(NTU)	0.02	OAKTON	470/1	9/30/2011	0.06
Turbidity(NTU)	20	OAKTON	470/1	9/30/2011	20.1
Turbidity(NTU)	100	OAKTON	470/1	9/30/2011	99.1
Turbidity(NTU)	800	OAKTON	470/1	9/30/2011	790

DI Water from Apel Lab 151/153			
Property of	Mfr.	Model	megohm-cm
Applied Process Engineering Laboratory	Barnstead	E-Pure	15.3

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Zeke Simmons	02/25/2011	[illegible]	05/26/2011

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PORE WATER SAMPLING
15

0715 hrs F QC Station Check/Survey
Staff gauge: 0.7 m Conductivity (uS/cm): 182.3

F1 Transect 8 Water depth at Station: 5.0 ft.
PURGE/Initial PW Readings

mL	Cond (uS/cm)	Temp (C°)
0	144	2.356
30	152	2.371
60	156	2.644
90	156	2.767
120	158	2.823

Substrate: Medium/small cobble

~~15~~ 02/25/2011

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Pete Simmons 02/25/2011 Anne Wm Radloff 03/30/2011

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Title: PORE WATER SAMPLING

Project No. 41274/216575

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INITIAL Porewater Readings Date: 02/25/2011

Myron Cond. 177.6

Water quality results (after purge water)

Conductivity (µS/cm)[b]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
158	2.823	248	7.71	8.43
Turbidity[a] 203 NTU				

SurfacewaterReadings

Water quality results (after purge water)

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
148.7	2.459	277	7.84	12.94
Turbidity[a] 2.96 NTU				

COMPOSITE Porewater Sample

Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates (deg.deg)NAD83 Accuracy 1.67ft.	
F1 Transect 8	F11-017	before: 0.7 after: 0.7	Start: 10:20 End: 11:00	E-119.44067572	N46.66074952

Probe Tip Depth (Inches) (6"-12") 12 inches BSG

1 LAG Lot No. 0422077

Water quality results (Composite)

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
155.8	2.793	255	8.04	9.60
Turbidity[a] 88.6 NTU				

HEIS Sample No.(s)	Volume (mL)	Duplicate? Tied To:	# Bottles/Notes:
B2BDC2	~600 mL	No	01/1LAG

FINAL Porewater Readings

Water quality results

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
149.9	2.856	243	7.97	8.76
Turbidity[a] 9.80 NTU				

a) Myron
b) Trident
c) YSI
d) OAKTON

Lee Simons

11:15 hrs. Decon in field per SAI.

1141 hrs: Cell phone communication with Anna Radloff (CHPRC) - Status/update
1143 hrs: Cell phone communication with A. Radloff - Status/update

ZS 02/25/2011

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Lee Simons	02/25/2011	Anna M Radloff	03/30/2011

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PORE WATER SAMPLING

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41274/216575

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F1 Transect 6 Water depth at Station 6.5 ft.

PURGE/Initial PW Readings

mL	Cond(uS/cm)	Temp (C°)
0	145	2.522
30	154	2.692
60	156	2.792
90	157	2.901
120	157	2.975

Substrate: Medium/Small Cobble

Luke Simmons

Myron Cond 151.8

INITIAL Porewater Readings Date: 02/25/2011

Water quality results (after purge water)

Conductivity (µS/cm)[b]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
157	2.975	245	8.07	9.58
Turbidity[d] 473 NTU				

SurfacewaterReadings

Water quality results (after purge water)

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
134.0	2.580	229	8.25	13.19
Turbidity[d] 5.55 NTU				

COMPOSITE Porewater Sample

Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates (deg.deg)NAD83 Accuracy 1.84 ft.	
F1 Transect 6	F11-017	before: 0.7 after: 0.8	Start: 11:50 End: 12:40	E-119.44112121	N46.66102397

Probe Tip Depth (Inches) (6"-12") 25 02/25/2011 ~~12~~ 11 inches BSG

1 LAG Lot. No. Ø422Ø7

Water quality results (Composite)

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
157.8	2.926	280	8.04	10.57
Turbidity[d] 84.7 NTU.				

HEIS Sample No.(s)	Volume (mL)	Duplicate? Tied To:	# Bottles/Notes:
B2BDCØ	~600 mL	No	01/1LAG

FINAL Porewater Readings

Water quality results

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
155.4	2.932	276	8.01	9.12
Turbidity[d] 24.4 NTU				

a) Myron
b) Trident
c) YSI
d) OAKTON

Luke Simmons

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Luke Simmons 02/25/2011 [illegible] 03/30/2011

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~~HDF-70~~ 79
41274/216575

PORE WATER SAMPLING
78

12:30 hrs.: Cell phone call to Jim Hogan (CHPRC) - Status/update & he informed me that we can relinquish samples before 19:00 hrs today.
12:35 hrs: Cell phone call to Brett Tiller (EAS) - Status/update
12:45 hrs: Cell phone call to Anna Radloff (CHPRC) concerning laboratory hours of operation this weekend.

12:55 hrs.: Decon in field per SAI.

12:57 hrs: Cell phone call from A. Radloff. She informed me that we are allowed to sample today until ~18:00 hrs. On 02/26/11 we are not allowed to sample. On 02/27/11 we may resume sampling at ~1000 hrs.

F2 Transect 6 Water depth at station: 11.7 ft.
PURGE/Initial PW Readings

mL	Cond. (µS/cm)	Temp (C°)
0	145	2.816
30	154	2.850
60	153	2.881
90	152	2.900
120	151	2.906

Weather P.M.: Clear Skies. Cold temperatures in the Mid 20's F° - Mid 30's F°. Moderate/Slight winds ~ 10 MPH.

25 02/25/2011

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SIGNATURE: Pete Simmons DATE: 02/25/~~2010~~ 2011 (25 02/25/2011) WITNESSED & UNDERSTOOD BY: Anna Radloff DATE: 03/20/2011

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PORE WATER SAMPLING
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HUF-N-701 2
41274/216575

Myron Cond. 149.5

INITIAL Porewater Readings Date: 02/25/2011

Water quality results (after purge water)

Conductivity (µS/cm)[b]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
151	2.906	263	8.33 ~~6.82~~ 25 02/25/11	9.75
Turbidity[d] 796 NTU				

SurfacewaterReadings

Water quality results (after purge water)

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
137.4	2.688	274	8.37	13.14
Turbidity[d] 5.62 NTU				

COMPOSITE Porewater Sample

Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates (deg.deg)NAD83 Accuracy 3.15ft	
F2Transect6	F11-017	before: 0.9 after: 1.0	Start: 14:07 End: 15:40	E-119.44107904	N46.66603273

Probe Tip Depth (Inches) (6"-12") 12 inches BSG

1 LAG Lot No. 942207

46.66103273

Water quality results (Composite)

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
146.6	2.909	241	8.21 ~~6.98~~ 25 02/25/11	11.32 ~~10.57~~ 25 02/25/11
Turbidity[d] 82.6 NTU				

HEIS Sample No.(s)	Volume (mL)	Duplicate? Tied To:	# Bottles/Notes:
B2BDD1	~600 mL	NO	01/1LAG

1500 hrs: Cell phone call to J. Hogan (CHPRC) - Informed him we would be at the launch at 17:30 hrs.

FINAL Porewater Readings

Water quality results

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
139.2	2.752	245	8.22	11.33
Turbidity[d] 22.9 NTU				

a) Myron
b) Trident
c) YSI
d) OAKTON

1550 hrs: Decon in field per SAI.
1606 hrs.: F QC Station Check/Survey
Staff guage: 1.0 m Conductivity (µS/cm): 172.7

1725 hrs: Relinquished Samples to CHPRC personnel.
25 02/25/2011

SIGNATURE	DATE	WITNESS (IF UNDERSTOOD)	DATE
	02/25/2011		05/30/2011

NA

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PORE WATER SAMPLING 4/274/216575

NA

Sunday 02/27/2011 Zeke Simmons (EAS) Zeke Simmons - Technician, Neil Sullivan (EAS) - Captain, Ron Paulsen (CMA) - Lead, Mark Biser (CMA) - Technician to be on EAS Vessel 2 participating in Sampling activities.

0730 hrs: Tailgate meeting (POD) held at Apel. Discussed plans to Collect 3 PW Samples & discussed high wind advisory predicted this afternoon.

River Flow:

Time	MCFS
0100	148
0200	149
0300	163
0400	167
0500	169
0600	171
0700	181

Decon per SAI at 0735 hrs.

Weather AM: Partly cloudy with mild temperatures in the mid 30's F° - Low 40°F

CHPRC 2011 100F				Date: 02-27-2011	
Trident Probe Conductivity Calibration Check					
Standard	Mfr.	Lot #	Expiration Date	Porewater Probe	Surface Probe
99.9 uS	Cole Parmer	CC8596	09/03/11	102	99
447	Oakton	205259	05/31/11	450	435

Myron L Ultrameter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
pH*	7	Myron L Company	1001397 EB	09/09/11	7.07
	4	Myron L Company	2003077 JM	08/03/11	4.10
Cond. (uS)	99.9	Cole Parmer	CC8596	09/03/11	98.23
	447	Oakton	205259	05/31/11	441.7

*ORP is calibrated using results of pH cal. Check

YSI Dissolved Oxygen Meter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
D.O.	Zero	Hanna	1427	March of 2014	0.10

OAKTON Turbitity Meter Calibration Check: SN 623329					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
Turbidity(NTU)	0.02	OAKTON	470/1	9/30/2011	0.07
Turbidity(NTU)	20	OAKTON	470/1	9/30/2011	20.1
Turbidity(NTU)	100	OAKTON	470/1	9/30/2011	98.2
Turbidity(NTU)	800	OAKTON	470/1	9/30/2011	796

DI Water from Apel Lab 151/153			
Property of	Mfr.	Model	megohm-cm
Applied Process Engineering Laboratory	Barnstead	E-Pure	10.3

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SIGNATURE: Zeke Simmons DATE: 02/27/2011 WITNESSED & UNDERSTOOD BY: Laura M Radcliff DATE: 03/30/2011

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41274/216575

PURE WATER SAMPLING

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1000 hrs: F QC Station check/Survey
Staff gauge: 1.1m Conductivity (uS/cm): 170.2
EXTREME HIGH WATER CONDITIONS
F1 Transect 4 Water depth at Station: 7.1 ft
PURGE/Initial PW Readings
Substrate: Medium/Small Cobble

mL	Cond (uS/cm)	Temp (c°)
0	144	2.294
30	148	2.299
60	157	2.366
90	162	2.422

SPLIT SAMPLE AT STATION/LOCATION F1 Transect 4
Primary sample collection vessel for SPLIT Sample taken/collected at F1 Transect 4: 160-2.5; Gallon LDPE Cubitainer
BOTTLE TYPE: Plastic
QA LEVEL: 01
LOT NO: 037688
MANUFACTURER: EP Scientific Products LLC
200 B.J. Tunnel Blvd.
Miami, OK 74354
Sample collected in cubitainer described above to be SPLIT into 02 1L Amber Glass bottles (1LAG). 1LAG described below.
112-01A; 1 Liter Amber Narrow Mouth Boston Round
BOTTLE TYPE: Glass
QA LEVEL: 01
LOT NO: 043672
MANUFACTURER: Same as above (EP Scientific Products LLC)

1025 hrs: Cell phone communication with Jim Hogan (CHPRC). He was inquiring as to confirm that we were collecting PW samples today.

25 02/27/2011

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SIGNATURE DATE SUPERVISOR/ENGINEER DATE
Pete Simmons 02/27/2011 [illegible] 05/30/2011

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Pore Water Sampling

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41274/216575

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INITIAL Porewater Readings					Date: 02/27/2011
Myron Cond. 160.7	Water quality results (after purge water)				
	Conductivity (µS/cm)[b]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
	162	2.422	273	7.68	9.66
	Turbidity[d] 407 NTU				

SurfacewaterReadings					
	Water quality results (after purge water)				
	Conductivity (µS/cm)[c]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
	136.1	2.343	275	7.80	12.87
	Turbidity[d] 6.14 NTU				

COMPOSITE Porewater Sample					
Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates Accuracy 1.73 ft (deg.deg)NAD83	
F1Transect4	F11-017	before: 1.1 after: 0.9	Start: 11:11 End: 12:35	E-119.44162281	N46.66128029
Probe Tip Depth (Inches) (6"-12") 12 inches BSG	Both ILAG Lot No.(s) 043672				
	Water quality results (Composite) ~1240 mL - 1300 mL				
	Conductivity (µS/cm)[c]	Temp (C°)[c]	ORP[c]	pH[c]	D.O.[c]
	167.9	2.502	232	7.67	9.51
	Turbidity[d] 42.2 NTU				

HEIS Sample No.(s)	Volume (mL)	Duplicate? Tied To:	# Bottles/Notes:
B2BDR6	~650 mL	SPLIT	01/ILAG
B2BDC9	~650 mL	SPLIT	01/ILAG

FINAL Porewater Readings					
	Water quality results				
	Conductivity (µS/cm)[c]	Temp (C°)[c]	ORP[c]	pH[c]	D.O.[c]
	161.3	2.662	238	7.88	8.46
	Turbidity[d] 7.68 NTU				

a) Myron
b) Trident
c) YSI
d) OAKTON

Pete Simmons

1135 hrs: Cell phone Communication with Jim Hogan (CHPRC). He informed us of the adverse weather alert issued today predicting high winds.

Weather (P.M.): At ~ 1230 hrs winds noticed to be increasing from the SSW.

1245 hrs: Decon in field per SAI.

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Pete Simmons	02/27/2011	Anna Mae Radell	05/31/2011

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PORE WATER SAMPLING

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F2 Transect 4 Water depth at Station: 11.4 ft.

PURGE/Initial PW Readings

Substrate: Medium/Small Cobble

mL	Cond(uS/cm)	Temp (C°)
0	142	2.713
30	152	2.690
60	154	2.710
90	154	2.742

INITIAL Porewater Readings Date: 02/27/2011

Myron Cond. 148.4

Water quality results (after purge water)

Conductivity (µS/cm)[b]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
154	2.742	260	7.85	10.26
Turbidity[c] 749 NTU				

SurfacewaterReadings

Water quality results (after purge water)

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
137.9	2.485	262	8.07	12.70
Turbidity[c] 4.56 NTU				

COMPOSITE Porewater Sample

Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates Accuracy 42.26 ft. (deg.deg)NAD83	
F2Transect4	F11-017	before: 0.9 after: 0.8	Start: 13:30 End: 14:05	E-119.44156226	N 46.66136025

Probe Tip Depth (inches) (6"-12") 12 inches BSG

1 LAG Lot NO. 042207

Water quality results (Composite)

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
150.5	2.8066	260	8.05	9.93
Turbidity[c] 195 NTU				

HEIS Sample No.(s)	Volume (mL)	Duplicate? Tied To:	# Bottles/Notes:
B2BDCB	~600 mL	No	01/1LAG

FINAL Porewater Readings

Water quality results

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
149.2	2.884	263	7.99	9.73
Turbidity[c] 49.5 NTU				

a) Myron
b) Trident
c) YSI
d) OAKTON

Zeke Simmons

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Zeke Simmons	02/27/2011	[illegible]	03/30/2011

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PORE WATER SAMPLING 41274/216575

Page No. 84 1415 hrs: Decon in field per SAI.

F1 Transect 3 Water depth at Station: 4.2 ft.

PURGE/Initial PW Readings

mL	Cond (uS/cm)	Temp (C°)
0	135	3.025
30	149	2.949
60	151	2.936
90	154	2.913
120	155	2.913

Substrate: Medium/small cobble

14:45 hrs: Cell phone communication with J. Hogan (CHPRC): Status/update

Myron Cond. 151.0

INITIAL Porewater Readings Date: 02/27/2011

Water quality results (after purge water)

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
155	2.913	268	7.81	9.49
Turbidity[a] 575 NTU				

SurfacewaterReadings

Water quality results (after purge water)

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
137.3	2.631	267	7.94	13.04
Turbidity[a] 13.90 NTU				

COMPOSITE Porewater Sample

Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates (deg.deg)NAD83 Accuracy 1.96 ft	
F1 Transect 3	F11-017	before: 0.8 after: 0.8	Start: 14:50 End: 15:30	E-119.44181295	N46.66139250

Probe Tip Depth (Inches) (6"-12") 12 inches BSG

1 LAG Lot No. 043672

Water quality results (Composite)

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
157.9	2.929	246	7.84	9.36
Turbidity[a] 87.2 NTU				

HEIS Sample No.(s)	Volume (mL)	Duplicate? Tied To:	# Bottles/Notes:
B2BDB5	~600 mL	No	01/1LAG

FINAL Porewater Readings

Water quality results

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[c]	pH[c]	D.O.[c]
152.5	2.929	253	7.60	8.74
Turbidity[a] 22.0 NTU				

a) Myron
b) Trident
c) YSI
d) OAKTON

16:00 hrs: F QC Station check/Survey
Staff gauge: 0.8 m Cond. (uS/cm): 174.8
16:05 hrs: Decon per SAI

1655 hrs: Relinquished Samples to CHPRC Personnel

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Pete Simmons	02/27/2011	[illegible]	03/30/2011

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PORE WATER SAMPLING

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41274/216575

NA

02/28/2011 (Monday) Zeke Simmons (EAS) - Zeke Simmons - Technician, Neil Sullivan (EAS) - Captain, Ron Paulsen (CMA) - Lead, Mark Biser (CMA) - Technician to be on EAS vessel 2 participating in Sampling activities.

LATE ENTRY: At 1706 hrs on Sunday 02/27/2011 Anna Radloff ZS 02/28/11 ~~CHR~~ (CHPRC) informed me via cell phone that we did not collect enough PW volume at F1 Transect 4 to perform a full SPLIT analysis. She instructed us to collect ≥ 1500 mL at any one of the remaining Stations/LOCATIONS.

0730 hrs: Tailgate meeting (POD) held at Apel. Discussed planned efforts to sample the 3 remaining Stations/LOCATIONS. Safety topic discussed was towing vessel on trailer on roadway in severe winds.

River Flow:

Time	KCFS
0100	169
0200	152
0300	163
0400	174
0500	174
0600	142
0700	138

Decon per SAI at 0735 hrs.

Weather AM: Extreme winds with temperatures in the high 30's F° - Mid 40's F°. Light rain 0930 hrs - 1130 hrs. Winds decreasing to Slight breeze at ~0930 hrs.

02/28/2011

SIGNATURE: Zeke Simmons DATE: 02/28/2011 WITNESSED & UNDERSTOOD BY: Anna Radloff DATE: 03/30/2011 PAGE NO. 87

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PORE WATER SAMPLING 41274/216575

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CHPRC 2011 100F				Date: 2-28-2011	
Trident Probe Conductivity Calibration Check					
Standard	Mfr.	Lot #	Expiration Date	Porewater Probe	Surface Probe
99.9 uS	Cole Parmer	CC8596	09/03/11	104	100
447	Oakton	205259	05/31/11	451	434

Myron L Ultrameter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
pH*	7	Myron L Company	1001397 EB	09/09/11	7.02
	4	Myron L Company	2003077 JM	08/03/11	4.11
Cond. (uS)	99.9	Cole Parmer	CC8596	09/03/11	99.09
	447	Oakton	205259	05/31/11	444.2

*ORP is calibrated using results of pH cal. Check

Zeke Sumner

YSI Dissolved Oxygen Meter Calibration Check: SN					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
D.O.	Zero	Hanna	1427	March of 2014	0.10

OAKTON Turbitity Meter Calibration Check: SN 623329					
	Standard	Mfr.	Lot #	Expiration Date	Actual Reading
Turbidity(NTU)	0.02	OAKTON	470/1	9/30/2011	0.09
Turbidity(NTU)	20	OAKTON	470/1	9/30/2011	20.0
Turbidity(NTU)	100	OAKTON	470/1	9/30/2011	98.8
Turbidity(NTU)	800	OAKTON	470/1	9/30/2011	790

DI Water from Apel Lab 151/153			
Property of	Mfr.	Model	megohm-cm
Applied Process Engineering Laboratory	Barnstead	E-Pure	10.3

F QC Station Check/Survey Time: 0950 hrs
Staff gauge: 1.0 m Conductivity (uS/cm): 173.3

F1 Transect 1 Water depth at station: 6.7 ft.
PURGE/Initial PW Readings
Substrate: Medium/Large cobble

mL	Cond (uS/cm)	Temp (C°)
0	145	2.504
30	152	2.546
60	158	2.693
90	161	2.788

ZS 02/28/2011

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Zeke Sumner	02/28/2011	[illegible]	05/20/2011

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41274/216575

PORE WATER SAMPLING

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SPLIT SAMPLE AT STATION/LOCATION F1 Transect 1
Primary Sample Collection vessel for SPLIT Sample collected at
F1 Transect 1: 160-2.5; Gallon LDPE Cubitainer
BOTTLE TYPE: Plastic
QA LEVEL: 01
LOT NO: 037688
MANUFACTURER: EP Scientific Products LLC
200 B.J. Tunnel Blvd.
Miami, OK 74354
Sample collection in cubitainer described above to be SPLIT into
02 1L Amber Glass bottles (1LAG). 1LAG described below.
112-01A; 1 Liter Amber Narrow Mouth Boston Round
BOTTLE TYPE: Glass
QA LEVEL: 01
LOT NO: 043672
MANUFACTURER: Same as above.

TS 02/28/2011

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SIGNATURE: Pete Simmons DATE: 02/28/2011 WITNESSED & UNDERSTOOD: [signature] DATE: 03/30/2011

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Book No. HNF-N-7012 89

TITLE: PORE WATER SAMPLING

Project No. 41274/216575

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Zeke Simmons

INITIAL Porewater Readings Date: 02/28/2011

Myron Cond. 157.4

Water quality results (after purge water)

Conductivity (µS/cm)[b]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
161	2.788	220	7.34	7.30
Turbidity[a] 150 NTU				

SurfacewaterReadings

Water quality results (after purge water)

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
139.9	2.563	310	7.75	12.98
Turbidity[a] 10.90 NTU				

COMPOSITE Porewater Sample

Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates (deg.deg)NAD83 Accuracy 1.71 ft.	
FITransect 1	F11-017	before: 1.0 after: 0.8	Start: 10:45 End: 12:20	E-119.44255764	N46.66177271

Probe Tip Depth (Inches) (6"-12") 12 inches BSG

Both 1LAG Lot No(s). 043672

Water quality results (Composite)

Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
161.7	2.838	287	7.62	8.07
Turbidity[a] 10.46 NTU				

HEIS Sample No.(s)	Volume (mL)	Duplicate? Tied To:	# Bottles/Notes:
B2BDB3	~1000 mL	SPLIT	01/1LAG
B2C6J9	~1000 mL	SPLIT	01/1LAG

FINAL Porewater Readings

Water quality results

Conductivity (µS/cm)[a]	Temp (C°)[a]	ORP[a]	pH[a]	D.O.[c]
158.8	2.810	290	7.58	5.61
Turbidity[a] 1.54 NTU				

a) Myron
b) Trident
c) YSI
d) OAKTON

Weather P.M.: Cloudy. Breeze changed to coming from the west.

1104 hrs: Cell phone communication with Ray Plunkett (CHPRC): Status/update

1228 hrs: Decon in field per SAI.

1230 hrs: Cell phone communication with Anna Radloff (CHPRC) - Regarding sample volume.

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Zeke Simmons	02/28/2011	Anna Radloff	03/30/2011

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PORE WATER SAMPLING

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F2 Transect 3 Water depth at station: 10 ft.

PURGE/Initial PW Readings

ml	Cond(uS/cm)	Temp (C°)
0	144	2.648
30	144	2.608
60	152	2.591
90	170	2.639
120	178	2.691

Substrate: Medium cobble

1445 hrs: Cell phone communication with R. Plunkett (CHPRC) - Status/update.

Myron Cond. 180.6

INITIAL Porewater Readings				Date: 02/28/2011
Water quality results (after purge water)				
Conductivity (µS/cm)[b]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
178	2.691	280	8.04	8.44
Turbidity[d] 521 NTU				

SurfacewaterReadings				
Water quality results (after purge water)				
Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
138.6	2.607	277	7.95	12.87
Turbidity[d] 6.68 NTU 6.68				

COMPOSITE Porewater Sample					
Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates (deg.deg)NAD83 Accuracy 2.08 ft.	
F2 Transect 3	F11-017	before: 0.8 after: 0.8	Start: 13:15 End: 15:05	E-119.44176214	N46.66144837
Probe Tip Depth (Inches) (6"-12") 12 inches BSG	1 LAG Lot No. 042207				
	Water quality results (Composite)				
	Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
	180.1	2.731	235	8.30	7.94
	Turbidity[d] 189 NTU				
HEIS Sample No.(s)	Volume (mL)			Duplicate? Tied To:	# Bottles/Notes:
B2BDC7	~620 mL			No	01/1LAG

FINAL Porewater Readings				
Water quality results				
Conductivity (µS/cm)[a]	Temp (C°)[b]	ORP[a]	pH[a]	D.O.[c]
173.2	2.746	237	8.52	6.19
Turbidity[d] 120 NTU				

a) Myron
b) Trident
c) YSI
d) OAKTON

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Lee Simmons 02/28/2011 [illegible] 03/30/2011

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TITLE: PORE WATER SAMPLING 41274/216575

Page 90 15:15 hrs.: decon infield per SAI.

F2 Transect 1 Water depth at Station: 10.2 ft.

PURGE/Initial PW Readings

Substrate: Medium/Large Cobble

ml	Cond(uS/cm)	Temp. (c°)
0	144	2.595
30	150	2.609
60	162	2.887
90	161	2.948
120	162	2.969

INITIAL Porewater Readings Date: 02/28/2011

Myron Cond. 156.6

Water quality results (after purge water)

Conductivity (µS/cm)[a]	Temp (C°)[a]	ORP[a]	pH[a]	D.O.[a]
~~156.6~~ 162	2.969	243	8.10	9.72
Turbidity[a] 658 NTU				

SurfacewaterReadings

Water quality results (after purge water)

Conductivity (µS/cm)[a]	Temp (C°)[a]	ORP[a]	pH[a]	D.O.[a]
135.8	2.678	241	8.25	12.40
Turbidity[a] 5.58 NTU				

COMPOSITE Porewater Sample

Station ID:	SAF#	Staff Guage (m.m)	Sample Time	Coordinates (deg.deg)NAD83	
F2Transect1	F11-017	before: 0.8 after:	Start: 16:10 End: 16:50	E-119.44256410	N46.66618864

Accuracy 2.63 ft

Probe Tip Depth (Inches) (6"-12") 12 inches BSG

1 LAG Lot No. 043672

Water quality results (Composite)

Conductivity (µS/cm)[a]	Temp (C°)[a]	ORP[a]	pH[a]	D.O.[a]
162.8	2.982	269	8.11	8.96
Turbidity[a] 98.6 NTU				

HEIS Sample No.(s)	Volume (mL)	Duplicate? Tied To:	# Bottles/Notes:
B2BDC5	~620 mL	No	01/1LAG

FINAL Porewater Readings

Water quality results

Conductivity (µS/cm)[a]	Temp (C°)[a]	ORP[a]	pH[a]	D.O.[a]
164.3	2.930	269	8.09	7.39
Turbidity[a] 29.9 NTU				

a) Myron
b) Trident
c) YSI
d) OAKTON

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SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Jule Simmons	02/28/2011	[illegible]	03/30/2011

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PORE WATER SAMPLING

41274/216575

From Page No. 91

F QC Station Check/Survey Time: 17:10 hrs
Staff gauge: 0.8m Conductivity(uS/cm): 170.5

17:15 hrs: Decon in field per SAI.

1750 hrs: Relinquished Samples to CHPRC personnel.

The entries on this page (Page No. 92) of this logbook are the final entries recorded in this logbook (HNF-N-7012). Pages 93-100 of this logbook will not be utilized.

TS 02/28/2011

To Page No. NA

SIGNATURE	DATE	WITNESSED & UNDERSTOOD BY	DATE
Zoe Simmons	02/28/2011	Duncan Rodd	05/30/2011

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