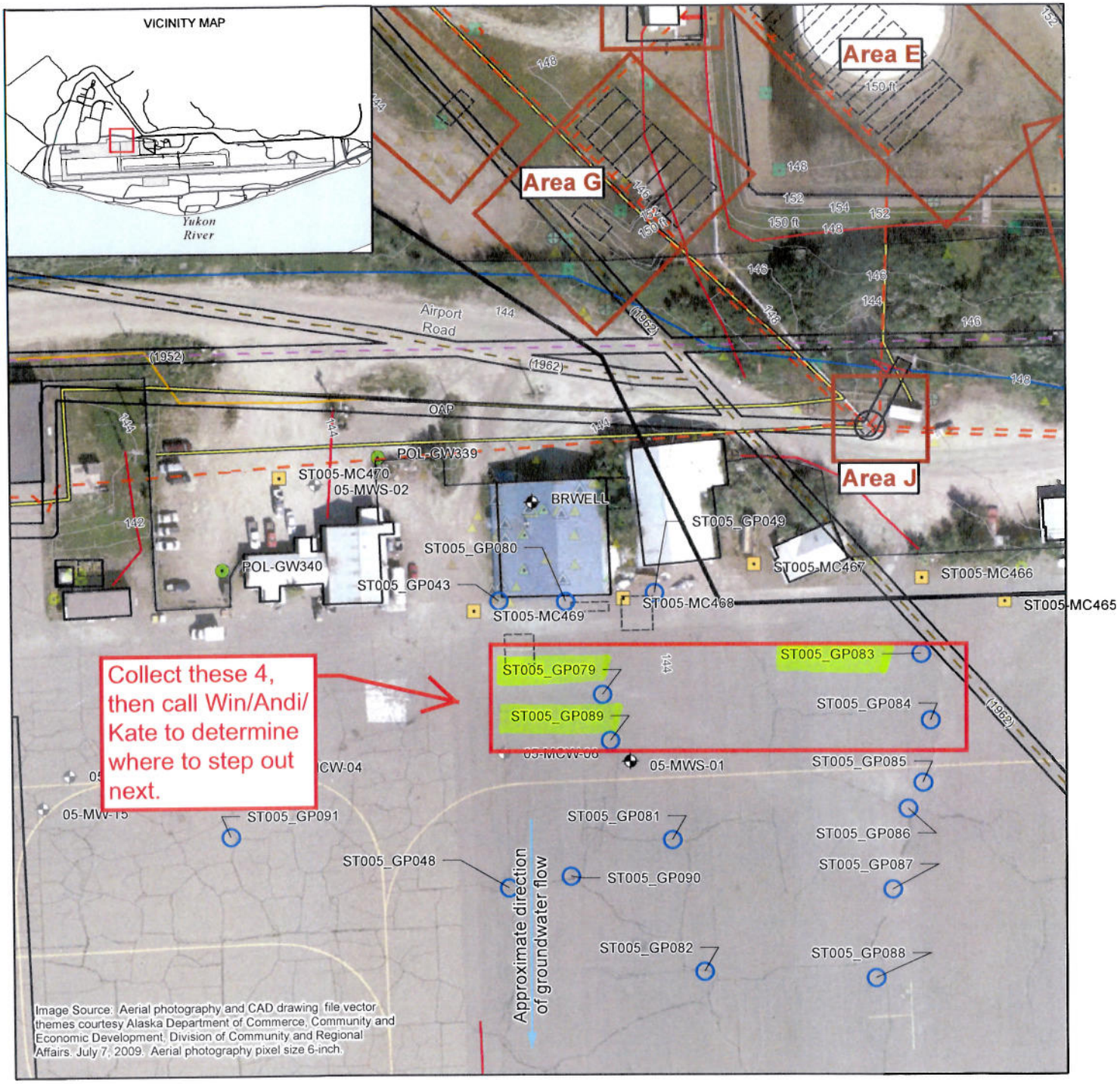

LEGEND

- ST005/CB001
- Adjacent Site
- Structure
- Approximate Location of Former Feature
- Source Area
- Fuel Tank
- Fence
- Abandoned Fuel Line (1952)
- Abandoned Fuel Line (1962)

Below Ground Utility Locates - 2010

- Electrical Line
- Communications Line
- Potable Water Main
- Fuel/Gas Line
- Former Fuel Line
- Proposed Soil Sample

Historical Sample Location

- Soil Boring
- Surface Soil Sample
- Sediment Sample
- Hydro Punch
- Monitoring Well
- Abandoned Monitoring Well
- Product Recovery Well
- Abandoned Recovery Well
- Bioventing System Well
- Surface Water Sample
- Ambient Air
- Gore Sorber
- Soil Vapor Sample
- Vapor Extraction System Effluen
- Vapor Extraction Well
- Vapor Monitoring Point

Notes:
1. The groundwater flow direction shown is thepredominant direction that persists from late August through breakup of the Yukon River(approximately May 15). Groundwater flowdirections during the remainder of the year are directed away from the Yukon River and are oriented approximately due north (exact directionwill vary depending on time and location).
2. * Soil Sample for Pipeline Evaluation.
3. VMP indicates vapor monitoring poinit from Attachment M-2.

0 60 120
Feet

N

FIGURE D19-ST005
Proposed Sample Locations on the Apron

Work Plan for Site Inspection, Remedial Investigation, and Site Characterization
Former Galena Forward Operating Location, Alaska

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V:\GALENA\TO184_394439\MAPFILES\OAPP\ST005\ST005_OAPP_PROP_D19_LETTERSIZE.MXD CVONFREE 6/16/2011 5:07:08 PM

Elevated PID 21 to 65 ft bgs

Highest PID 24 to 29 ft bgs

PROJECT NUMBER	BORING NUMBER	SHEET 1 OF 3
417336	ST005_GP079	

SOIL BORING LOG

PROJECT: Former Galena FOL — LOCATION: ST005

ELEVATION: N.E — DRILLING CONTRACTOR: GTA

DRILLING METHOD AND EQUIPMENT USED: DPT 6620 DT

WATER LEVELS: 9.0' — START: 0940 06-18-11 — END: 1200 06-18-11 — LOGGER: S. Fenton

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): %G %S %F
5	0-5	95%	1-GP	NA	Asphalt and bedding (SP) (2.5Y 4/3), moist, loose, bedded poorly graded. Intermixed 5-20 mm sub-rounded small gravel.	0.1 ppm, 0.1 ppm, 0.1 ppm, 0.2 ppm, 0.1 ppm — Head spacing 0.2 ppm C0855 *Sampled 0-2 ST005GP07950_00-02 *Sampled 4-6 ST005GP07950_04-06
10	5-10	90%	2-GP	NA	Sand fine to medium (SM) (2.5Y 3/3), moist, loose, bedded, poorly graded Trace intermixed 5-20 mm gravel, well rounded. Silt (ML) (2.5Y 3/3), wet, very stiff slow dilatency, nonplastic, non cohesive bedded.	1.4 ppm, 1.6 ppm, 1.7 ppm, 1.7 ppm, 2.1 ppm — Head spacing 1.2 ppm C0910 *Sampled 07-09' ST005GP07950_07-09
15	10-15	90%	3-GP	NA	Thinly bedded zone (ML) (5/cy 2.5/1) and (10R 5/8) ▽ wet at 8.5' 0910 ▽ wet at 9.0'	0.5 ppm, 0.5 ppm, 0.5 ppm, 0.6 ppm, 0.6 ppm — Head spacing 0.0 ppm C0918 *Sampled 11-13' ST005GP07950_11-13
20	15-20	90%	4-GP	NA	Sand (SM) (2.5Y 3/3) wet, loose to medium density; bedded, poorly graded.	0.6 ppm, 0.6 ppm, 0.7 ppm, 2.2 ppm, 2.3 ppm — Head spacing 0.0 ppm C0926 *Sampled 19-21' ST005GP07950_19-21
25	20-25	90%	5-GP	NA	Grading with depth 10-20 mm well rounded gravel intermixed. Trace organic matter; root-wood	531.9 ppm, 202 ppm, 250 ppm, 990 ppm, 1229 ppm — Head spacing 107 ppm C0940 Strong hydrocarbon odor
	25-30	85%	6-GP	NA		1500 ppm, 2750 ppm, 2690 ppm, 1375 ppm — Head spacing 89.7 ppm C0955 *Sampled 26-28 ST005GP07950_26-28 Strong hydrocarbon odor

PROJECT NUMBER	BORING NUMBER	
417336	ST005-GP079	SHEET 2 OF 3

CH2MHILL

SOIL BORING LOG

PROJECT : Former Galena FOL
LOCATION : ST005
ELEVATION : NA
DRILLING CONTRACTOR : GTA
DRILLING METHOD AND EQUIPMENT USED : DPT 6620 DT
WATER LEVELS : 9.0"
START : 0840 06-18-11
END : 1200 06-18-11
LOGGER : J. Ferrin

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm). %G %S %F
35	30-35	95%	7-GP	NA	Grading with depth, little 5-15mm small gravel intermixed.	50.1, 90.5, 122, 120, 29.0 — Head spacing 711ppm; C01010; Strong hydrocarbon odor
40	35-40	90%	8-GP	NA	Trace organic matter, roots - wood	25.2, 29.5, 35.0, 28.7, 16.5 — Head spacing 159ppm; C1020; Slight hydrocarbon odor
45	40-45	90%	9-GP	NA	Sand medium to coarse (SW)(2.5Y3/3) wet, medium density, bedded, well graded sand. Trace organic matter, wood	28.1, 35.1, 31.2, 69.5, 68.2 — Head spacing 163ppm; C1030; *Sampled 40'-42'; ST005GP07950-40-42; Strong hydrocarbon odor
50	45-50	90%	10-GP	NA		58.2, 54.2, 160, 84.3, 79.5 — Head spacing 200ppm; C1040; Strong hydrocarbon odor
55	50-55	80%	11-GP	NA	Grading with depth little 5-10mm small gravels, well rounded.	59.6, 62.3, 79.2, 74.5 — Head spacing 103ppm; C1048; *Sampled 53'-55'; ST005GP07950-53-55
	55-60	80%	12-GP	NA		11.2, 11.5, 0.9, 0.4 — Head spacing 44.2ppm; C1058

CH2MHILL

PROJECT NUMBER	BORING NUMBER	SHEET OF
417336	ST005_GP079	3 OF 3

SOIL BORING LOG

PROJECT: Former Galena FOL
LOCATION: ST005
ELEVATION: NA
DRILLING CONTRACTOR: STA
DRILLING METHOD AND EQUIPMENT USED: DPT 6620 DT
WATER LEVELS: 9.0
START: 0840 06-18-11 END: 1200 06-18-11 LOGGER: J. Ferraro

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm) %G %S %F
65	60-65	10"	13-SP	NA	Gravel lens, 5-15mm well rounded small gravel	6.5 ppm Head spacing 25.3 ppm C1110 *Sampled 63'-65' ST005GP079SO_63-65
70	65-70	15"	14-SP	NA		All material recovery was fluff. NO new sediment was observed
					Refusal 68.0'	
45						-Soil cuttings from 20'-55' were drummed. -All remaining sediment was returned to soil boring location. -Breathing zone 0.0 ppm
50						
55						

Elevated PID 14 to 41 ft bgs

Highest PID 21 to 30 ft bgs

PROJECT NUMBER	BORING NUMBER	
417336	ST005-GP083	SHEET 1 OF 2

SOIL BORING LOG

PROJECT: Former Galena FOL — LOCATION: ST005

ELEVATION: Refer to 05-VMP-15 — DRILLING CONTRACTOR: GTA

DRILLING METHOD AND EQUIPMENT USED: DPT 6620 DT

WATER LEVELS: 9.0' — START: 1535 06-18-11 — END: 1750 06-18-11 — LOGGER: J. Flowin

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6" 6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): %G %S %F
5	0-5	90%	1-GP	NA	Asphalt and bedding (SP) (2.5Y 3/3) moist, loose, bedded poorly graded. Interm 5-20mm sub-rounded small gravel.	0 ppm Head spacing 1.9 ppm 0 ppm @1600 0 ppm *Sampled 0-2' ST005GP083S0-00-02 0 ppm *Sampled 4-6' ST005GP083S0-04-06 0 ppm
10	5-10	90%	2-GP	NA	Sand fine to medium (SM) (2.5Y 3/3) moist, loose, bedded, poorly graded. Little interm 5-20 mm gravel well rounded. Silt (ML) (2.5Y 4/3), wet very stiff, slow dilatency, nonplastic, non cohesive	0 ppm Head spacing 0.0 ppm 0 ppm @1610 0 ppm *Sampled 07-09' ST005GP083S0-07-09 0 ppm ST005GP083S0-07-09FD 0 ppm
15	10-15	95%	3-GP	NA	Thinly bedded zone (ML) (Gley 2 5/1) and (10R 5/8) ▽ Wet at 8.5' 1610 ▼ wet at 9.0' Sand (SM) (2.5Y 3/3) wet, loose to medium density, bedded, poorly graded.	0 ppm Head spacing 1.6 ppm 2.5 ppm @1618 1.1 ppm *Sampled 11-13 ST005GP083S0-11-13 20.9 ppm 21.1 ppm
20	15-20	90%	4-GP	NA		37.1 ppm Head spacing 23.9 ppm 29.2 ppm @1628 190 ppm 210 ppm 240 ppm Strong hydrocarbon odor
25	20-25	90%	5-GP	NA	Grading with depth 10-20mm well rounded gravel interm. True organic matter; wood-root	1720 ppm Head spacing 165.3 ppm 2150 ppm @1638 2250 ppm *Sampled 22-24 ST005GP083S0-22-24 2260 ppm
	25-30	90%	6-GP	NA		2170 ppm Very strong hydrocarbon odor 2190 ppm Head spacing 125.0 ppm 2610 ppm @1648 2792 ppm *Sampled 28-30' ST005GP083S0-28-30 2679 ppm 2800 ppm Very strong hydrocarbon odor

PROJECT NUMBER	BORING NUMBER	
417336	ST005-GP083	SHEET 2 OF 2

CH2MHILL

SOIL BORING LOG

PROJECT : Former Galena FOL
LOCATION : ST005
ELEVATION : Refer to D5-VMP-15
DRILLING CONTRACTOR : GTA
DRILLING METHOD AND EQUIPMENT USED : DPT 6620 DT
WATER LEVELS : 9.0'
START : 1555 06-18-11
END : 1750 06-18-11
LOGGER : J. Fenton

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): %G %S %F
35	30-35	90%	7-GP	NA	Sand medium (SM) (2.5 Pb) wet, loose, bedded, poorly graded, little fines present ~10%	75.4 ppm Head spacing 880 ppm 25.3 ppm C1658 85.2 ppm ~~*Sampled 0-2' STF~~ ~~ST005GP083S0-01-00~~ 62.1 ppm 48.2 ppm slight hydrocarbon odor
40	35-40	80%	8-GP	NA	Grading with depth 5-15mm well rounded gravel.	35.2 ppm Head spacing 26.6 ppm 35.6 ppm ~~C1710~~ STF 34.1 ppm C1710 31.2 ppm *sampled 40-42' ST005GP083S0-40-42
45	40-45	80%	9-GP	NA		62.1 ppm Head spacing 35.4 ppm 18.9 ppm C1720 11.5 ppm 12.6 ppm
50	45-50	90%		NA	Grading with depth increased ~~percentage~~ STF percent sand coarse.	35.4 ppm Head spacing 36.5 19.0 ppm C1738 21.0 ppm 11.5 ppm 10.0 ppm
55	50-55	75%				0 ppm Head spacing 10.4 ppm 0 ppm C1748 0 ppm *sampled 53'-55' 0 ppm ST005GP083S0-53-55
					Total Depth 55.0'	- Soil cuttings 15'-50' were drumed - Soil cuttings 0-15' and 50'-55' were returned to soil boring location. - Breathing air space 0.0 ppm

Elevated PID 26 to 42 ft bgs
Highest 26 to 30 ft bgs

PROJECT NUMBER	BORING NUMBER	SHEET 1 OF 2
417336	ST005-GP089	

SOIL BORING LOG

PROJECT: Former Galena FOL — LOCATION: ST005
ELEVATION: NA — DRILLING CONTRACTOR: STA
DRILLING METHOD AND EQUIPMENT USED: DPT 6620 DT
WATER LEVELS: 9.0' — START: 1240 06-28-11 — END: 1520 06-28-11 — LOGGER: J. Fowler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): %G %S %F
5	0-5	90%	1-GP	NA	Asphalt and bedding (SP) (2.5Y 3/3), moist, loose, bedded, poorly graded. Intermixed 5-20mm subrounded small gravels	0 ppm Head spacing 9.1 ppm 0 ppm C1300 0 ppm *Sampled 0-2' ST005GP089S0_00-02 0 ppm *Sampled 4-6' ST005GP089S0_04-06 0 ppm
10	5-10	95%	2-GP	NA	Sand fine to medium (SM) (2.5Y 3/3) moist, loose, bedded, poorly graded Trace intermixed 5-10mm small gravel well rounded.	0 ppm Head spacing 0.0 ppm 0 ppm C1318 0 ppm *Sampled 7-9' ST005GP089S0_07-09 0 ppm 0 ppm
15	10-15	90%	3-GP	NA	Silt (ML) (2.5Y 3/3), wet, very soft, slow dilatency, nonplastic, non cohesive, bedded Little intermixed fine quartz grains. ▽ wet at 8.5' 1318 ▼ wet at 9.0'	0 ppm Head spacing 1.1 ppm 0 ppm C1326 0 ppm *Sampled 11-13' ST005GP089S0_11-13 0 ppm 0 ppm
20	15-20	95%	4-GP	NA	Sand (SM) (2.5Y 3/3) wet, loose to medium density, bedded, poorly graded.	0 ppm Head spacing 1.1 ppm 0 ppm C1335 0 ppm *Sampled 19-21' ST005GP089S0_19-21 0 ppm 0 ppm
25	20-25	90%	5-GP	NA	Clean gravel lens 5-15mm well rounded small gravel.	0 ppm Head spacing 18.5 ppm 0 ppm C1345 0 ppm 0 ppm 12.5 ppm Slight petroleum odor
	25-30	90%	6-GP	NA	Intermixed 5-15mm well rounded small gravel.	50.3 ppm Head spacing 136 ppm 92.0 ppm C1355 910 ppm *Sampled 28-30' ST005GP089S0_28-30 1320 ppm 1550 ppm Strong hydrocarbon odor

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PROJECT NUMBER	BORING NUMBER	
417336	ST005-SP089	SHEET 2 OF 2

SOIL BORING LOG

PROJECT: Former Galena FOL — LOCATION: ST005
ELEVATION: NA — DRILLING CONTRACTOR: STA
DRILLING METHOD AND EQUIPMENT USED: DPT 6620 DT
WATER LEVELS: 9.0' — START: 1240 06-19-11 — END: 1520 06-19-11 — LOGGER: J. Ferraro

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (IN)	#/TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION. OVM (ppm): %G %S %F
35	30-35	90%	7-SP	NA	Sand medium (sm) (2.5Y 4/3) wet, loose, bedded, poorly graded. Little fines present ~15%	12.6 ppm Head spacing 32.4ppm 7.5 ppm C1405 12.4 ppm 12.8 ppm 14.0 ppm
40	35-40	75%	8-SP	NA		8.2 ppm Head spacing 81.4ppm 17.6 ppm C1415 16.4 ppm
45	40-45	75%	9-SP	NA	44'-45' gravel lens 5-15mm well rounded gravel	12.5 ppm Head spacing 99.1 ppm 9.5 ppm C1425 10.8 ppm *Sampled 40-42 ST005SP0895D_40-43
50	45-50	75%	10-SP	NA	Grading with depth increased Coarse Sands and 5-10mm Gravel	3.5 ppm Head spacing 15.0ppm 1.5 ppm C1440 1.4 ppm
55	50-55	90%	11-SP	NA		6 ppm Head spacing 0.2ppm 0 ppm C1450 0 ppm 0 ppm 0 ppm
	55-60	5%	12-SP	NA		0 ppm Head spacing 0.0ppm 0 ppm C1458 0 ppm

Total Depth 60.0'

- Soil cuttings from 25'-30' were drummed
- Remaining soil cuttings were returned to soil boring location.
- Breathing zone 0.0 ppm

Westervelt, Win/ANC

From: Buciak, Melissa/RDD
Sent: Monday, June 20, 2011 12:36 PM
To: Westervelt, Win/ANC; Lord, Andrea/ANC; O'Connor, Kate/ANC
Cc: Fields, Ronny/ANC
Subject: Former Galena FOL: Status of ST005 Apron Sampling
Attachments: ST005_GP089.pdf; ST005_GP079.pdf; ST005_GP083.pdf

Attached are the boring logs for completed borings ST005_GP0089, ST005_GP079, ST005_GP083.

We set up at GP084 this morning and hit refusal 5 times between 11.5 and 12'. From the original location, we stepped out 4' to the north and 8' feet to the south. We stayed within the cracks but at this point, I told the team to fill in the holes and they are going to set up at MGH. I was concerned that we are getting out of our area that we are approved for (NOTAM good until next Friday). Note that we did collect the shallow samples at 0 – 2', 5-7' and 10-12' though, there were no PID hits. Should we submit these?

We can discuss at out 2 pm call.

Melissa Buciak
Associate Geologist
Environmental Services

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