ATTACHMENT A

Field Notes

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Rite in the Rain
ALL-WEATHER WRITING PAPER

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Kynan Adams
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Anchorage AK 99501
Phone 907-258-4880

Project Gravel Pits, Ponds, & Badger Slough
Surface Water, Groundwater, & Sediment
Sampling Work Plan
North Pole, AK
PN: 0149896

6/18/15
~80-90°
Gravel Pits
K. Adams

0800 Start mobing at ERM office
0845 Calibrate 961. Charge GPS
Contact Michelle Barnes from OAF about sample containers. She will drop them off at ERM FBX with in the hour.
1000 Head to SGS FBX & pick up sampling containers
1130 Arrive onsite. Meet up with A. Weller
Go through HSE Plan
Conduct tailgate safety
1230 SET up on Pond 5M
Sample SW-5M @ 1245
ID: NPR-13-SW-5M
Sample GW-5M @ 1440
Sample SO-5M @
1415 A. Weller back onsite
1430 A. Weller leaves site. Set up on 5W
Sample NPR-13-SW-5W @ 1525
~~Sample NPR-13-GW-5W @~~ SC
Sample NPR-13-SO-5W
1545 SET up on 5E
Sample NPR-13-SW-5E @ 1615
Sample NPR-13-SO-5E

Sarah Clark 1/2

6/18/15
~80-90 slight wind
Gravel Pits
K. Adams

~~0700 SC Arrive at ERM. Calibrate 961~~ SC
1700 Take GPS points above each soil sample location
1715 Demob. Head back to Fairbanks
1745 Leave sampling equipment in ERM office

Sarah Clark 6/18

20-40 Wind | North Fork | R. Rawls

6/19/13 | Gravel Pits | S. Christiansen

0700 Arrive at ERM office
Calibrate YSI & pack truck

0800 Arrive onsite. Walk around pond 8. Verify location of lath
Bring gear to location

0915 SET up on 8M take GPS PT
Sample NPR-13-GW-8M @ 1000
Sample NPR-13-SW-8M @ 1030
DUP NPR-13-FD-1 @ 2200
Soil NPR-13-SO-8M @ 1020

1045 SET up on 8E - take GPS PT
Sample NPR-13-~~GW~~SW-8E @ 1110
Sample NPR-13-SO-8E @ 1120
DUP NPR-13-~~SO~~FD-2 @ 2300

1145 SET up on 8W & take GPS PT
Sample NPR-13-SW-8W @ 1200
Sample NPR-13-SO-8W @ 1210

1245 Bring samples back to ERM

1330 Pick up bottles at SGS. Head back out to site

1430 Set up on 4M & Take GPS Pt
Sample NPR-13-GW-4M @ 1515
MS/MSD NPR-13-SW-4M @ 1540
NPR-13-SO-4M @ 1550

Sewage

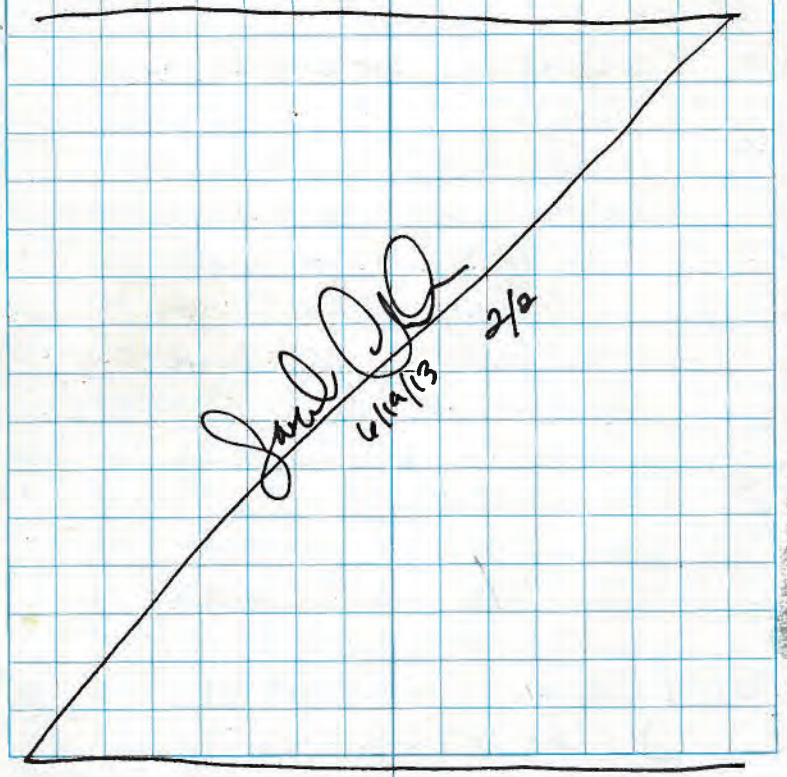
1/2

85-90 | Gravel Pits | S. Christiansen

1610 Set up on 4W / take GPS Pt
Sample NPR-13-SW-4W @ 1620
MS/MSD NPR-13-SO-4W @ 1630

1640 SET up on 4E - take GPS PT
Sample NPR-13-SW-4E @ 1700
NPR-13-SW-4E @ 1710

1730 DEMOB off site. Head back to ERM office



Rite in the Rain

6 [illegible]
75-85 Gravel Pits K. Adams

0630 Arrive to ERM office
Kyman calibrates YSI. Sarah packs last two days of water samples and soil samples. Fill out COC.
Mob Vehicle. Head to SGS to drop off samples.

0845 Contact Tracy from HC construction & coordinate to meet up with her onsite at Pond #6

0915 Meet w/ Tracy. Do a walk around of site.

0945 Conduct tailgate safety meeting
Head out & set up on 6M
Sample NPR-13-SW-6M @ 1020
NPR-13-SD-6M @ 1030
Talked to Jane & decided to move gw sample to 6W since berms at 6E & 6M are about 4' high

1100 SET UP on 6E take GPS PT
Sample NPR-13-SW-6E @ 1115
NPR-13-FD-3 @ 2200
NPR-13-SD-6E @ 1125

1135 SET up on 6W take GPS PT
Dig hole for GW sample

1/3

7

1150 Sample NPR-~~13~~-SW-6W @ 1150
NPR-13-SD-6W @ 1155
Wait for sediment to calm down in hole dug for GW. Sides keep caving in making it hard

1300 OFF HC Construction site

1400 Arrive at North Pole School
SET up on 10M
Sample NPR-13-SW-10M @ 1420
Sample NPR-13-SD-10M @ 1420
NPR-13-FD-4 @ 2300
~~Sample NPR-13-GW-10M @ 1500 SC~~
NOT enough GW to take sample dig hole deeper & leave for tomorrow

1515 Move to Slough S
Meet Tim Bogowith at slough to show him how we sample.

1530 SET up on SLOUGH (S) S
Sample NPR-~~13~~SC-13-SW-S-S @ 1600
NPR-13-SD-S-S @ 1610
NOT enough water dig hole deeper to take GW sample. Collect LAF SW sample

1645 Find lath at S-M. Dig hole at lath-ish for GW sample.

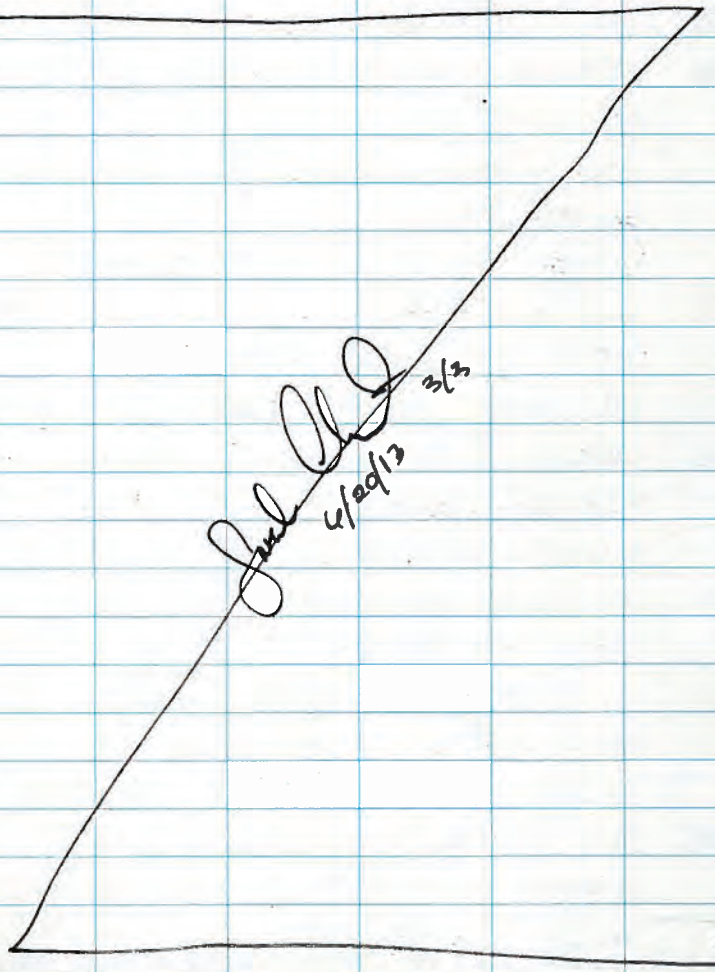
2/3

Rite in the Rain.

8

6/24/13
~~65 sunny~~
~~45 cloudy/rain~~
North Pole Gravel Pits
S. Christiansen/K. Adams

1515/15	Find lath on opposite side of river. Drive around. Dig hole at lath to enable collection of GW sample tomorrow.
1800	Head back to ERM office



9

6/25/13
65° cloudy/rain
North Pole Gravel Pits
S. Christiansen
K. Adams

0630	Arrive at ERM office Kynan calibrates YSI. Sarah writes chain for previous day samples. Mob truck & head to SGG
0830	Drop off coolers at SGS & head to North Pole highschool
0930	Rained overnight. Plan is to dig hole right next to previous one & fill old one up. Unnecessary because bucket lid that was covering hole kept water out. Head to Slough-M
1000	SET UP on S-M Take GPS pt Sample NPR-13-SW-S-M @ 1010 NPR-13-SD-S-M @ 1020 NPR-13-~~SS~~GW-S-M @ 1040 FD-5~~SS~~ NPR-13-FD-5 @ 2100 Take SW & GW sample for UAF SLOUGH-2-M SW SLOUGH-2M GW
1100	SET UP on S-N Take GPS pt Sample NPR-13-SW-S-N @ 1115 NPR-13-SD-S-N @ 1125 NPR-13-GW-S-N @ 1200 Take UAF SW/GW samples

S. Christiansen 1/2

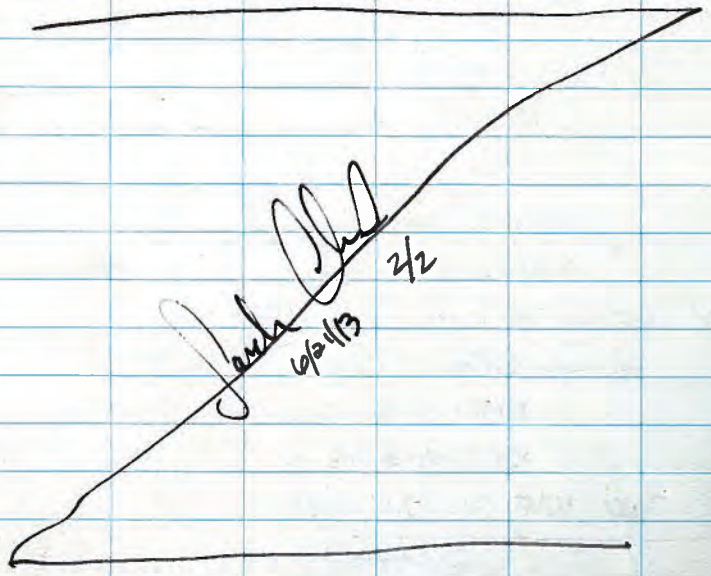
6/21/13 North Pole F. Adams
65 cloudy/rain Gravel Pits S. Christiansen

1200 SET up on S-S. Take parameter
Sample NPR-13-GW-S-S @ 1300
Take UAF GW sample
SLOUGH-15 GW

1300 Head to NP Highschool. Set up on GW-10M
Sample NPR-13-GW-10M
White Kyman Samples. Sarah writes
COC for todays samples

1400 Head back to Fairbanks SGS to
drop off samples.

1600 Talk to Michelle at UAF & coordinated
pickup of samples on Tuesday
Back at ERM off. Demob



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North Pole
Pond + Slough Sampling

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6/17/13 →

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CONTENTS

PAGE	REFERENCE	DATE

0149896-6004-0001
Leo Regner's cell 750-0557

Jeremy Riddle
460-2745

6/17/18

1145 calling Digline, Karen
1192 caller ID (client ID)
password 88270
1330 GVEA - Cindy - checking
buried power utilities at slough
crossings - OK
- Need waiver for private utility locate.

, Sun

6/18/13 N. Pole Surface Water Weller

0800 GCI called - no conflicts

0830 Weller at North Pole for SSC at point disturbances. Tailgate Safety Meeting Ø^e Spoke with Leo Regner - go to his Ponds first. End of Loamie Drive. It dead ends in his yard. Machinery in yard.

0930 SSC at 4M
- Dug to 2' bgs, 4' from edge of Pond
- Frozen soil ~~seeping in at~~ @ 2' bgs
- water seeping in at ~ 1.5' bgs
- decon shovel + posthole diggers
- rinse in pond, torch, DI rinse
- move to 5M

1015 SSC at 5M
- Dug to 2' bgs, 4' from edge of Pond
- gravel sloughing, no frozen silt
- decon tools

1030 SSC at 8M
- Dug to 1' bgs at 8M in two locations, 4' from pond edge.
- Ice at 1' bgs at both, silt, water at 6" bgs

(1/2)

+ 80°F, Sun

6/18/14 N. Pole Ponds + Sloughs Weller

1100 decon tools, paperwork, go back to Pond 5

1130 K. Adams and S. Christiansen arrive onsite. Have job briefing.

1230 Look for gravel near Pond 4 - no luck, leave groundwater location according to figure.

1245 find gravel at NE side of Pond 8, move groundwater location here.

1315 Look at access to Slough at end of Peridot - not comfortable going through there.

1330 Badger Slough at Mack
- good gravel at "Slough-M"
- frozen at 15" bgs, water at 10 bgs
- decon tools

1430 SSC at Badger Slough at Airway
- topsoil Then gravel - Dug to 2' bgs gravel caving in
- water at 15" bgs
- decon tools
- SSC paperwork

1500 check on Simple crew

1600 Back at office

42 miles

85°F, sunny

6-19-13 North Pole Ponds & Sloughs Rhodes

1400 Rhodes on-site @ Pit 6 -> HC Contractors pit to meet w/ Tracy of HC. Tailgate Safety meeting.

1410 Locate sample location for 6M. large (30' - 40') stockpiles present from hauling along shore line. Will have to move 6M to about where 6E is placed on figure. Proceed w/ physical clearance using post hole digger & shovel. Water & gravel sloughing into hole @ 2.5' bgs. No utilities. decon shovel & posthole diggers

1445 Leave Pit 6 -> head to Pit 10 @ NPHS.

1500 Arrive @ Pit 10, proceed to pond to physically clear 10M, using post hole digger. Dig to 2' bgs, hit water sloughing silt, sand, gravel. No utilities. Decon ~~shovel~~ & posthole digger.

1530 Head to slough N to investigate Brock rd. access on N side of slough.

Dirk Rhodes

WR

1/2

85°F, sunny.

Rhodes North Pole Ponds & Sloughs 6-19-13

1545 Arrive @ pullout @ end of Brock rd. Excellent trail from Pullout to slough along overhead Utility ROW. Begin Clearing location for 6NO using posthole digger. Hit water @ 1.5' and sluffing fine sand & organics. No utilities. Complete SSC paperwork

1615 Rhodes off-site.

Dirk Rhodes

WR

2/2

YOF, SUN

6-26-13 North Pole Ponds & Sloughs Flint Ballou

1130 arrive at Pond-3, Bradley Sky-Ranch Airport in North Pole to collect 3 surface water samples (Pond 3-N, Pond 3-M, & Pond 3-S), 3 sediment samples (same locations), & 1 pore water sample (Pond 3-M)
1 duplicate sample will be collected at surface water Pond 3-M
1 ms/msd sample will be collected at sediment Pond 3-M
1 ms/msd sample will be collected at pore water Pond 3-M
1 equipment blank will be collected after sampling
1130 conduct daily safety mtg, begin surface water sampling at 3-N, take 3 photos, see datasheets
1209 collect NPR-13-SW-3N
spoke with Jeremy Riddle, owns hanger adjacent to location 3N. He would like to see results: 460-2745
1220 collect NPR-13-SD-3N
1230 break for lunch

Remflint

1 of 3

YOF, SUN

6-26-13 North Pole Ponds & Sloughs Flint Ballou

1250 set up at 3-M, take 3 photos
1310 collect NPR-13-SW-3M
1315 collect surface water dup@3-M NPR-13-FD-6
1320 collect NPR-13-SW-3M RF (sediment sample at 3-M) primary & ms/msd
1344 gps Pond-3M location
1350 talk to Jamie Bradley begin digging hole for pore water sample
1416 collect NPR-13-GW-3M primary & ms/msd
1500 set up at 3-S, take photos
1510 collect NPR-13-SW-3S
1520 collect NPR-13-SD-3S
1530 decontaminate shovel
* decontaminated shovel after each use & before the 1st sample
1540 collect equipment blank NPR-13-EB-1
pour DI water over shovel into sample bottles
1600 take photos at Pond-10 at NPHS,

Remflint

2 of 3

Tom Sun Flint

6-26-13 North Pole Ponds & Sloughs Ballou

Slough-M (Plack Rd) facing N,
Slough-N (Peridot Rd)
1700 ERM offsite
Sample Summary:

Sample ID	Time	Matrix	Dup	MS/MSD
NPR-13-SW-3N	1209	SW		
NPR-13-SO-3N	1220	SO		
NPR-13-SW-3M	1310	SW		
NPR-13-FD-6	1315	SW	X	
NPR-13-SO-3M	1320	SO		X
NPR-13-GW-3M	1416	GW		X
NPR-13-SW-3S	1510	SW		
NPR-13-SO-3S	1520	SO		
NPR-13-EB-1	1540	GW		

Rem/flint

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Low-Flow Groundwater Sampling with Minimal Drawdown Worksheet

Project # : 0149896
Project Name: Gravel Pits
Site: Pond 4
Field Team: K. Adams S. Christiansen
Sample ID: NPR-13-GW-4M Time: 1515 primary dup split ms/msd
Sample ID: Time: primary dup split ms/msd

Well ID: GW-4M
Date: 6/19/13
Start Time: 1430
End Time: 1530

Weather Conditions: 80-90 Sunny

Depth to Top of Product (ft BTOC):
Depth to Oil/Water Interface* (ft BTOC):
* Note: Same as depth to water

Depth to Water (ft BTOC): 0.5
Total Depth (ft BTOC): 1"
Final Depth (ft BTOC): 0.5

Criteria for Stable Parameters

Parameter	Working Range	Stability Criteria	Notes
Temperature	>0.00 °C	± 0.3 °C	
pH	0-14	± 0.1	
Conductivity	0-99999 µS/cm	± 3%	
ORP	± 1999 mV	10	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU		

Sensory Observations

Color: (Clear) Amber, Tan, Brown, Grey, Milky White, Other:
Odor: (None) Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: (None) Low, Medium, High, Very Turbid, Heavy Silts

Instrument Observations

Flow Rate (ml/min)	Time	Temp °C	Spec. Cond. (mS/cm^C)	Conductivity (µS/cm)	Salinity	DO (mg/L)	pH	ORP (mV)	Color	Odor	Water Level (ft BTOC)	Draw-down
~~300~~ 300	~~1445~~	12.68	.668	511		3.24	6.20	-270.1	clear	none		
300	1450	12.80	.668	514		2.94	6.32	-318.2	clear	none		
300	1455	12.85	.669	513		3.02	6.35	-303.2	clear	none		
300	1500	12.94	.670	515		3.00	6.47	-285.0	clear	none		

Notes: Drawdown should be less than 0.3 feet while sampling. Minimal drawdown shall be achieved and measured by pumping at a low rate (approximately 0.1 to 0.5 liter/minute) and continually measuring water levels in the well. Note that site's hyrogeology may make it difficult to achieve this specification.

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
~~Gro~~ Sulfolane	2	1 L	2x 1-liter Glass Ambers for Sulfolane
dro			
doc			
pah			
lead			
edb			

Signed: Date: 6/19/13
Signed/reviewer: Date: 6/21/13

Surface Water Sampling Worksheet

Project # : 0141896
Project Name: Gravel Pits
Site: Pond 4
Field Team: K. Adams
Location 4M
Date: 6/19/2013
Start Time: 1525
End Time: 1545

Sample ID: NPR-13-SW-4M Time: 1540 (primary) dup split (ms/msd)
Sample ID: [redacted] Time: _____ primary dup split ms/msd
Weather Conditions: 80° Sun.. light breeze

Sensory Observations (circle all that apply)

Color: (Clear), Amber, Tan, Brown, Grey, Milky White, Other:
Odor: (None), Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: (None), Low, Medium, High, Very Turbid, Heavy Silts

Marine	(Lake/Pond)	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm^{C})	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
24.17	.182	179	7.32	7.52	-152.5

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
.3	1.5	—	—

Location Diagram/Notes

Soil sandy gravel / brown & gray

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Sulfolane	6	1 liter Glass Amber	MS/MSD

Signed: Kyra Adams Date: 6/19/2013
Signed/reviewer: Sarah Chmielewski Date: 6/21/13

Surface Water Sampling Worksheet

Project # : 0149896
Project Name:
Site:
Field Team: SC KA
Location 4W
Date: 6/19/13
Start Time: 1605
End Time: 1635

Sample ID: NPR-13-SW-4W Time: 1620 (primary) dup split ms/msd
Sample ID: Time: primary dup split ms/msd
Weather Conditions: 85-90 Sunny

Sensory Observations (circle all that apply)

Color: (Clear,) Amber, Tan, Brown, Grey, Milky White, Other:
Odor: (None) Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: (None) Low, Medium, High, Very Turbid, Heavy Silts

Marine	(Lake/Pond)	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm°)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
25.16	0.229	230	~~7.2~~ 7.46	7.56	-81

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
0.5	3'		

Location Diagram/Notes

Soil

silty sand w/ gravel

5-6 inches

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Sulfolane	2	1L	

Signed: Sarah [illegible] Date: 6/19/13
Signed/reviewer: [illegible] Date: 6/21/13

Surface Water Sampling Worksheet

Location: ~~SE~~ 4E
Project # : ~~010~~ 0149896
Date: 6/19/13
Project Name:
Start Time: 1645
Site:
End Time: 1715
Field Team: SC EA
Sample ID: NPR-13-SW-4E Time: 1700 (primary) dup split ms/msd
Sample ID: Time: primary dup split ms/msd
Weather Conditions:

Sensory Observations (circle all that apply)

Color: (Clear), Amber, Tan, Brown, Grey, Milky White, Other:
Odor: (None), Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: (None), Low, Medium, High, Very Turbid, Heavy Silts

Marine	(Lake/Pond)	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm^C)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
25.52	0.181	182	1.78	7.57	-90

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
0.2	2 ft		

Location Diagram/Notes

Soil

Silty sand dug 4-5 inches

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
2			
Sulfide	2	1L	

Signed: Date: 6/19/13
Signed/reviewer: Date: 6/21/13

Low-Flow Groundwater Sampling with Minimal Drawdown Worksheet

Well ID: GW-5M
Project #: 0149896
Date: 6/18/2013
Project Name: Gravel Pits North Pole
Start Time: 1350
Site: Pond 5
End Time: 1432
Field Team: K. Adams, S. Christiansen
Sample ID: NPR-13-GW-5M Time: 1440 primary dup split ms/msd
Sample ID: Time: primary dup split ms/msd

Weather Conditions: 88° Sunny 0-5 mph Breeze

Depth to Top of Product (ft BTOC):
Depth to Oil/Water Interface* (ft BTOC):
* Note: Same as depth to water

Depth to Water (ft BTOC): 0.7
Total Depth (ft BTOC): ~~0.7~~ 1.4
Final Depth (ft BTOC): ~~0.2~~ 0.7

Criteria for Stable Parameters

Parameter	Working Range	Stability Criteria	Notes
Temperature	>0.00 °C	± 0.3 °C	
pH	0-14	± 0.1	
Conductivity	0-99999 µS/cm	± 3%	
ORP	± 1999 mV	10	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU		

Sensory Observations

Color: (Clear), (Amber), Tan, Brown, Grey, Milky White, Other:
Odor: (None) Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: (None), Low, Medium, High, Very Turbid, Heavy Silts

Instrument Observations

Flow Rate (ml/min)	Time	Temp °C	Spec. Cond. (mS/cm^C)	Conductivity (µS/cm)	Salinity	DO (mg/L)	pH	ORP (mV)	Color	Odor	Water Level (ft BTOC)	Draw-down
300	1355	24.36	.370	370		2.25	6.38	-278.5	clear	none		
300	1400	24.14	.377	377		2.49	6.47	-286.4	clear	none		
300	1405	23.89	.376	369		2.48	6.42	-288.1	clear	none		
300	1410	23.84	.376	368		2.48	6.39	-292.4	clear	none		
–	1415	23.56	.376	365		2.39	6.36	-296.6	clear	none		
–	1420	23.29	.375	363		2.34	6.32	-262.5	clear	none		
–	1425	22.70	.373	356		2.18	6.20	-245.6	clear	none		
–	1430	22.34	.370	351		1.98	6.14	-305.4	clear	none		

Notes: Drawdown should be less than 0.3 feet while sampling. Minimal drawdown shall be achieved and measured by pumping at a low rate (approximately 0.1 to 0.5 liter/minute) and continually measuring water levels in the well. Note that site's hyrogeology may make it difficult to achieve this specification.

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Groundwater	2	1 L	2x 1-liter bottles for Sulfolane
dro			
doc			
pah			
lead			
edb			

Signed: [signature] Date: 6/18/2013
Signed/reviewer: [signature] Date: 6/21/13

Surface Water Sampling Worksheet

Project # : 0149896
Project Name: NORTH POLE SAMPLING
Site:
Field Team: S.C K.A
Sample ID: SW-5M Time: 1245 (primary) dup split ms/msd
Sample ID: Time: primary dup split ms/msd
Weather Conditions: 85° Sunny

Location SW-5M
Date: 6/18
Start Time: 12:45
End Time: 1300

Sensory Observations (circle all that apply)

Color: Clear, (Amber) Tan, Brown, Grey, Milky White, Other:
Odor: (None) Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: (None) Low, Medium, High, Very Turbid, Heavy Silts

Marine	(Lake/Pond)	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
26.96	0.184	191	7.15	8.22	-211

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
3 in	6 in		

Location Diagram/Notes

Soil

Sandy gravel

dug 3-4 inch

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
SW Toluene	2	1L	

Signed: Sarah Colombo Date: 6/18/13
Signed/reviewer: Ryan Colombo Date: 6/21/13

Surface Water Sampling Worksheet

Project # : 0149896
Project Name: North Pole Gravel Pits
Site: Pond 5
Field Team: K. Adams, S. Christiansen
Sample ID: NPR-13-SW-5W Time: 1525 (primary) dup split ms/msd
Sample ID: Time: primary dup split ms/msd
Weather Conditions: Hot

Location: SW-5W
Date: 6/18/13
Start Time: 1500
End Time: 1535

Sensory Observations (circle all that apply)

Color: (Clear), Amber, Tan, Brown, Grey, Milky White, Other:
Odor: (None), Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: (None), Low, Medium, High, Very Turbid, Heavy Silts

Marine	Lake/(Pond)	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm^C)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
24.40	.184	182	8.19	8.10	-236.3

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
.4	1.8'	—	—

Location Diagram/Notes

Soil

Sandy gravel

dug 3-4'

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Sulfolane	2	1 L	2x 1-Liter Bottles for Sulfolane

Signed: Kym Adams Date: 6/18/13
Signed/reviewer: Sarah Date: 6/24/13

Surface Water Sampling Worksheet

Project # : 0149896
Project Name: Gravel Pits Sampling
Site: Pond 5
Field Team: K. Adams, S. Christiansen
Sample ID: NPR-13-SW-5E Time: 1615 (primary) dup split ms/msd
Sample ID: Time: primary dup split ms/msd
Weather Conditions: 88°

Location SW-5E
Date: 6/18/2013
Start Time: 1600
End Time: 1630

Sensory Observations (circle all that apply)

Color: (Clear), Amber, Tan, Brown, Grey, Milky White, Other:
Odor: (None), Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: (None), Low, Medium, High, Very Turbid, Heavy Silts

Marine	(Lake/Pond)	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm^C)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
27.64	.184	193	7.87	8.29	-201.2

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
.2"	.4"	—	—

Location Diagram/Notes

Soil: ~~sandy gravel~~ sc : silty sand
sand is fine brown
~~dug 3-4 inches~~ sc
dug 2-3 inches

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Sulfolane	2	Glass 1 liter (none)	

Signed: Kyrsten Cabana Date: 6/18/2013
Signed/reviewer: Sarah Christiansen Date: 6/21/13

Low-Flow Groundwater Sampling with Minimal Drawdown Worksheet

Well ID: GW
Project #: 0149896
Project Name: North pole Gravel Pits
Site:
Field Team: S.C KA
Date: 6/20/13
Start Time: 1235
End Time: 1245

Sample ID: NPR-13-GW-GW Time: 1230 (primary) dup split ms/msd
Sample ID: Time: primary dup split ms/msd

Weather Conditions: 75-80 No Wind Sunny

Depth to Top of Product (ft BTOC):
Depth to Oil/Water Interface* (ft BTOC):
* Note: Same as depth to water

~~Depth of pvc under water~~ 0.1
~~Depth to Water~~ (ft BTOC): 0.5
Total Depth (ft BTOC): 0.6
Final Depth (ft BTOC): 0.1

Criteria for Stable Parameters

Parameter	Working Range	Stability Criteria	Notes
Temperature	>0.00 °C	± 0.3 °C	
pH	0-14	± 0.1	
Conductivity	0-99999 µS/cm	± 3%	
ORP	± 1999 mV	10	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU		

Sensory Observations

Color: Clear, Amber, Tan, (Brown), Grey, Milky White, Other:
Odor: (None), Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: None, Low, Medium, High, Very Turbid, (Heavy Silts)

Instrument Observations

Flow Rate (ml/min)	Time	Temp °C	Spec. Cond. (mS/cm^C)	Conductivity (µS/cm)	Salinity	DO (mg/L)	pH	ORP (mV)	Color	Odor	Water Level (ft BTOC)	Draw-down
	1227	19.08	0.421	374		2.49	7.20	-139	brown	NO		
	1231	19.44	0.419	374		2.14	6.95	-126				
	1235	19.42	0.420	376		2.12	6.85	-212				
	1239	19.73	0.420	378		2.04	6.87	-192				
	1243	20.24	0.422	384		2.02	4.93	-190				
	1247	20.28	0.425	387		2.03	6.97	-187				
	1251	20.30	0.427	388		2.10	6.99	-189				

Notes: Drawdown should be less than 0.3 feet while sampling. Minimal drawdown shall be achieved and measured by pumping at a low rate (approximately 0.1 to 0.5 liter/minute) and continually measuring water levels in the well. Note that site's hyrogeology may make it difficult to achieve this specification.

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
~~Gro~~ Sulfolane	2	(2) 1 L	
dro			
doc			
pah			
lead			
edb			

Signed: [signature] Date: 6/20/13
Signed/reviewer: [signature] Date: 6/21/13

Surface Water Sampling Worksheet

KA

Location: SW-~~BK~~ GW
Project #: 0149896
Date: 6/20/13
Project Name: Gravel Pits
Start Time: 1135
Site: Pit 6
End Time: # 1200
Field Team: K. Adams, S. Christiansen
Sample ID: NPR-15-SW-GW Time: 1150 primary dup split ms/msd
Sample ID: Time: primary dup split ms/msd
Weather Conditions: 80°

Sensory Observations (circle all that apply)

Color: Clear, Amber, Tan, Brown, Grey, Milky White, Other:
Odor: None, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: None, Low, Medium, High, Very Turbid, Heavy Silts

Marine	Lake/Pond	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm^C)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
21.85	.368	346	9.85	8.20	-205.4

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
.3	.7	—	—

Location Diagram/Notes

Soil Character

Sandy gravel

dug hole to 1' but walls kept falling in

total depth 6'

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Sulfolane	2	1-liter Glass Amber	

Signed: [signature] Date: 06/20/13
Signed/reviewer: [signature] Date: 6/21/13

Surface Water Sampling Worksheet

Project # : 0149886
Project Name: Gravel Pits
Site: Pit 6
Field Team: K. Adams
Sample ID: NPR-13-SW-6M Time: 1020 (primary) dup split ms/msd
Sample ID: _____ Time: _____ primary dup split ms/msd
Weather Conditions: 80° Sun

Location SW-6M
Date: 6/20/13
Start Time: 0945
End Time: 1030

Sensory Observations (circle all that apply)

Color: (Clear), Amber, Tan, Brown, Grey, Milky White, Other:
Odor: (None), Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: (None), Low, Medium, High, Very Turbid, Heavy Silts

Marine	(Lake/Pond)	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm^{C})	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
17.92	.378	326	8.58	7.04	-180.2

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
.4	1.5	—	—

Location Diagram/Notes

Large Gravel Pit

Soil: gravel about ¼" to 1" in diameter

digging down becomes sandy gravel

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Sulfolane		1-liter Glass Amber x2	

Signed: [signature] Date: 6/20/13
Signed/reviewer: [signature] Date: 6/21/13

Surface Water Sampling Worksheet

Project # : 0149896
Project Name: NPR Gravel Pits
Site: Pit 6
Field Team: K. Adams, S. Christiansen
Sample ID: NPR-13-SW-6E Time: 1115 primary dup split ms/msd
Sample ID: NPR-13-FD-3 Time: 2200 primary dup split ms/msd
Weather Conditions: Sunny

Location SW-6E
Date: 6/20/13
Start Time: 1100
End Time: 1120

Sensory Observations (circle all that apply)

Color: Clear, Amber, Tan, Brown, Grey, Milky White, Other:
Odor: None, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: None, Low, Medium, High, Very Turbid, Heavy Silts

Marine	Lake/Pond	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm°)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
10.77	.366	322	8.91	7.45	-231.8

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
.3	.8	—	—

Location Diagram/Notes

gravel pit

Soil: sandy gravel: ¼" to 1" diameter

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Sulfolane	4	1-liter Glass Amber	

Signed: [signature] Date: 06/20/2013
Signed/reviewer: [signature] Date: 6/20/13

Low-Flow Groundwater Sampling with Minimal Drawdown Worksheet

Well ID: 8M
Project # : 0149896
Date: 6/19/13
Project Name: North Pole Gravel Pits
Start Time: 930
Site:
End Time: 1010
Field Team: SC KA
Sample ID: NPR-13-GW-8M Time: 1000 (primary) dup split ms/msd
Sample ID: Time: primary dup split ms/msd
Weather Conditions: 80-90 Sunny Slight wind

Depth to Top of Product (ft BTOC):
Depth to Oil/Water Interface* (ft BTOC):
* Note: Same as depth to water
Depth to Water (ft BTOC): 0.7
Total Depth (ft BTOC): ~~0.5~~ 1.3
Final Depth (ft BTOC): 0.5

Criteria for Stable Parameters

Parameter	Working Range	Stability Criteria	Notes
Temperature	>0.00 °C	± 0.3 °C	
pH	0-14	± 0.1	
Conductivity	0-99999 µS/cm	± 3%	
ORP	± 1999 mV	10	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU		

Sensory Observations

Color: (Clear) Amber, Tan, (Brown), Grey, Milky White, Other:
Odor: (None) Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: None, (Low), Medium, High, Very Turbid, Heavy Silts

Instrument Observations

Flow Rate (ml/min)	Time	Temp °C	Spec. Cond. (mS/cm^C)	Conductivity (µS/cm)	Salinity	DO (mg/L)	pH	ORP (mV)	Color	Odor	Water Level (ft BTOC)	Draw-down
	939	12.4	0.544	413		4.89	6.68	-244	clear/grey			
	943	12.35	0.545	413		4.70	6.8	-236				
	947	12.30	0.545	413		4.56	6.8	-236				
	951	12.23	.545	412		4.44	6.86	-226				
	955	12.21	.545	412		4.38	6.86	-228				

Notes: Drawdown should be less than 0.3 feet while sampling. Minimal drawdown shall be achieved and measured by pumping at a low rate (approximately 0.1 to 0.5 liter/minute) and continually measuring water levels in the well. Note that site's hyrogeology may make it difficult to achieve this specification.

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
~~Gro~~ Sulfolane	2	1 L	Sampled 0.2' under water
dro			
doc			
pah			
lead			
edb			

Signed: Date: 6/19/13
Signed/reviewer: Date: 6/21/13

Surface Water Sampling Worksheet

Project # : 0149896
Project Name: North Pole Gravel Pits
Site:
Field Team: S.C KA
Location 8M
Date: 6/19/13
Start Time: 1015
End Time: 1040

Sample ID: NPR-13-~~SD-8M-SS~~ SW-8M Time: 1030 (primary) dup split ms/msd
Sample ID: NPR-13-FD-1 Time: 2200 primary (dup) split ms/msd
Weather Conditions:

Sensory Observations (circle all that apply)

Color: (Clear), Amber, Tan, Brown, Grey, Milky White, Other:
Odor: (None), Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: (None) Low, Medium, High, Very Turbid, Heavy Silts

Marine	(Lake/Pond)	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm^C)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
21.89	0.297	280	7.07	7.83	-157

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
0.6'	~ 2'		

Location Diagram/Notes

Soil
sandy gravel / brown
dug 2-3 in

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
sulfolane	4		

Signed: Sarah Lloyd Date: 6/19/13
Signed/reviewer: Lynnann Coleman Date: 6/21/13

Surface Water Sampling Worksheet

Project # : 0149896
Project Name: NPGP
Site:
Field Team: S.C KA
Sample ID: NPR-13-SW-SW Time: 1200 (primary) dup split ms/msd
Sample ID: Time: primary dup split ms/msd
Weather Conditions: 80-90 slight wind sunny

Location SW
Date: 6/19/13
Start Time: 1145
End Time: 1220

Sensory Observations (circle all that apply)

Color: (Clear) Amber, Tan, Brown, Grey, Milky White, Other:
Odor: (None) Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: (None) Low, Medium, High, Very Turbid, Heavy Silts

Marine | (Lake/Pond) | Seep/Spring
Brackish | River | Emergent Vegetation
Fresh Water | Stream/Creek | Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm°)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
23.78	.298	291	8.56	8.06	-190.0

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
.2	1.0	—	—

Location Diagram/Notes

Soil:
silty sand / brown
saturated
dug 5-6 inches

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Sulfolane	2	1-Liter Glass	

Signed: Sarah Clifton Date: 6/19/13
Signed/reviewer: Kyman Gilbert Date: 6/21/13

Surface Water Sampling Worksheet

Location: 8E
Project #: 0149896
Date: 6/19/13
Project Name: NORTH POLE
Start Time: 1055
Site:
End Time: 1120
Field Team: S.C KA
Sample ID: NPR-18-SW-8E Time: 1110 (primary) dup split ms/msd
Sample ID: Time: primary dup split ms/msd
Weather Conditions:

Sensory Observations (circle all that apply)

Color: (Clear), Amber, Tan, Brown, Grey, Milky White, Other:
Odor: (None), Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: (None), Low, Medium, High, Very Turbid, Heavy Silts

Marine	(Lake/Pond)	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm^C)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
22.18	0.297	281	8.16	7.84	-161

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
0.7	2.5		

Location Diagram/Notes

Soil: gravelly/sand

dug ~~5-6~~ 3-4 inches

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
3			
~~Sulfolane~~	2	1L	

Signed: Sarah Clayton Date: 6/19/13
Signed/reviewer: Tyson Cline Date: 6/21/13

Low-Flow Groundwater Sampling with Minimal Drawdown Worksheet

Well ID: 10M
Project #: 0149896
Date: 6/21/13
Project Name: NPR Gravel Pits
Start Time: 1300
Site: Pond 10
End Time: 1400
Field Team: K.A., S.C.
Sample ID: NPR-13-GW-10M Time: 1345 (primary) dup split ms/msd
Sample ID: Time: primary dup split ms/msd
Weather Conditions: 65° Cloudy

Depth to Top of Product (ft BTOC):
Depth to Oil/Water Interface* (ft BTOC):
* Note: Same as depth to water
Depth to Water (ft BTOC): .6
Total Depth (ft BTOC): 1.0
Final Depth (ft BTOC):

Criteria for Stable Parameters

Parameter	Working Range	Stability Criteria	Notes
Temperature	>0.00 °C	± 0.3 °C	
pH	0-14	± 0.1	
Conductivity	0-99999 µS/cm	± 3%	
ORP	± 1999 mV	10	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU		

Sensory Observations

Color: Clear, Amber, Tan, (Brown), Grey, Milky White, Other:
Odor: (None) Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: None, (Low), Medium, High, Very Turbid, Heavy Silts

Instrument Observations

Flow Rate (ml/min)	Time	Temp °C	Spec. Cond. (mS/cm^C)	Conductivity (µS/cm)	Salinity	DO (mg/L)	pH	ORP (mV)	Color	Odor	Water Level (ft BTOC)	Draw-down
100	1310	10.16	.741	531		2.02	6.84	-264.9	Brown	—		
	1315	10.04	.742	530		2.07	6.82	-258.4	Brown			
	1310	10.05	.743	531		1.97	6.87	-266.0	Brown			
	1315	10.01	.740	530		1.89	6.86	-256.0	Brown			

Notes: Drawdown should be less than 0.3 feet while sampling. Minimal drawdown shall be achieved and measured by pumping at a low rate (approximately 0.1 to 0.5 liter/minute) and continually measuring water levels in the well. Note that site's hyrogeology may make it difficult to achieve this specification.

Analyses	# of Bottles Collected	Bottle Type (preservative)
~~Gro~~ Sulfolane	2	1L
dro		
doc		
pah		
lead		
edb		

Comments: poor recharge. After 1st bottle had to stop & let recharge for 15 minutes

Signed: [signature] Date: 6/21/13
Signed/reviewer: [signature] Date: 6/21/13

Surface Water Sampling Worksheet

Project # : 0149896
Project Name: Gravel Pits Sampling
Site: Pond 10
Field Team: K. Adams
Location: SW10M
Date: 6/20/13
Start Time: 1415
End Time: 1430

Sample ID:	NPR-13-SW-10M	Time: 1420	primary	dup	split	ms/msd
Sample ID:		Time:	primary	dup	split	ms/msd

Weather Conditions: Very Hot

Sensory Observations (circle all that apply)

Color: Clear, Amber, tan, Brown, Grey, Milky White, Other:
Odor: None, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: None, Low, Medium, High, Very Turbid, Heavy Silts

Marine	Lake/Pond	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
25.78	.221	225	13.92	9.49	-230.4

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
.2	2.0	—	—

Location Diagram/Notes

*Pond is full of algae

Soil: Sandy gravel w/ organics

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Sulfolane	2	1-liter Glass Amber	

Signed: [signature] Date: 6/20/13
Signed/reviewer: [signature] Date: 6/21/13

Low-Flow Groundwater Sampling with Minimal Drawdown Worksheet

Well ID: (S-S) Slough S
Project #: 01699896
Date: 6/21/13
Project Name: North Pole Gravel Pits
Start Time: 1240
Site:
End Time: 1300
Field Team: S.C KA
Sample ID: NDR-13-GW-S-S Time: 1300 (primary) dup split ms/msd
Sample ID: Time: primary dup split ms/msd

Weather Conditions: 65 Cloudy

Depth to Top of Product (ft BTOC): NA
Depth to Oil/Water Interface* (ft BTOC): NA
* Note: Same as depth to water

Depth to Water (ft BTOC): 1.3
Total Depth (ft BTOC): hole 1.5ft
Final Depth (ft BTOC): 0.2

Criteria for Stable Parameters

Parameter	Working Range	Stability Criteria	Notes
Temperature	>0.00 °C	± 0.3 °C	
pH	0-14	± 0.1	
Conductivity	0-99999 µS/cm	± 3%	
ORP	± 1999 mV	10	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU		

Sensory Observations

Color: Clear, Amber, Tan, (Brown) ~~Grey~~, Milky White, Other: light amber
Odor: (None) Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: None, Low, Medium, (High), Very Turbid, Heavy Silts

Instrument Observations

Flow Rate (ml/min)	Time	Temp °C	Spec. Cond. (mS/cm^C)	Conductivity (µS/cm)	Salinity	DO (mg/L)	pH	ORP (mV)	Color	Odor	Water Level (ft BTOC)	Draw-down
	1210	11.60	.316	235		~~10.24~~	7.14	-98	Brown	No		
	1219	11.67	.317	236		1.72	7.10	-230				
	1222	11.61	.318	237		1.64	7.09	-257				
	1225	11.49	.320	237		1.39	7.09	-269				
	1228	11.39	.320	237		1.21	7.08	-303				
	1231	11.39	.320	237		0.99	7.07	-311				
	1234	11.35	.322	238		0.78	7.07	-311				
	1237	11.40	.322	239		0.70	7.06	-309	light			
	1240	11.37	.324	239		0.71	7.06	-307	amber			
	1243	11.41	.324	240		0.73	7.06	-308				

Notes: Drawdown should be less than 0.3 feet while sampling. Minimal drawdown shall be achieved and measured by pumping at a low rate (approximately 0.1 to 0.5 liter/minute) and continually measuring water levels in the well. Note that site's hyrogeology may make it difficult to achieve this specification.

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
~~Gro~~Sulfolane	2	1 Liter	
dro			
doc			
pah			
lead			
edb			

Signed: [signature] Date: 6/21/13
Signed/reviewer: [signature] Date: 6/21

Surface Water Sampling Worksheet

Project # : 0149896
Project Name: Gravel Pits Samples
Site: Slough 5
Field Team: K. Adams, S. Christianson
Sample ID: NPR-13-SW-5-5 Time: 1600 (primary) dup split ms/msd
Sample ID: _____ Time: _____ primary dup split ms/msd
Weather Conditions: 80-90 sunny

Location SW-5-5 (Slough 5)
Date: 6/20/13
Start Time: 1545
End Time: 1610

Sensory Observations (circle all that apply)

Color: (Clear) Amber, Tan, Brown, Grey, Milky White, Other:
Odor: (None) Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: (None) Low, Medium, High, Very Turbid, Heavy Silts

Marine | (Lake/Pond) (Slough) | Seep/Spring
Brackish | River | Emergent Vegetation
Fresh Water | Stream/Creek | Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm^C)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
16.68	.347	292	9.50	7.58	-114.6

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
.6	1.0	—	—

Location Diagram/Notes

Soil: Sandy gravel

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Sulfolane	2	1-Liter Glass Amber	
	2	VIALS (UHF)	

Signed: [signature] Date: 06/20/2013
Signed/reviewer: [signature] Date: 6/21/13

Low-Flow Groundwater Sampling with Minimal Drawdown Worksheet

Well ID: Slough M
Project #: 0149896
Date: 6/21/13
Project Name: Gravel Pits
Start Time: 1015
Site: Slough M
End Time: 1055
Field Team: K.A. S.G.
Sample ID: NPR-13-GW-Slough-M Time: 1040 (primary) dup split ms/msd
Sample ID: Time: 2100 primary (dup) split ms/msd
Weather Conditions: 65° Cloudy

Depth to Top of Product (ft BTOC):
Depth to Oil/Water Interface* (ft BTOC):
* Note: Same as depth to water
~~Depth to Water~~ (ft BTOC): Sample : .7
Total Depth (ft BTOC): .6
Final Depth (ft BTOC):

Criteria for Stable Parameters

Parameter	Working Range	Stability Criteria	Notes
Temperature	>0.00 °C	± 0.3 °C	
pH	0-14	± 0.1	
Conductivity	0-99999 µS/cm	± 3%	
ORP	± 1999 mV	10	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU		

Sensory Observations

Color: Clear, Amber, Tan, Brown, (Grey) Milky White, Other:
Odor: (None), Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: None, (Low) Medium, High, Very Turbid, Heavy Silts

Instrument Observations

Flow Rate (ml/min)	Time	Temp °C	Spec. Cond. (mS/cm^C)	Conductivity (µS/cm)	Salinity	DO (mg/L)	pH	ORP (mV)	Color	Odor	Water Level (ft BTOC)	Draw-down
200	1025	6.63	.434	281		1.93	5.51	-232.1	Grey	—		
200	1030	6.48	.432	279		1.79	5.44	-239.6	Grey	—		
200	1035	6.40	.428	277		1.74	5.40	-241.8	gray	—		
200	1040	6.30	.430	276		1.70	5.20	-245.1	gray	—		
200	1045	6.26	.425	273		1.79	5.30	-248.5	gray	—		

Notes: Drawdown should be less than 0.3 feet while sampling. Minimal drawdown shall be achieved and measured by pumping at a low rate (approximately 0.1 to 0.5 liter/minute) and continually measuring water levels in the well. Note that site's hyrogeology may make it difficult to achieve this specification.

Analyses	# of Bottles Collected	Bottle Type (preservative)
~~Gro~~ SW Volatiles	4	1 L
dro	2	VIALS (UAF)
doc		
pah		
lead		
edb		

Comments:
4x 1-liter Glass Amber
1 small vial for Isotope Analysis

Signed: [signature] Date: 6/21/13
Signed/reviewer: [signature] Date: 6/21/13

Surface Water Sampling Worksheet

Project # : 0149896
Project Name: Gravel Pits Sampling
Site: Slough M
Field Team: K. Adams S. Christiansen
Sample ID: NPR-13-SW-Slough-M Time: 1010 primary dup split ms/msd
Sample ID: Time: primary dup split ms/msd
Weather Conditions: Cloudy 65°

Location Slough M S-M
Date: 6/21/13
Start Time: 955
End Time: 1020

Sensory Observations (circle all that apply)

Color: Clear, Amber, Tan, Brown, Grey, Milky White, Other:
Odor: None, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: None, Low, Medium, High, Very Turbid, Heavy Silts

Marine	Lake/Pond	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
14.02	.358	282	9.58	6.48	-114.9

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
.4	.6	NA	NA

Location Diagram/Notes

*Slough with some running water

Soil: ~~Sandy gravel~~
Silty sand w/ gravel / saturated

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Sulfolane	2	1-liter Glass Amber Vials (Cool)	*Also collected +1 vial for Isotope Analysis

Signed: Kym Cole Date: 6/21/13
Signed/reviewer: Sarah Ohnsorg Date: 6/21/13

Low-Flow Groundwater Sampling with Minimal Drawdown Worksheet

Project #: 0149896
Project Name: Gravel Pits NPR
Site: Slough N
Field Team: K.A., S.C.
Sample ID: NPR-13-GW-Slough-N Time: 1200 (primary) dup split ms/msd
Sample ID: Time: primary dup split ms/msd

Well ID: Slough-N
Date: 6/21/13
Start Time: 1115
End Time: 1200

Weather Conditions: 60° light drizzle

Depth to Top of Product (ft BTOC):
Depth to Oil/Water Interface* (ft BTOC):
* Note: Same as depth to water

Depth to Water (ft BTOC): .2
Total Depth (ft BTOC): .8
Final Depth (ft BTOC):

Criteria for Stable Parameters

Parameter	Working Range	Stability Criteria	Notes
Temperature	>0.00 °C	± 0.3 °C	
pH	0-14	± 0.1	
Conductivity	0-99999 µS/cm	± 3%	
ORP	± 1999 mV	10	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU		

Sensory Observations

Color: (Clear), Amber, Tan, Brown, Grey, Milky White, Other:
Odor: (None), Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: (None), Low, Medium, High, Very Turbid, Heavy Silts

Instrument Observations

Flow Rate (ml/min)	Time	Temp °C	Spec. Cond. (mS/cm[C])	Conductivity (µS/cm)	Salinity	DO (mg/L)	pH	ORP (mV)	Color	Odor	Water Level (ft BTOC)	Draw-down
200	1120	9.56	.263	185		4.34	6.57	-238.2	clear	none		
200	1125	9.00	.279	194		3.75	6.42	-260.4	clear	none		
200	1130	9.07	.275	191		2.56	6.32	-275.1	—	—		
200	1135	9.10	.268	187		1.34	6.30	-283.0	—	—		
200	1140	9.14	.260	183		1.29	6.32	-285.0	—	—		
100	1145	9.13	.264	184		1.22	6.36	-289.0	—	—		

Notes: Drawdown should be less than 0.3 feet while sampling. Minimal drawdown shall be achieved and measured by pumping at a low rate (approximately 0.1 to 0.5 liter/minute) and continually measuring water levels in the well. Note that site's hyrogeology may make it difficult to achieve this specification.

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Gro Sulfolane	2	1L	2x 1-liter Glass Amber,
dro			1 small plastic vial - Isotope Analysis
doc			
pah			
lead			
edb			

Signed: [signature] Date: 6/21/13
Signed/reviewer: [signature] Date: 6/21/13

Surface Water Sampling Worksheet

Project # : 0149896
Project Name: Gravel Pits
Site: Slough #1 N
Field Team: K.A. S.C
Location: Slough #1 N S-N
Date: 6/21/13
Start Time: 1105
End Time: 1130

Sample ID: NPR-13-SW-Slough-N Time: 1115 primary dup split ms/msd
Sample ID: _____ Time: _____ primary dup split ms/msd
Weather Conditions: 65 Cloudy

Sensory Observations (circle all that apply)

Color: Clear, Amber, Tan, Brown, Grey, Milky White, Other:
Odor: None, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: None, Low, Medium, High, Very Turbid, Heavy Silts

Marine	Lake/Pond	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

slough

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm^{C})	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
12.62	341	260	10.16	7.96	-194.1

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
.4	1.0	—	—

Location Diagram/Notes

Sed: Sandy gravel

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Sulfolane	2	1-liter Amber Glass	
Isotope Analysis	Dc 1	plastic vials	

Signed: _____ Date: 6/21/13
Signed/reviewer: _____ Date: 6/21/13

Surface Water Sampling Worksheet

Location: Pond 3-N
Project #: 0149896
Date: 6-26-13
Project Name: North Pole Ponds & Sloughs
Start Time: 1130
Site: Pond-3
End Time: 1230
Field Team: R. Flint, N. Ballew
Sample ID: NPR-13-SW-3N Time: 1209 (primary) dup split ms/msd surface water
Sample ID: NPR-13-SO-3N Time: 1220 (primary) dup split ms/msd sediment
Weather Conditions:

Sensory Observations (circle all that apply)

Color: Clear, Amber, Tan, Brown, Grey, Milky White, Other:
Odor: None, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: None, Low, Medium, High, Very Turbid, Heavy Silts

Marine	Lake/Pond	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
24.38	0.305	301	7.15	8.15	-195.5

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
7 inches	18 inches	NW (wind driven)	low

Location Diagram/Notes

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Sulfolane	2	1L bottle	
Sulfolane	1	4oz jar	

Signed: Remi Flint Date: 6-26-13
Signed/reviewer: Date:

Surface Water Sampling Worksheet

Project # : 0149896
Project Name: North Pole Ponds & Sloughs
Site: Pond-3
Field Team: R. Flint, N. Ballou
Sample ID: NPR-13-SW-3M Time: 1310 primary dup split ms/msd
Sample ID: NPR-13-FD-6 Time: 1315 primary dup split ms/msd
Weather Conditions: NPR-13-SO-3M 1320 primary ms/msd

Location: Pond 3-M
Date: 6-26-13
Start Time: 1250
End Time: 1350

Sensory Observations (circle all that apply)

Color: Clear, Amber, Tan, Brown, Grey, Milky White, Other:
Odor: None, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: None, Low, Medium, High, Very Turbid, Heavy Silts

Marine	Lake/Pond	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm^{C})	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
25.33	0.300	302	7.36	8.26	-230.4

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
5 in	14 in	still / none	still / none

Location Diagram/Notes

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Sulfolane	4	1L bottle	
Sulfolane	3	4oz jar	

Signed: Rena Flint Date: 6-26-13
Signed/reviewer: Date:

Low-Flow Groundwater Sampling with Minimal Drawdown Worksheet

Project #: 0149896
Project Name: North Pole Ponds & Sloughs
Site: Pond-3
Field Team: R. Flint, N. Ballou
Sample ID: NPR-13-GW-3M
Sample ID:

Well ID: Pond 3-M
Date: 6-26-13
Start Time: 1350
End Time:

Time: 1416 (primary) dup split (ms/msd)
Time: primary dup split ms/msd

Weather Conditions: 90 F, sun

Dore Water Sample location 2ft from pond edge

Depth to Top of Product (ft BTOC):
Depth to Oil/Water Interface* (ft BTOC):
* Note: Same as depth to water

Depth to Water (ft BTOC): 12" bgs
Total Depth (ft BTOC): 16" bgs
Final Depth (ft BTOC):

Criteria for Stable Parameters

Parameter	Working Range	Stability Criteria	Notes
Temperature	>0.00 °C	± 0.3 °C	
pH	0-14	± 0.1	
Conductivity	0-99999 µS/cm	± 3%	
ORP	± 1999 mV	10	
Dissolved Oxygen	0-19.99 mg/L	± 10%	
Turbidity	0-800 NTU		

Sensory Observations

Color: Clear, Amber, Tan, Brown, Grey, Milky White, Other:
Odor: None, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: None, Low, Medium, High, Very Turbid, Heavy Silts

Instrument Observations

Flow Rate (ml/min)	Time	Temp °C	Spec. Cond. (mS/cm^C)	Conductivity (µS/cm)	Salinity	DO (mg/L)	pH	ORP (mV)	Color	Odor	Water Level (ft BTOC)	Draw-down
~200 ml/min	1406	24.37	0.356	351	N/A	1.23	6.98	-108.9	Brown	None	12" bgs	none
"	1409	24.10	0.347	340	"	0.90	6.96	-171.9	"	"	"	"
"	1412	23.91	0.344	336	"	0.91	6.96	-204.9	"	"	"	"
"	1415	23.73	0.341	333	"	0.89	6.95	-220.9	"	"	"	"

Notes: Drawdown should be less than 0.3 feet while sampling. Minimal drawdown shall be achieved and measured by pumping at a low rate (approximately 0.1 to 0.5 liter/minute) and continually measuring water levels in the well. Note that site's hyrogeology may make it difficult to achieve this specification.

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Gro			
dro/sulfolane	6	1 L bottle	
doc			
pah			
lead			
edb			

Signed: Rena Flint Date: 6-26-13

Signed/reviewer: Date:

Surface Water Sampling Worksheet

Project # : 0149896
Project Name: North Pole Ponds & Sloughs
Site: Pond 3
Field Team: R. Flint, N. Bollow
Sample ID: NPR-13-SW-35 Time: 1510 (primary) dup split ms/msd
Sample ID: NPR-13-SD-35 Time: 1520 (primary) dup split ms/msd
Weather Conditions: NPR-13-EB-1 1540 ~~primary~~ RF (equipment rinse blank)

Location: Pond 3-5
Date: 6-26-13
Start Time: 1500
End Time:

Sensory Observations (circle all that apply)

Color: Clear, Amber, Tan, Brown, Grey, Milky White, Other:
Odor: None, Low, Medium, High, Very Strong, H2S, Fuel Like, Chemical ?, Unknown
Turbidity: None, Low, Medium, High, Very Turbid, Heavy Silts

Marine	Lake/Pond	Seep/Spring
Brackish	River	Emergent Vegetation
Fresh Water	Stream/Creek	Submerged Vegetation

Instrument Observations

Temp (° C)	Spec. Cond. (mS/cm^C)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
25.48	0.301	304	7.53	8.30	-190.4

Sample Depth	Total Depth	Flow Direction	Velocity (ft/sec)
8"	36"	still / none	still / none

Location Diagram/Notes

Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
Sulfolane	2	1L bottle	
Sulfolane	1	4 oz jar	

Signed: Rem Flint Date: 6-26-13
Signed/reviewer: Date:

ATTACHMENT B

Photograph Log

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PHOTOGRAPH 1: CONDUCTING SUBSURFACE CLEARANCE AT POND LOCATION 4M

PHOTOGRAPH 2: SUBSURFACE CLEARANCE AT LOCATION 5M

PHOTOGRAPH 3: FACING WEST AT POND 8, LOCATION 8M

PHOTOGRAPH 4: SAMPLING EQUIPMENT STAGED AT POND LOCATION 5M

PHOTOGRAPH 5: COLLECTING A GROUNDWATER SAMPLE FROM LOCATION 5M

PHOTOGRAPH 6: COLLECTING SURFACE WATER SAMPLE FROM LOCATION 4M

PHOTOGRAPH 7: COLLECTING SURFACE WATER SAMPLE FROM LOCATION 4M

PHOTOGRAPH 8: SAMPLING TUBE DEPLOYMENT SHOWING DISPOSABLE STRYOFOAM USED TO KEEP PVC OUT OF WATER

PHOTOGRAPH 9: COLLECTING SAMPLES AT POND 6, LOCATION 6M

PHOTOGRAPH 10: FACING SOUTH AT SLOUGH-S SAMPLE LOCATION

PHOTOGRAPH 11: FACING NORTH AT SLOUGH-M

PHOTOGRAPH 12: STANDING ON BANK OF SLOUGH-N FACING NORTH, WITH SAMPLE LOCATION ON OPPOSITE BANK

PHOTOGRAPH 13: FACING SOUTH AT POND 10

PHOTOGRAPH 14: STANDING ON BANK AT POND LOCATION 3-M

PHOTOGRAPH 15: COLLECTING PORE WATER SAMPLE AT POND LOCATION 3-M

PHOTOGRAPH 16: FACING SOUTH AT POND LOCATION 3-S