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JOURNAL
No. 391

BASF North Works

Pore Water Sample Collection

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10/25/10 – 10/29/10

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

Name KIM WHITLOCK
TECHLAW, INC.

Address 205 W. WACKER DR. STE 1622
CHICAGO, IL 60606

Phone 312-345-8930
217-721-5483 (cell)

Project BASF-NORTH WORKS
WYANDOTTE, MICHIGAN
PORE WATER SAMPLING

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	CONTACTS	
	BREWSTER CONANT: 519-502-5702	
	GARY CYGAN: 312-420-0278	
	JOE BONEM: 989-714-1347	
	JUAN THOMAS: 708-646-5946	
	ROBERT SNYDER: 708-466-4281	

DATE	TIME	LOCATION	DEPTH	pH	CONDUCTIVITY	TDS	
10/25/10	1140	T29-25	2.75	12.47	17.38ms	8.36 ppt	
	1258	T29-25	3.5	12.86	12.47 ms	6.19 ppt	
	1347	T29-25	4.0	13.07	18.44 ms	9.19 ppt	
KW 10/25/10	~~1603~~ 1703	T22-25	1.0	12.19	~~18~~ KW 10/25/10 1712 ms	856 ppm	
	1753	T22-25	3.5	13.20	12.73ms	6.37 ppt	
10/28/10	0938	T26-50	1.0	11.03	3.97 ms	1.99 ppt	
	1037	T26-50	2.0	11.56	2.79 ms	1.40 ppt	
	1120	T26-50	5.0	11.85	4.03 ms	2.00 ppt	
	1130	T26-50	6.5	10.65	4.28 ms	2.16 ppt	
	1147	T26-50	8.0	8.32	3.48 ms	1.76 ppt	
	1545	T25-50	0.5	9.51	922 ms	464 ppm	
	1737	SP1-V04	0.5	7.06	1260 ms	621 ppm	
10/29/10	0953	T29-100	4.25	10.65	2.17 ms	1.09 ppt	
	1008	T29-100	5.0	9.92	11.10 ms	5.58 ppt	
	1200	T24-75	0.5	11.50	2.81 ms	1.41 ppt	
	1222	T24-75	0.5	12.50	6.24 ms	3.15 ppt	post-sampling
	1238	T24-75	1.5	12.52	7.90ms	3.96 ppt	
	1310	T24-75	3.5	10.32	7.38 ms	3.71 ppt	
	1320	T24-75	4.5	9.98	4.31 ms	2.15 ppt	
	1549	T18-25	0.5	11.74	2.20 ms	1.10 ppt	
	1605	T18-25	1.1	11.64	1510 ms	751 ppm	
	1639	T18-25	2.5	9.11	2.93 ms	1.37 ppt	
	1650	T18-25	3.5	7.29	4.42 ms	2.20 ppt	

Kim Nelson 10/29/10

DATE	TIME	LOCATION	DEPTH	PH	CONDUCTIVITY	TDS

10/29/10

10/29/10

DATE	TIME	LOCATION	DEPTH	pH	CONDUCTIVITY	TDS

10/24/10

2300 CALIBRATE pH meter using 7.0 and 10.0 buffer solutions.

- Also, calibrate Conductivity/TDS meter using 447 µs and 1413 µs standards for conductivity and 226 ppm (447 µs) and 1382 ppm (2764 µs) for TDS.
- will check meters in the morning prior to use

10/24/10

10/25/10 BASF

0740 Arrive @ Pier 500 marina + meet GLNPO Captain + First Mate

Weather: overcast 60s, light breeze

Personnel: Kim Whitlock - Tech Law
Brewster Conant - Univ. of Waterloo
Juan Thomas - U.S. EPA
Joe Boreen - EPA GLNPO Captain
John Wagar - EPA GLNPO 1st Mate

PPE: Level D - Safety Glasses, steel toes, life vest, hard hat when crane in operation, ear protection w/ percussion hammer

Objective: Collect pore water samples in sediments adjacent to BASF facility

- Safety briefing: life vests on outside of cabin, watch for slips/trips/falls, be aware of line of sight for captain

0950 Prepare to mobilize to first location - T29-25

0953 Leave marina

1005 Arrive at T29-25 - anchor using 3 anchors

GPS readings: @ T29-25
42° 12.664962'N, 83° 08.573515'W

- meters checked for calibration; recal cond/TDS per mfg. instructions — Kim Whitlock 10/25/10

BASF 10/25/10

1024 PHOTOS 1+2 View of T29-25 [FW]
Sampling location w/ respect to shore
- set up sampling manifold, meters, + harpoon sampler

1040 Employ harpoon sampler to a depth of six inches

1045 Record conductivity, pH, TDS of surface water

Surface water @ T29-25
pH = 8.25
cond. = 252 us
TDS = 127 ppm

Turn on pump, pressure is ~30 psi, but no water is recovered; no sample collected @ T29-25-0.5; prepare to utilize waterloo profiler @ greater depths

- when removing harpoon sampler, sediment material appeared to have clay - could be why water wasn't recovered

1050 PHOTO 3 View of sampling setup [FW]

1123 Backflush waterloo profiler w/ deonized water — Kim Whitlock 10/25/10

10/25/10 BASF

1133 Begin pumping @ T29-25-2.75
- Change vials in sampling manifold to collect parameters from a clean vial

1137 PHOTO 4 View of T29-25-2.75 pore water [FSW]
- pore water is grayish/brown - sampling manifold is bubbling - water almost appears rusty

1140 Collect water quality parameters - refer to table
- Backflush w/ DI and put probe @ 3.5 depth (feet)
- Trouble recovering water - Brewster heard a weird noise → thinks there is something wrong w/ the lines; decide to pull up Waterloo profiler + check connections - air leak caused by loose ferrules - Brewster in process of fixing problem

1250 Place waterloo profiler back in place @ T29-25-3.5; backflush w/ DI
- Begin pumping; wait for color change - view color change; change out vial so sample is collected into clean 40 mL vial

Kim Whitbeck 10/25/10

BASF 10/25/10

1257 PHOTO 5 View of pore water from T29-25-3.5 [FSW]

1258 Collect water quality parameters from T29-25-3.5 (only recover ~ 10 mL of pore water @ this depth

1305 Backflush w/ DI as penetrate to next depth - go to depth of 4 ft to try to obtain another pore water sample for field testing

1310 Begin pumping @ T29-25-4.0
- Change to clean vial once pore water is visible

1314 PHOTO 6 View of pore water [FSW] from T29-25-4.0
- @ 4 ft depth, Brewster indicated he had to pound into a harder material for ~ 6 inches to reach final 4 ft depth

1325 Collect porewater samples for T29-25-4.0 to be analyzed for Chloride, Sulfate, Carbonate and metals
- Samples for metals filtered prior to preservation w/ HNO_3 - use a 0.45 μm filter (attached to a Luer Lock Syringe)
- Sheen noted on pore water - also

Kim Whitbeck 10/25/10

10/25/10 BASF

odor is observed (similar to fuel /diesel)

1335 Mike Gerdenich (BASF) stops by fenceline - indicates they have comments regarding Techlaw's SAP. He also wants to know our field schedule - KW sends him an email w/ her contact info

1345 Finish collecting pore water samples for lab analysis @ T29-25-4.0

1347 Collect water quality parameters @ T29-25-4.0

1348 PHOTO 7 View of filtering metals pore water @ T29-25-4.0

1350 PHOTO 8 View of pH reading (13.07) @ T29-25-4.0 [F DOWN]

1357 PHOTO 9 View of waterloo profiler [FS] tip after pulling up from T29-25-4.0

1405 Prepare to head back to marina for lunch; samples for lab for T29-25-4.0 placed in cooler w/ ice

@ T29-25-4.0, filtered approx 100 mLs for metals analysis and collected 120 mLs for chloride, sulfate, + alkalinity

Kim Wheeler 10/25/10

BASF 10/25/10

- Break for lunch

1540 Leave marina - head to T22-25

1553 Attempt to anchor @ T22-25

1557 Anchored in @ T22-25

1600 Collect GPS reading @ T22-25 42°12.8867'N, 83°08.4749'W

1622 Place harpoon sampler in @ T22-25-0.5 after backflushing w/ DI; tubing was inspected in between use and no visible contamination

1630 Harpoon sampler does not recover any water from the pore space @ T22-25-0.5; no parameters / sample collected; prepare to switch to waterloo profiler

1640 Surface water depth: 21.5 ft

1643 Waterloo profiler inserted to a depth of 6 inches - attempt to sample pore water; no recovery of pore water

1650 Use crane to hook up electric percussion hammer to drive waterloo profiler deeper into sediments

1652 [FS] PHOTO 10 Using electric percussion hammer to drive in Waterloo

Kim Wheeler, 10/25/10

10/25/10 BASF

profiler to a depth of 1 ft.

1655 Begin pumping @ T22-25-1.0

→ pore water is light gray

1657 PHOTO 11 View of pore water @ T22-25-1.0 [FSW]

1700 Collect enough pore water (~10 mL) for field testing @ T22-25-1.0

1703 Collect parameters @ T22-25-1.0

1710 Drive profiler to a depth of 2.5 ft into sediments @ T22-25

- when driving profiler, hit a soft spot where profiler went into sediments easily

- Begin pumping, but no water is recovered; decide to try to go deeper

1721 PHOTO 12 [FSW] View of T22-25 with respect to shore

1722 PHOTO 13 [FW] View of T22-25 w/ respect to shore

1725 Penetrate waterloo profiler to a depth of 3.5 ft depth @ T22-25

1730 Begin collecting T22-25-3.5 pore water for chloride, sulfate, alkalinity, metals

Kim Mueller 10/25/10

BASF 10/25/10

- pore water at T22-25-3.5 has a odor that smells like fuel / PAHs / sweet smelling / tar-like

- Collect a MS/MSD and a blind duplicate @ T22-25-3.5 since we are getting good recovery - will label blind dup as T30-25-3.5 @ 1130

1753 PHOTO 14 [Fdown] View of pH = 13.20 @ T22-25-3.5; collect field parameters

- running out of daylight - collect rest of metals volume - place in unpreserved container - will filter on shore; samples placed on ice upon collection

1815 Pull up anchors and head for the marina

1834 Arrive back @ marina and unload equipment

1900 Leave marina; call Gary Cygan to give him an update

1915 Arrive @ hotel; finish filtering metals samples for T22-25-3.5

1930 Check pH meter to verify calibration w/ 10.0 buffer ⇒ pH = 10.13

Kim Mueller 10/25/10

10/25/10 BASF

1935 Check Conductivity meter w/ 10,000 µs std to verify cal = 13.76 ms ; therefore cond. values may be biased high

check cal w/ 447 µs = 518 µs ; once again, conductivity values may be biased high

1945 Check calibration of TDS w/ 2226 ppm Std. => 2258 ppm; So TDS may be biased slightly high

1950 Complete field activities for the day

Sample Summary:

TIME	LOCATION	DEPTH	ANALYSES
1325	T29-25	4.0 ft.	Metals, Chloride, sulfate, alkalinity
1730	T22-25	3.5 ft.	↓
1130	T30-25*	3.5 ft.	↓

* Blind duplicate sample of T22-25-3.5; Also, Note that extra volume Collected @ T22-25-3.5 for MS/MSD

Kim Whitlock 10/25/10

BASF 10/26/10

0730 Arrive @ marina

Weather: windy (17 mi/hr w/ gusts to 21 mi/hr) 50s°F, partly cloudy

Personnel: Kim Whitlock - TechLaw
Brewster Conant - Univ. of Waterloo
Juan Thomas - US. EPA
Joe Boreen - GLNPO Mudpuppy Captn
John Wagar - GLNPO First Mate

PPE: Level D - safety glasses, steel toes, life vest, gloves, hard hat (when using crane), ear plugs (when using percussion hammer)

Objective: Collect pore water samples from the sediments adjacent to the BASF facility in Wyandotte, Michigan

- Upon arrival, Joe is listening to weather reports/forecasts; the Mudpuppy cannot go out on the water when winds exceed 20 mi/hr
- Due to winds approaching 20 mi/hr limit and wind warnings that indicate winds will get much worse, decide to call off field sampling activities for the day
- Prior to leaving marina, test out rain shelter for equipment

Kim Whitlock 10/26/10

10/26/10 BASF

0845 Leave marina and call Gary Cygan to provide an update - indicate we will not be working on the water today and that the winds may prevent us from working tomorrow; we will just have to wait and see how the weather turns out tomorrow; plan to meet @ the marina again tomorrow morning to assess the situation

Kim Whitlock 10/26/10

BASF 10/27/10

0720 Arrive @ Marina

Weather: Windy (in excess of 25 mi/hr), brisk, clear skies

Personnel: Kim Whitlock - Techlaw
Brewster Conant - U. of Waterloo
Juan Thomas - US EPA
Joe Bonem - GLNPO Captain
John Wagar - GLNPO 1st Mate
Alison Skwarski - Arcadis
↳ (BASF contractor)

PPE: Level D - steel toes, safety glasses, gloves, life vest, hard hat + hearing protection w/ use of crane/percussion hammer

Objective: Collect pore water samples from sediments adjacent to BASF facility
- Meet w/ Alison Skwarski (Arcadis) to show her boat/equipment, explain safety hazards as well as sampling process
- Brewster back flushes Waterloo profiler tubing w/ deionized water to decontaminate and prepare for sampling activities

Kim Whitlock 10/27/10

10/27/10 BASF

- Due to high winds, Joe indicates we cannot go out on the water today
- Juan indicates that BASF was concerned w/ our proposed decontamination procedure and indicated they wanted Techlaw to decontaminate w/ Alconox
- KW indicates that TL will collect an equipment blank to demonstrate that decontamination procedure is sufficient

0858 Collect Equipment blank for Chloride/Sulfate/alkalinity + metals by back-flushing DI through the waterloo profiler and collecting EB from tip of waterloo profiler

- Brewster puts together another Harpoon sampler so we have an extra

0920 Leave the marina

- Arrive @ hotel and meet in lobby w/ Brewster + Juan to discuss BASF's comments on Techlaw's SAP

1020 Juan has to gather items to leave; finish discussion of BASF's comments

Kim Whitford 10/27/10

BASF 10/27/10

1430 Gary Cygan arrives at hotel and meets w/ KW and Brewster to go over current field activities, etc.

1630 Break for the day

Kim Whitford 10/27/10

10/28/10 BASF

0720 Arrive @ Pier 500 marina

Weather: Cold, 40s, Cloudy, winds 15mi/hr

Personnel: Kim Whitlock - TechLaw
Brewster Conant - U. of Waterloo
Gary Cygan - US EPA
Joe Bonem - GLNPO Captain
John Wager - GLNPO 1st Mate
Alison Skwarski - Arcadis (BASF cont.)

PPE: Level D - gloves, safety glasses, steel toes, life vest, hard hat (when crane in use), + hearing protection (when using percussion hammer)

Objective: Collect pore water samples from sediments adjacent to BASF facility

- Load up supplies onto boat

0830 Depart marina for T26-50

- Water level went down over the last few days as the ropes on the boat were all tight when we arrived @ marina

0845 Attempt to anchor @ T26-50, but current is forcing the boat sideways, so have to pick up anchors

- Re attempt to anchor @ T26-50

0900 Anchor @ T26-50 and collect GPS readings

Kim Whitlock 10/28/10

BASF 10/28/10

42° 12.1648'N, 83° 08.5225'W

0903 PHOTOS 15+16 [FNW] View of collection of GPS readings from sampling platform

- Currently 12 ft. north of original GPS location provided by BASF's contractor
- Surface water depth is approx. 21 ft. deep
- Begin to setup Harpoon sampler
- Backflush Harpoon sampler w/ deionized water (100 mL)

0912 Check calibration of pH meter using 10.0 buffer sol'n = 10.20; decide to recalibrate

- Backflush harpoon as inserting to depth - insert to a depth of 1.0 ft into sediments
- Recalibrate w/ 7.0 and 10.0 stds

Slope = 87.7, 10.0 = 10.20, 7.0 = 7.08

0930 Begin pumping @ T26-50-1.0

0933 PHOTO 17 [FNE] View of pore water from T26-50-1.0

0934 PHOTOS 18+19 [FW + NW] View of T26-50 w/ respect to shore

Kim Whitlock 10/28/10

10/28/10 BASF

0935 Begin Collecting pore water @ T26-50-1.0 for chloride, sulfate, alkalinity + metals; odor noted (sweet / roofing tar / PAH)

0938 Collect water quality parameters
- Calibrate conductivity meter w/ 10,000 µs std.; calibration accepted
- Filtering metals sample w/ 0.45 micron filters; initial vial was lightly opaque, then it cleared up during sampling

0952 Finish collection of pore water samples for lab analysis; place in cooler w/ ice
- Backflush harpoon w/ deionized in place @ 1.0 ft.
- Prepare to collect equipment blank after backflushing harpoon

0955 PHOTOs 20+21 [F down] View of sediment adhered to harpoon after pulling up ~~on~~ KW 10/28/10 @ T26-50-1.0

1007 Collect equipment blank for Harpoon for chloride, sulfide, alkalinity, + metals

1009 PHOTO 22 View of collection of [FE] equipment blank w/ Harpoon
- Prepare to insert Harpoon to a depth of 2.0 ft.

Kim Whitlock 10/28/10

BASF 10/28/10

1022 Insert probe to a depth of 2 ft into sediments while backflushing w/ DI

1025 Begin pumping @ T26-50-2.0
- water is pretty clear, but notice a slight opaque color and odor; will only collect water quality parameters @ T26-50-2.0 so only collect about 15 mL

1037 Collect water quality parameters @ T26-50-2.0

1040 PHOTOs 23+24 [FE] View of pore water from T26-50-2.0
- Prepare to insert Waterloo profiler
- When removing Harpoon from T26-50-2.0 observe sandy material adhered to Harpoon
- Use crane to hook up jackhammer to drive in Waterloo profiler

1046 PHOTOs 25+26 View of jackhammer hooked up to winch on crane [FNW]
- Backflush Waterloo profiler w/ DI water and insert to a depth of 3.5 ft into sediments

1105 Begin pumping @ T26-50-3.5
- Did not recover any water from

Kim Whitlock 10/28/10

10/28/10 BASF

T26-50-3.5 ft: backflush w/ DI, then will drive to another depth

1112 Drive to a depth of 5 ft into sediments

- When driving, it was hard, hard, hard, then soft

1113 Begin pumping and begin to see color of sediment come into vial

1118 PHOTO 27 [FE] View of porewater from T26-50-5.0

1120 Collect water quality parameters @ T26-50-5.0, odor noted

- Backflush waterloo profiler w/ DI KW 10/28 + push to next depth of ~~7 ft~~ 6.5 feet

1123 Begin pumping @ T26-50-6.5, odor noted

1129 PHOTO 28 [FE] View of porewater from T26-50-6.5

1130 Collect water quality parameters (pH, cond., TDS) from T26-50-6.5

1135 PHOTO 29 [FNW] View of marking off waterloo profiler rods to measure final depths

Kim Wallace 10/28/10

BASF 10/28/10

- Prepare to drive Waterloo deeper @ T26-50; drive to a depth of 8.0 feet into sediments

1140 Begin pumping @ T26-50-8.0; slight odor noted

1145 PHOTO 30 [FE] View of porewater @ T26-50-8.0; opaque in color

1147 Begin collecting water quality parameters @ T26-50-8.0

- Drive waterloo profiler to a depth of 9.5 ft @ T26-50 while backflushing DI

- It should be noted that gloves are changed @ each location and a clean vial is placed on sampling manifold prior to collecting pore water for field testing or lab analysis

1152 Collect surface water off the side of the boat @ T26-50 to measure pH; pH = 8.09

- Also collect conductivity + TDS of surface water @ T26-50
Conductivity = 378 µS
TDS = 189 ppm

Kim Wallace 10/28/10

10/28/10 BASF

- Could not recover any porewater from T26-50-9.5; decide to end sampling @ this location; prepare to pull up waterloo profiler
- Backflush waterloo w/ DI prior to pulling up waterloo
- Backflush waterloo again, once it is pulled up; also clean ports on waterloo profiler tip w/ DI

1215 Pulling up the anchors and heading to marina for lunch break

- having trouble picking up last anchor - it appears to be caught on a 1,000 lb railroad tie

1240 Cut off anchor since there is no way to pull it up and head back to marina

1255 Return to marina & break for lunch

1430 Leave marina and head to T25-50

- Our GPS coordinates are close to US Army Corps of Engineers boat, so we tie off to their boat w/ their permission

1440 Collect GPS @ T25-50

Kim Whitehead 10/28/10

BASF 10/28/10

42° 12.7977'N 83° 08.5126'W

Surface water depth = 21 ft.

- Prepare to insert harpoon to depth of 6 inches

1456 PHOTO 31 FNW View of insertion of Harpoon @ T25-50-0.5

1457 PHOTO 32 FNW View of T25-50 w/ respect to shore

1458 Begin pumping @ T25-50-0.5

- No recovery of water; decide to pull out the harpoon, test to make sure it isn't clogged - everything appears to be working; will reinsert Harpoon again to see if we can recover pore water from 0.5 ft interval

1507 Reinsert Harpoon to a depth of 0.5 ft while backflushing w/ DI

1510 Begin pumping again @ T25-50-0.5 very slow moving, but we are recovering water here @ T25-50-0.5; first have to purge all DI in tubing, then wait for pore water; once pore water is visible (evident by color of sediment), a clean vial is placed

Kim Whitehead 10/28/10

10/28/10 BASF

onto sampling manifold and pore water collection begins

- Purged approx. 45-50 mL prior to placing new vial onto manifold for pore water collection

1543 PHOTO 33 FE View of pore water from T25-50-0.5 KW 10/28/10

- Odor observed @ T~~26~~25-50-0.5, very slightly cloudy/light gray

1545 Finish purging and begin collecting water quality parameters @ KW 10/28/10 T~~26~~25-50-0.5

- When pulling up Harpoon from T25-50-0.5, sediment adhered to Harpoon appeared to be a gray silty clay w/ little sand

- Backflush Harpoon w/ De-ionized; also backflush w/ DI when inserting to next depth

1555 Insert Harpoon to a depth of 1.8 ft and begin purging

1558 Collect surface water off side of boat for field testing

Kim Whitted 10/28/10

BASF 10/28/10

Surface water quality parameters @ T25-50:

pH = 8.11

conductivity = 365 us

TDS = 180 ppm

- Did not recover any pore water @ T25-50-1.8

- Backflush w/ DI; reinsert Harpoon in while backflushing DI to a depth of 2.5 ft

1610 Begin pumping @ T25-50-2.5

- Do not recover any pore water at T25-50-2.5; backflush w/ DI

- Prepare to insert waterloo profiler to a depth of ~~3.5 ft.~~ 3.75 ft KW 10/28/10

1623 Insert profiler to depth of 3.75 ft and begin purging at T25-50-3.75

- Allison Skwarski (Arcadis) asks for data from Monday - KW dictates readings to Alison; She also asks what pH probe we are using - KW allows her to view probe and cond model info

- Using Thermo Scientific Orion 9107BN Triode low maintenance pH meter

Kim Whitted 10/28/10

10/28/10 BASF

- pH probe was brand new prior to using for this sampling event
- Do not recover pore water @ T25-50-3.75; backflush waterloo w/ DI; remove waterloo from water
- EPA + Techlaw discuss pulling up + mobing to next location since we are not yielding any water — all agree that we should move to next location

1635 Untie from USACE tugboat and mobilize to SPI-U04 reference location immediately West of Mud Island

1705 Anchor in @ SPI-U04; collect GPS readings:
42° 14.3554'N 83° 08.6376'W

- Begin to setup Harpoon sampler

1704 PHOTO 34 [FN]
1704 PHOTO 35 [FS]
1705 PHOTO 36 [FE]
1705 PHOTO 37 [FW]
1705 PHOTO 38 [FNW]
} View of SPI-U04 location w/ respect to shore

Kim Whitlock 10/28/10

BASF 10/28/10

1710 Backflush Harpoon w/ DI water
Surface water depth = 9.25 ft
1712 Drive in Harpoon by hand to a depth of 0.5 ft. into sediments
1714 Begin pumping @ SPI-U04-0.5
1715 Collect surface water from side of boat to collect water quality parameters
pH = 7.92
cond = 374 µS
TDS = 184 ppm
~~1712~~ 1717 PHOTO 39 [FSE] View of pore water from SPI-U04-0.5
- pore water is slightly opaque w/ a slight odor

1720 Collect porewater for chloride, sulfate, alkalinity, + metals @ SPI-U04-0.5
- collect a blind duplicate @ SPI-U04-0.5 and label as SPI-U01-0.5 @ 1900

1737 Collect water quality parameters @ SPI-U04
- Filter metals samples w/ 0.45 µ filter
- Purged a total of 480 mL from SPI-U04; this is 80 mL more than max indicated in SAP; but 400 mL max was calculated based on a sphere

Kim Whitlock 10/28/10

10/28/10 BASF

reaching 3 inches from the surface, and not the surface. Therefore, an additional 80 mL should not draw in surface water. 3 inch sphere is centered on 6 inch sampling depth

- Backflush Harpoon w/ DI water and place samples in cooler w/ ice; prepare to head back to marina

1755 Pull up anchors and head to marina

1815 Arrive @ marina and unload/pack up supplies

1830 Leave marina and head back to hotel

- On way back to hotel, receive a call from Juan Thomas (EPA); provide him w/ update of today's field activities;

1845 Complete work for the day

Sample Summary:

Time	Location/Depth	Analyses
0935	T26-50-1.0	Chloride, Sulfate, alkalinity, metals
1007	EB-Harpoon	↓
1720	SP1-U04-0.5	↓
1900	SP1-V01-0.5*	↓ * Duplicate of SP1-U04

Kim Whitlock, 10/28/10

BASF 10/29/10

0730 Arrive @ marina

Weather: 40s, light winds, cloudy

Personnel: Kim Whitlock - TechLaw
Brewster Conant - U. of Waterloo
Gary Cygan - US EPA
Joe Boovem - GLNPO Captain
John Wagar - GLNPO 1st Mate
Alison Skowerski - Arcadis (BASF contractor)

PPE: Level D: safety glasses, steel toes, gloves, life vest, hard hat (when crane in use), hearing protection (when using jackhammer)

Objective: Collect pore water samples from sediments adjacent to BASF facility

0815 Depart from marina and head to T29-100

0833 PHOTO 40 [FN] Placing/Setting anchors @ T29-100

0835 Anchor in @ T29-100

0837 Check calibration of pH meter

- Surface water @ T29-100 = 22.5 ft

pH 10.0 = 10.16, pH 7.0 = 6.96

→ calibration acceptable

- Backflush Harpoon w/ DI water

0847 Insert Harpoon to a depth of 0.5 ft while backflushing w/ DI

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immediately turn off backflushing when @ correct depth

0849 Begin purging @ T29-100-0.5

0855 Calibrate conductivity meter w/ 10,000 us std.; cal. accepted

0900 Do not recover pore water from T29-100-0.5; remove harpoon, clay noted on device; decide to go to a depth of 1.5 ft

0902 Calibrate for TDS w/ 1382 ppm; Calibration accepted

0904 Insert Harpoon to a depth of 1.5 ft @ T29-100

- When inserting, seemed stiff, but then soft for last 6 inches

0905 Begin purging @ T29-100-1.5

0911 PHOTO 41 [FW] View of shore from T29-100

0911 PHOTO 42 [FW] View of shore while standing on sampling platform @ T29-100

0913 Do not recover any pore water @ T29-100-1.5, so pull up harpoon sampler and harpoon was slightly bent; backflush w/ DI

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- Prepare to insert Waterloo profiler
- Will likely need to use jackhammer so get set up w/ it + crane

0930 Begin insertion of Waterloo profiler

- Insert to a depth of 4.0 ft

0932 Begin pumping @ T29-100-4.0

0933 PHOTO 43 [FNW] View of Waterloo profiler inserted @ T29-100-4.0

- Waterloo profiler settles to a depth of 4.25 ft

0951 PHOTO 44 [FE] View of pore water from T29-100-4.25

- mild odor noted; cloudy

0953 Collect water quality parameters @ T29-100-4.25

0958 Collect surface water quality parameters

pH = 8.28
Cond. = 293 us
TDS = 145 ppm

- Insert waterloo (after backflushing w/ DI) to a depth of 5.0 ft. + begin pumping - good recovery, so collect samples for lab analysis

1001 PHOTO 45 [FE] View of pore water @ T29-100-5.0

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1002 Begin collecting pore water for Chloride, Sulfate, alkalinity + metals @ T29-100-5.0; organic odor detected

1008 Begin collecting water quality parameters @ T29-100-5.0

1013 PHOTO 46 [FNW] View of filtering metals sample w/ 0.45μ filter

- lots of particulate in T29-100-5.0 so had to use approx. 3 filters for every 40mLs.

- Backflush waterloo profiler w/ DI in site

- GPS readings recorded by captain @ T29-100 after anchoring; obtain GPS coordinates for T29-100:
  42° 12.6641'N, 83° 08.5585'W

- Pull up waterloo + backflush again w/ DI; also wipe down rods + clean out ports @ tip w/ DI

1035 Pull up anchors @ T29-100 and mobilize to next location

- make a quick stop @ marina

1120 Set anchors @ T24-75

1127 Anchor in @ T24-75

- Prepare to collect GPS reading

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1130 Collect GPS reading @ T24-75
- 42°12.8181'N, 83° 08.4865'W

- Surface water depth = 26.25 ft

1130 PHOTO [47] [FNW] View of collecting GPS reading from sampling platform @ T24-75

- Set up harpoon sampler + mark off rod to determine depth when inserting

1138 PHOTO 48 [FN] View of harpoon sampling tip

1138 PHOTO 49 [FW] View of T24-75 with respect to shore from sampling platform

1139 PHOTO 50 [FNW] "

1145 PHOTO 51 [FN] View of backflushing Harpoon w/ DI water

- Joe indicates we have move about 30 ft. back from original location we anchored

- Collect new surface water depth = 28 ft.

1155 Insert Harpoon Sampler to a depth of 0.5 ft

1158 Collect new GPS reading post-drift GPS @ T24-75 =
  42° 8.121'N, 83° 08.4837'W

- Begin purging @ T24-75-0.5

1200 Collect water quality parameters @ T24-75-0.5

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1201 PHOTO 52 [FE] View of porewater from T24-75-0.5 - has slight light brown/yellow color and slight odor

1205 Collect pore water for chloride, sulfate, alkalinity, + metals - filter metals to remove particulate w/ 0.45μ filter

- collect approx. 12 mL into 250 mL plastic bottle for chloride, sulfate + alkalinity
- collect approx. 100 mL into 250 mL plastic bottle w/ HNO_3 after filtering

1222 Collect pH reading at end of sampling (which is what we have been usually recording)

pH = 12.50

Cond = 6.24 mS

TDS = 3.15 ppt

- water quality parameters may have changed since we are pulling more water over time and may have captured from a different formation
- Prepare to insert Harpoon to a depth of 1.5 ft. @ T24-75

1230 Insert Harpoon @ T24-75-1.5

- Samples placed on ice immediately upon collection

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1232 Begin pumping @ T24-75-1.5

- Change out gloves

1237 PHOTO 53 [FE] View of porewater from T24-75-1.5

1238 Collect water quality parameters @ T24-75-1.5

- All probes are rinsed w/ DI before + after inserting into sample and are also wiped off w/ a Kim wipe
- Prepare to insert Waterloo profiler

1247 PHOTO 54 [FW] View of New position (@ T24-75 from sampling platform looking towards shore (post-moving/drifting 30 ft from original position) This is where new GPS reading was collected.

1255 Begin backflushing Waterloo profiler

1257 PHOTO 55 [FW] View of backflushing of Waterloo profiler tip

1300 Insert Waterloo to a depth of 3.5 ft

- Camera breaks, will use Brewster's camera to take rest of photos (starts @ 2299)

1302 Begin purging @ T24-75-3.5

1310 Begin collecting water quality parameters @ T24-75-3.5

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1310 PHOTO 56 [FS] View of meter setup and pH measurement (still in process of equalizing) @ T24-75-3.5

1315 Drive Waterloo to depth of 4.5 ft

1316 Begin purging @ T24-75-4.5

1317 PHOTO 57 [FS] View of porewater @ T24-75-3.5

1319 PHOTO 58 [FE] View of porewater from T24-75-4.5

1320 Collect water quality parameters @ T24-75-4.5

1330 Complete activities @ T24-75

1335 Bring up anchors and head back to marina for lunch

1500 Depart marina for T18-25

1515 Anchor @ T18-25

- Surface water depth = 27.5 ft.

- Collect GPS reading @ T18-25
  42° 13.0225'N, 83° 08.4527'W

- Prepare to insert Harpoon sampler

1527 PHOTO 59 [FW] View of T18-25 with respect to shore

- Backflush Harpoon w/ DI

1528 Insert Harpoon to a depth of 0.5 ft. @ T18-25

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1532 Begin purging @ T18-25-0.5

1535 Collect pore water from T18-25-0.5 for chloride, sulfate, alkalinity, + metals

1535 PHOTO 60 [FE] View of porewater @ T18-25-0.5

1549 Collect water quality parameters @ T18-25-0.5

1553 Backflush Harpoon w/ DI

1559 Insert Harpoon to a depth of 1.1 feet

1600 Begin purging @ ~~T18-25-0~~ T18-25-1.1 KW 10/29/10

1603 PHOTO 61 [FE] View of pore water from T18-25-1.1

1605 Collect water quality parameters @ T18-25-1.1

- Remove Harpoon and backflush w/ DI; switch to Waterloo

- Backflush Waterloo w/ DI

1625 PHOTO 62 [FW] View of jackhammer and Waterloo profiler prior to driving to a depth of 2.5 ft

1628 Begin purging @ T18-25-2.5

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- Slow purge rate @ this depth

1637 PHOTO 63 [FN] View of Waterloo profiler inserted @ T18-25-2.5 and purging @ this location

1639 Collect water quality parameters @ T18-25-2.5

* - Backflush Waterloo and drive to 3.5 ft

1645 - Begin purging @ T18-25-3.5

~~1648 - PHOTO 64 F~~ KW 10/29/10

*1640 PHOTO 64 [FW] View of pore water @ T18-25-2.5

*KW 10/29/10 1648 PHOTO 65 [FW] View of pore water @ T18-25-3.5

1650 Collect water quality parameters @ T18-25-3.5

1652 Collect a surface water sample @ T18-25 + measure water quality

pH = 8.20
cond = 296 us
TDS = 148 ppm

1658 PHOTO 66 [Fdown] View of pH probe

1700 Pull up anchors and mobilize back to marina

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1715 Arrive back @ Marina

- Pack up supplies, get all items off of boat

- Transfer IDW into 12 250mL bottles and the remaining waste into a clean 2.5 gallon ~~gas~~ can and transfer to Alison Skwerski of Arcadis for disposal

1840 Leave marina and head back to hotel

Sample Summary:

TIME	LOCATION/DEPTH	ANALYSES
1002	T29-100-5.0	CHLORIDE, SULFATE,
KW 10/29/10	~~T24-75-0.5~~	ALKALINITY + METALS
1205	T24-75-0.5	↓
1535	T18-25-0.5	↓

— END —

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