

Injection and Confining Zones

The proposed injection well is designed to inject into the Upper Devonian Elk 3 Sand, with injection into notched and frac'd intervals at a depth of 2354 to 2403 feet bgs.

As shown on the generalized stratigraphic column (attached), most of the geologic Groups and Formations overlying the Elk 3 Sand can be considered confining units totaling approximately 2,000 feet. Although many of these units are predominantly shale and siltstone, the Upper Devonian Speechley Sand also contains reservoir rock and this zone is highlighted yellow in the stratigraphic column.

The uppermost units at the site are mapped as the Allegheny Group of Pennsylvanian Age and the Pennsylvanian Age Pottsville Group of which both consist of limestone, sandstone, shale, and coal deposits. At approximately 200 feet bgs, the Mississippian-Devonian Age Shenango through Oswayo undivided consists of sandstone, siltstone, and shale to approximately 500 feet bgs. The Upper Devonian siltstones, shale, and sands are present beneath the site beginning from approximately 500 feet bgs.

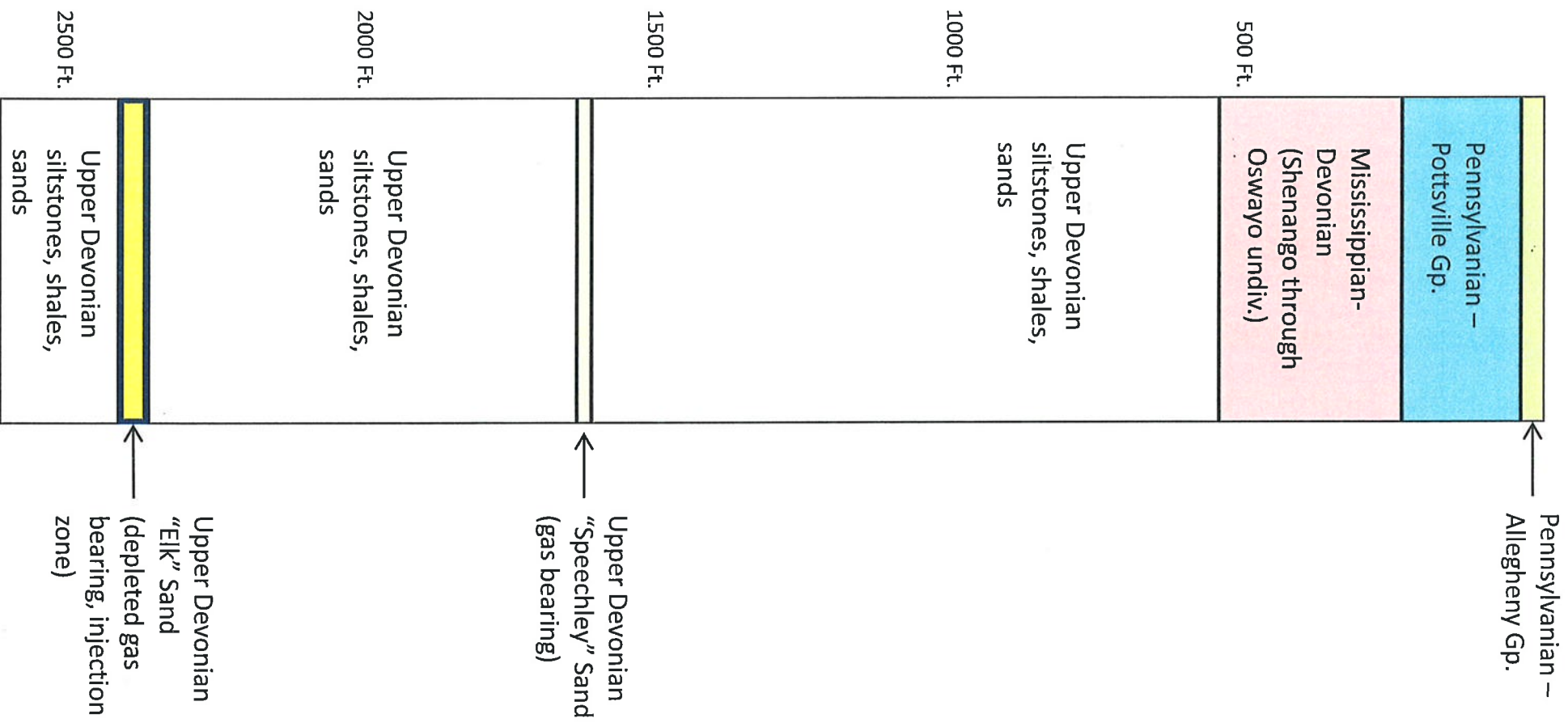
Also attached are the following:

- Seneca Well #38268 completion record, treatment record, service company job logs documenting cement returns, and geophysical log,
- Maximum Injection Pressure (MIP) calculations based on Instantaneous Shut-In Pressure (SIP) data for Seneca Well #38268,
- Seneca #38281 (proposed monitoring well) completion record and treatment report.

GEOLOGIC DATA

GENERALIZED STRATIGRAPHIC COLUMN

Stratigraphic Column



GEOLOGIC DATA

38268 WELL RECORD

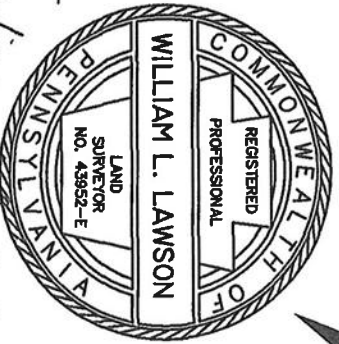
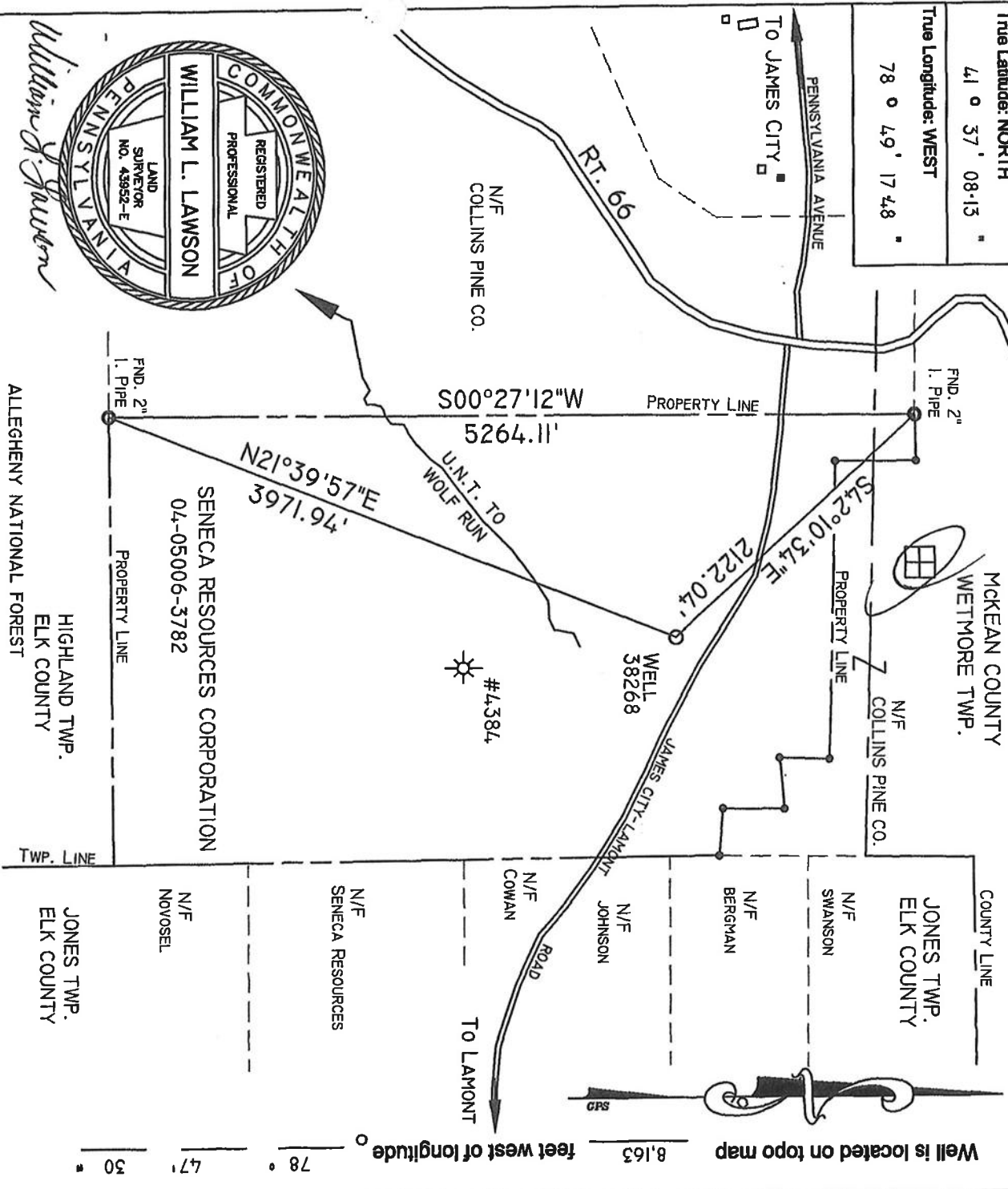


COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Oil and Gas Management Program
WELL LOCATION PLAT *76c*

DEP Application Tracking #	0557
Permit #	247-238-35c
Project #	20067
DEP USE ONLY	

<input type="checkbox"/> Denotes location of well on topo map.
True Latitude: NORTH 41 ° 37 ' 08.13 "
True Longitude: WEST 78 ° 49 ' 17.48 "

Well is located on topo map 2.207 feet south of latitude 41 ° 37 ' 30 "



William L. Lawson

Surveyor or Engineer **WILLIAM L. LAWSON** Phone # (814) 752-2291 Dwg. # P/WELL FILES/38268.DWG Date 02/09/07 Scale 1" = 1000' Trax Average 299.6

Lat. & Long. Method	GPSDF	Accuracy +/-	3	ft. Datum	NAD - 27	Elevation Method	TOPO	Accuracy +/-	10	ft. Datum	NGVD-29	Survey Date	01/30/07
Applicant / Well Operator Name	SENECA RESOURCES CORPORATION				Well(Farm) Name	FEE-SRC WT. 3771		Well #	38268		Serial #		
Address	286 OLD 36 ROAD SIGEL, PA 15860				County - Code	ELK - 2L		Map Section	"2"		Map Section		
Surface Landowner	SENECA RESOURCES CORPORATION				USGS 71/2 Quadrangle Map Name	JAMES CITY, PA		Map Section			Map Section		
Surface Lessor	NONE				Angle & Course of Deviation (if any)	VERTICAL		Surface Elevation	2070		Anticipated Total Depth	2530	
Surface Owner or Mineral Party with a Water Supply within 1,000'	NONE				Approximate Course and Distance to Water Supply	NONE		Owner, Lessee, or Operator of Well (if different from Applicant)	NONE		Anticipated Total Depth	2530	
Watershed	WATERSHED				Watershed	WATERSHED		Permit #	247-238-35c		Project #	20067	



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Oil & Gas Management Program

19
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WELL RECORD AND COMPLETION REPORT

Auth # _____ AFS # _____
Site # _____ Facility # _____
Fix Client # _____ Sub-fac # _____

Well Operator: SENECA RESOURCES CORPORATION DEP ID #: 72993
Address: 286 OLD 36 ROAD Well API # (Permit / Reg): 37-047-23835-00
City: SIGEL State: PA Zip Code: 15860 Project Number: _____
Phone: 814-752-2291 Fax: 814-752-6204 Well Farm Name: FEE SENECA RESOURCES WARRANT 3771 Well # 38268
County: Elk Municipality: Highland
USGS 7.5 min quadrangle map: James City 2

WELL RECORD Also complete Log of Formations on back (page 2)

Well Type: Gas Oil Combination Oil & Gas Injection Storage Disposal
Drilling Method: Rotary - Air Rotary - Mud Cable Tool
Date Drilling Started: 3/20/07 Date Drilling Completed: 3/22/07 Surface Elevation: 2040' Total Depth - Driller: 2530' Total Depth - Logger: 2532'
Cement returned on surface casing? Yes ~~XXXX~~ See Driller's Log
Cement returned on coal protective casing? Yes No X N/A

Casing and Tubing

Hole Size	Pipe Size	Wt.	Thread / Weld	Amount in Well (ft)	Material Behind Pipe Type and Amount	Packer / Hardware / Centralizers Type Size Depth	Date Run
11 1/4	9 5/8	26	T	63			
8 3/4	7	17	T	553	106 sks. Common Class A, 3% CaCl 1/2#unicele		523, 349, 3/21/07 175
6 1/4	2 3/8		T	2498			7/03/07
	5/8		T	2475			7/03/07

COMPLETION REPORT

Perforation Record

Date	Interval Perforated From To	Date	Interval Treated	Type	Fluid Amount	Propping Agent Type	Amount	Average Injection Rate
		7/03/07	1667 0	Gel	8770 gal	20/40 sand	120 sks	19 8
			1671 5	Water Gel	11,040 gal	20/40 sand	160 sks	20
			1676 0	Water Gel	10,910 gal	20/40 sand	160 sks	20
			1721 0	Water Gel	8910 gal	20/40 sand	120 sks	20
			1739 5	Water Gel	9250 gal	20/40 sand	120 sks	20 3

Stimulation Record

Date	Interval Perforated From To	Date	Interval Treated	Type	Fluid Amount	Propping Agent Type	Amount	Average Injection Rate

Natural Open Flow Natural Rock Pressure Hours Days
mcfd After Treatment Open Flow After Treatment Rock Pressure 125 Hours Days 2
Mcfd 350

Well Service Companies -- Provide the name, address, and phone number of all well service companies involved.

Name: Dailis-Morris Drilling Co Address: Moms Lane City - State - Zip: Bradford PA 16701 Phone: (814) 362-6493	Name: Universal Well Services Address: P O Box 180 City - State - Zip: Bradford, PA 16701 Phone: (814) 368-6175	Name: Schumberger Address: 95 Rutherford Run City - State - Zip: Bradford, PA 16701 Phone: (814) 362-7441
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AUG 16 2007

ENVIRONMENTAL PROTECTION
SOUTHWEST REGIONAL OFFICE

LOG OF FORMATIONS					Well API#: 37-053-23835-00	
Formation Name	Top	Bottom	Gas at	Oil at	Water at (Fresh or Brine)	Source of Data
SEE ATTACHED						

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AUG 20 2007

ENVIRONMENTAL PROTECTION
WARREN DISTRICT OFFICE

Well Operator's Signature:

Greg A. Stewart
Title: Superintendent / Prod. & Eng. Date: 7/26/07

DEP USE ONLY

Reviewed by:

T. Camp
Comments: **RECEIVED** Date: 6-9-08

AUG 16 2007

DALLAS-MORRIS DRILLING, INC.

WELL OWNER: Seneca Resources Corporation
 EASE: Fee-SRC Warrant 3771
 OWNERSHIP: Highland
 COUNTY: Elk
 PERMIT NO.: 37-047-23835-00

WELL NO.: 38268
 SPUD DATE: 3/20/07
 T.D. DATE: 3/22/07
 TOTAL DEPTH: 2530'
 RIG NO.: RD-23

DEPTH	UNIT	CONDUCTOR CASING	CONDUCTOR CASING	CONDUCTOR CASING	CEMENT
62.6	FT	CONDUCTOR CASING	9 5/8"	SIZE	
	FT	CONDUCTOR CASING		SIZE	106 sks
553.2	FT	SURFACE CASING	7"	SIZE	7 bbl cement returns
275	FT	FRESH WATER DEPTH	5 GPM	SIZE	
290	FT	FRESH WATER DEPTH	10 GPM	SIZE	
325	FT	FRESH WATER DEPTH	15 GPM	SIZE	
415	FT	FRESH WATER DEPTH	20 GPM	SIZE	
Bits Used: 12 1/4", 8 3/4", 6 1/4"					
Fuel Use:		Spud: 8057	T. D.: 8916	Rig Hours:	5051 - 5093

TOP	BOTTOM	FORMATIONS	TOP	BOTTOM	FORMATIONS
0	5	Dirt & Rock	1910	1925	Gas
5	15	Sand	1925	1980	Cooper 4.0 & Sand
15	40	Sand	1980	2135	Cooper 6.0
40	55	Sand	2135	2275	Gas
55	70	Shale	2275	2295	Elk 1.0 (gas)
70	95	Sand	2295	2355	Sand (gas)
95	120	Sand & Shale	2355	2390	Gas
120	225	Sand	2390	2420	Elk 4.0
225	415	Sand & Shale	2420	2510	Sand (gas)
415	558	Sand	2510	2530	Sand
558	635	Red Rock	2530		Total Depth
635	650	Shale			
650	820	Red Rock			
820	865	Shale			
865	915	Red Rock			
915	1270	Sand & Shale			
1270	1345	Sand			
1345	1360	Red Rock			
1360	1385	Sand & Shale			
1385	1555	Base Warren 1.0			
1555	1565	Red Rock			
1565	1575	Sand			
1575	1598	T-12 Marker			
1598	1675	Speechley 2.0			
1675	1725	Gas			
1725	1750	Speechley 6.0 (gas)			
1750	1765	Gas			
1765	1875	Tiona 1.0			
1875	1890	Red Rock (gas)			
1890	1910	Sand			

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AUG 20 2007

ENVIRONMENTAL PROTECTION
 WARREN DISTRICT OFFICE

RECEIVED

AUG 06 2007

DALLAS-MORRIS DRILLING, INC.

WELL OWNER: Seneca Resources Corporation
 EASE: Fee-SRC Warrant 3771
 TOWNSHIP: Highland
 COUNTY: Elk
 PERMIT NO.: 37-047-23835-00

WELL NO.: 38268
 SPUD DATE: 3/20/07
 T.D. DATE: 3/22/07
 TOTAL DEPTH: 2530'
 RIG NO.: RD-23

62.6	FT	CONDUCTOR CASING	9 5/8"	SIZE	CEMENT
	FT	CONDUCTOR CASING		SIZE	106 sks
553.2	FT	SURFACE CASING	7"	SIZE	7 bbl cement returns
275	FT	FRESH WATER DEPTH	5 GPM	SIZE	
290	FT	FRESH WATER DEPTH	10 GPM	SIZE	
325	FT	FRESH WATER DEPTH	15 GPM	SIZE	
415	FT	FRESH WATER DEPTH	20 GPM	SIZE	
Bits Used: 12 1/4", 8 3/4", 6 1/2"					
Fuel Use:		Spud: 8057	T. D.: 8916	Rig Hours:	5051 - 5093

TOP	BOTTOM	FORMATIONS	TOP	BOTTOM	FORMATIONS
0	5	Dirt & Rock	1910	1925	Gas
5	15	Sand	1925	1980	Cooper 4.0 & Sand
15	40	Sand	1980	2135	Cooper 6.0
40	55	Sand	2135	2275	Gas
55	70	Shale	2275	2295	Elk 1.0 (gas)
70	95	Sand	2295	2355	Sand (gas)
95	120	Sand & Shale	2355	2390	Gas
120	225	Sand	2390	2420	Elk 4.0
225	415	Sand & Shale	2420	2510	Sand (gas)
415	558	Sand	2510	2530	Sand
558	635	Red Rock	2530		Total Depth
635	650	Shale			
650	820	Red Rock			
820	865	Shale			
865	915	Red Rock			
915	1270	Sand & Shale			
1270	1345	Sand			
1345	1360	Red Rock			
1360	1385	Sand & Shale			
1385	1555	Base Warren 1.0			
1555	1565	Red Rock			
1565	1575	Sand			
1575	1598	T-12 Marker			
1598	1675	Speechley 2.0			
1675	1725	Gas			
1725	1750	Speechley 6.0 (gas)			
1750	1765	Gas			
1765	1875	Tiona 1.0			
1875	1890	Red Rock (gas)			
1890	1910	Sand			

2300

SEE SKL Wharrior 3710
(Farms City)

38268

EIKY

total of 960SKS

960SKS

EIKY 1

filled up to 1/2 in 8

300SKS

filled up to #1 and 2 w/ 3 weeks

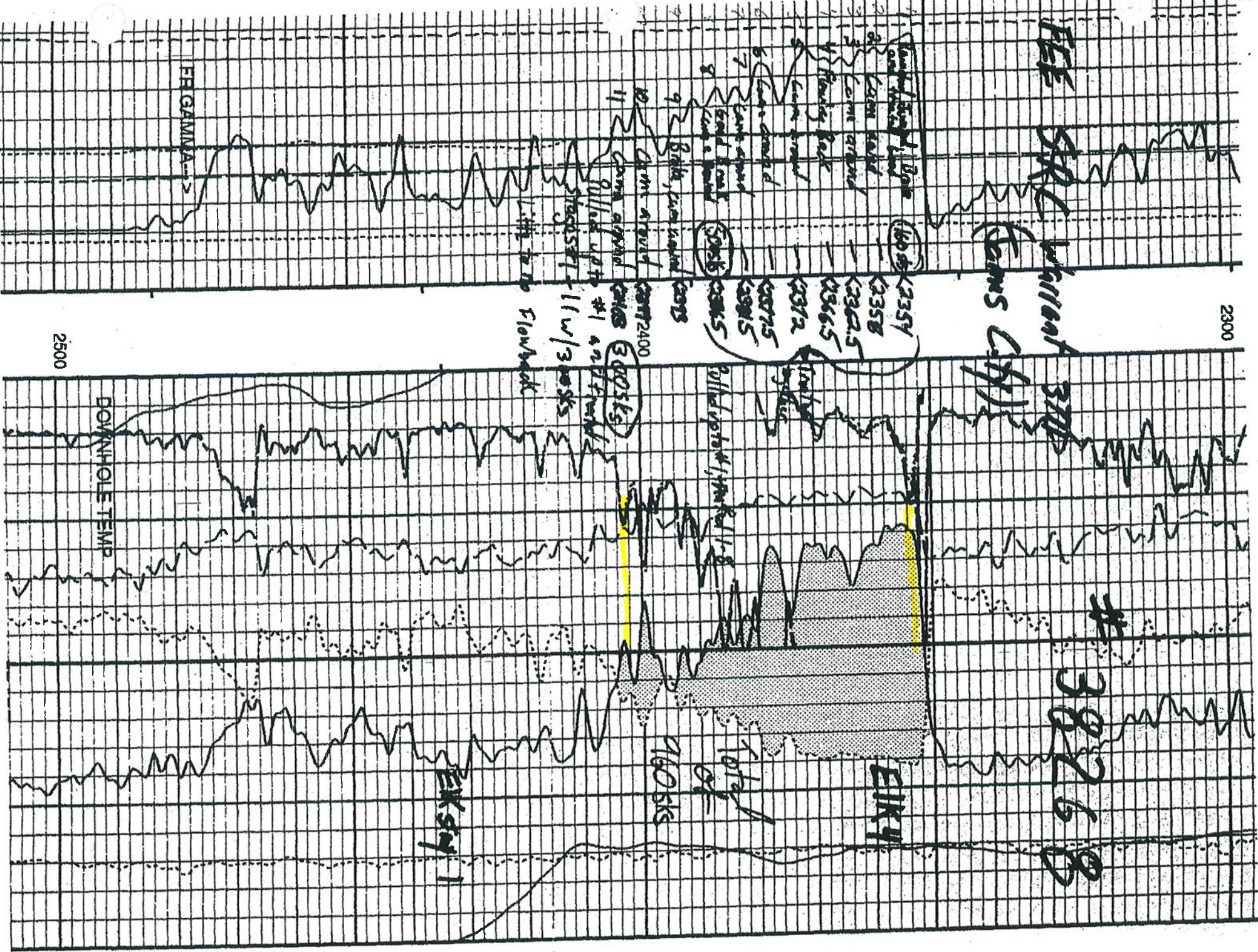
Little to no flowback

- 10 down around 20072400
- 11 Gamma around 2008 (300SKS)
- 9 2 Baffle, run normal 2009
- 8 Gamma around 2005 (200SKS)
- 7 Gamma around 2005 (200SKS)
- 6 Gamma around 2007 (200SKS)
- 5 Gamma around 2007 (200SKS)
- 4 Gamma around 2007 (200SKS)
- 3 Gamma around 2007 (200SKS)
- 2 Gamma around 2007 (200SKS)
- 1 Gamma around 2007 (200SKS)

FR GAMMA

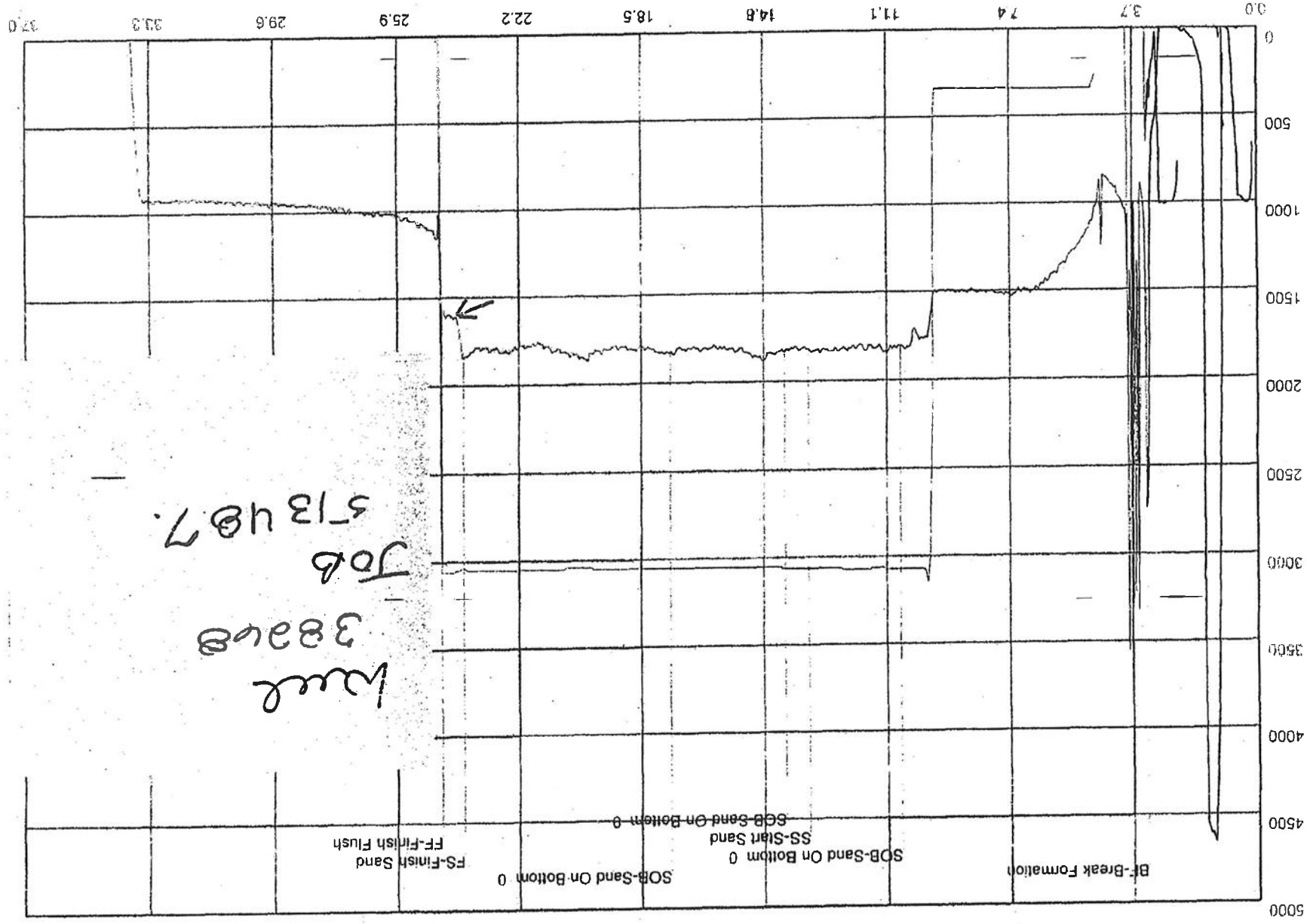
DOWNHOLE TEMP

2500



PRESSURE _____ DENSITY _____ RATE A _____ RATE B _____

Time (min.)



Job 513487
 Well 38248

Frac Data

#1 160 SKD 4/5/07
 Elk 4

GEOLOGIC DATA

38281 WELL RECORD



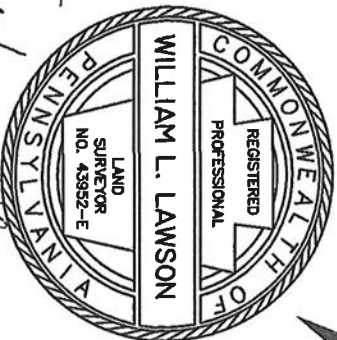
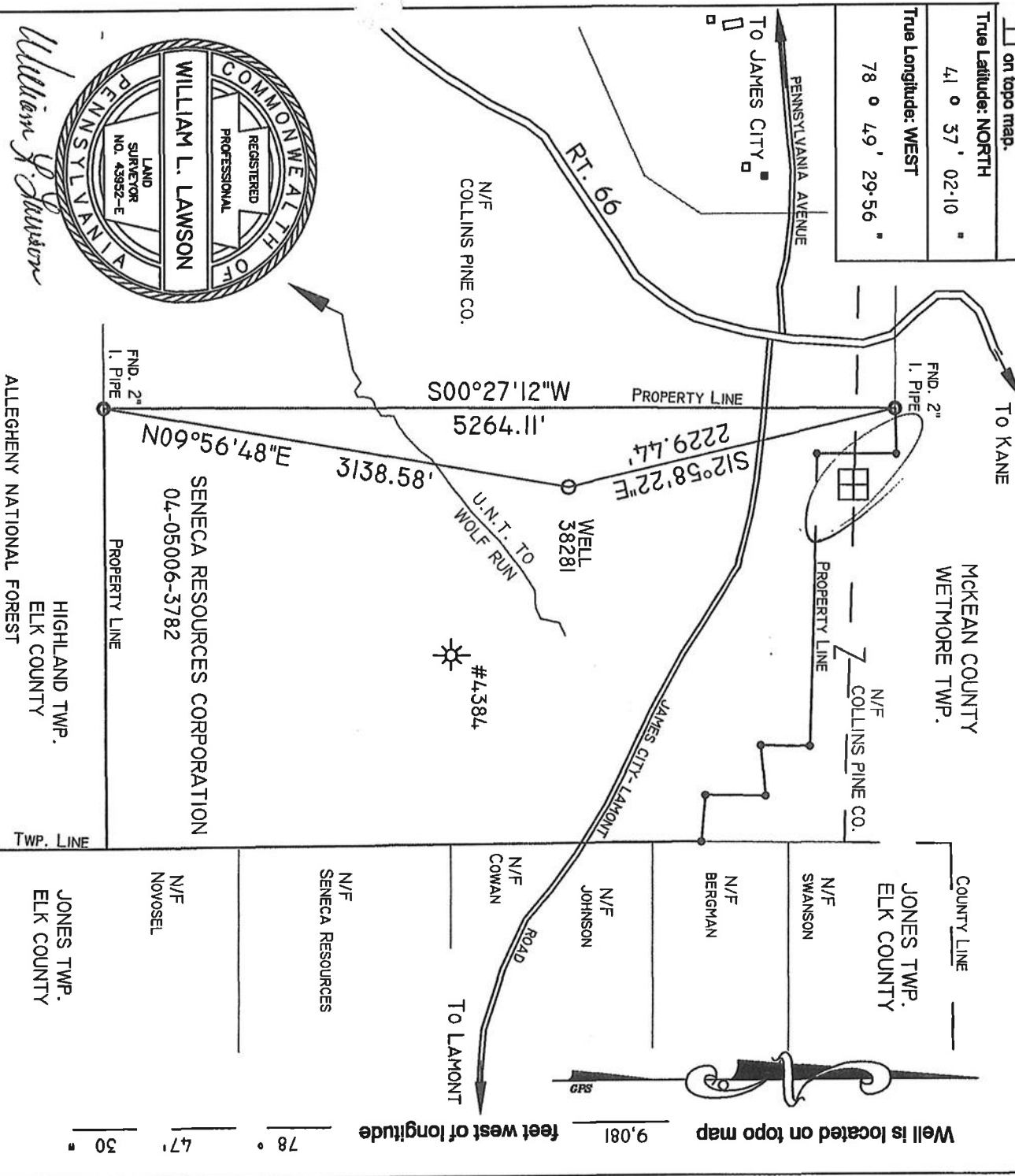
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Oil and Gas Management Program
WELL LOCATION PLAT

DEP Application Tracking #	24723884	DEP Application Project #	510610
USE ONLY			

<input checked="" type="checkbox"/> Denotes location of well on topo map.
True Latitude: NORTH 41 ° 37 ' 02.10 "
True Longitude: WEST 78 ° 49 ' 29.56 "

Well is located on topo map 2,815 feet south of latitude 41 ° 37 ' 30 "

Well is located on topo map 9,081 feet west of longitude 78 ° 47 ' 30 "



William L. Lawson

Surveyor or Engineer **WILLIAM L. LAWSON** Phone # (814) 752-2291 Dwg. # P-WEL/PLS/38281.DWG Date 04/09/07 Scale 1" = 1000' Tread Average 299.6

Lat. & Long. Method	Accuracy +/-	ft. Datum	NAD - 27	Elevation Method	Method	TOPO	Accuracy +/-	ft. Datum	NGVD-29	Survey Date	02/30/07
Applicant/Well Operator Name	SENECA RESOURCES CORPORATION			Well(Farm) Name	FEE-SRC WT. 3771			Sheet #	38281		
Address	286 OLD 36 ROAD SIGEL, PA 15860			County - Code	ELK - 24			Municipality	HIGHLAND TOWNSHIP		
Surface Landowner	SENECA RESOURCES CORPORATION			USGS 712 Quadrangle Map Name	JAMES CITY, PA			Map Section	"2"		
Surface Lessor	NONE			Angle & Course of Deviation (Drilling)	VERTICAL			Surface Elevation	2570		
Strata Owner or Water Purveyor with a Water Supply within 1,000 ft.	NONE			Director, Lessee, or Operator of Marketable Coal Seam	D			Name of Coal Seam	Owned, Leased, or Operated by		

WATERSHED *Wolf Run* **APR 30 2007**



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Oil & Gas Management Program

WELL RECORD AND COMPLETION REPORT

Auth #	AP# #
Site #	Facility #
Fix Client #	Sub-fac #

Well Operator SENECA RESOURCES CORPORATION	DEP ID # 72993	Well API # (Permit / Reg) 37-047- 32988 33884	Project Number	Acres
Address 51 Zentis Blvd	City Brookville	State PA	Zip Code 15825	Well # 38281
Phone 814-849-4555	Fax 814-849-4795	County Mckean	Municipality Highland	Send #
USGS 7.5 min quadrangle map				

WELL RECORD Also complete Log of Formations on back (page 2)

Well Type	<input type="checkbox"/> Gas	<input type="checkbox"/> Oil	<input checked="" type="checkbox"/> Combination Oil & Gas	<input type="checkbox"/> Injection	<input type="checkbox"/> Storage	<input type="checkbox"/> Disposal
Drilling Method	<input checked="" type="checkbox"/> Rotary - Air	<input type="checkbox"/> Rotary - Mud	<input type="checkbox"/> Cable Tool			
Date Drilling Started	01/22/08	Date Drilling Completed	01/24/08	Surface Elevation	2020	Total Depth - Driller
						2544
						Total Depth - Logger
						2540

Casing and Tubing

Cement returned on surface casing? Yes No
Cement returned on coal protective casing? Yes No N/A

Hole Size	Pipe Size	Wt.	Thread / Weld	Amount in Well (ft)	Material Behind Pipe Type and Amount	Packer / Hardware / Centralizers Type Size	Depth	Date Run
12 1/4	9 5/8	26	T	47				01/22/08
8 3/4	7	17	T	602	124 sks Class A Cement, 3% CaCl, 1/2# unicele/sk			01/23/08
1/2	2 3/8	4.9	T	2482				03/11/08
	5/8		T	2475				03/11/08

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APR 17 2008

ENVIRONMENTAL PROTECTION
COMPLETION REPORT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Perforation Record

Date	Interval Perforated From	To	Date	Interval Treated	Type	Fluid Amount	Propping Agent Type	Amount	Average Injection Rate
			03/11/08	1650	Gel	8460	20/40	120	20
				1655	Gel	9620	20/40	140	20
				1658	Water	10728	20/40	160	20
				1662	Water	8672	20/40	140	20
				1704	Gel	7401	20/40	100	20
				1719	Water	9111	20/40	120	20

Stimulation Record

Mcfd	Flow Type	Pressure	Hours	Days
Natural Open Flow	Natural Rock Pressure			
Mcfd 1	After Treatment Open Flow	After Treatment Rock Pressure	Hours	Days
Mcfd 500				

Well Service Companies -- Provide the name, address, and phone number of all well service companies involved.

Name	Address	City - State - Zip	Phone
Natural Oil and Gas	1410 W Warren Road	Brookville, PA 16701	814-362-2543
Keane and Sons Drilling	12 Keane Lane	Brookford, PA 16701	814-362-2659
Schlumberger	95 Rutherford Run	Brookford, PA 16701	814-362-7441

LOG OF FORMATIONS

Well API#: 37-047-32884

Formation Name	Top	Bottom	Gas at	Oil at	Water at (Fresh or Brine)	Source of Data
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SEE ATTACHED

<p style="text-align: center;">RECEIVED</p> <p style="text-align: center;">APP</p>
--

Well Operator's Signatures

Doug A. Murray
 Title: Superintendent / Prod. & Eng. Date: 4/14/08

DEP USE ONLY

Reviewed by: *[Signature]* Date: 6-9-08
 Comments: *[Signature]*



NATURAL OIL & GAS CORP.

1410 WEST WARREN ROAD, BRADFORD, PENNSYLVAN
Telephone: (814) 362-6890 Fax: (814) 362-6120

WELL # 38281

PERMIT # 37-047-23884

SPUD DATE 1/22/2008

COUNTY Elk

SPUD TIME 4:30 p.m.

TOWNSHIP Highland

CONDUCTOR 47 ft.

LEASE James City

CASING 603 ft.

TD DATE 1/24/2008

TOTAL DEPTH 2544 ft.

TD TIME 11:57 a.m.

PIPE TALLY

1	23.2 ft.	7	23.2 ft.	13	23.2 ft.	19	23.2 ft.	25	23.2 ft.
2	23.2 ft.	8	23.2 ft.	14	23.2 ft.	20	23.2 ft.	26	23.2 ft.
3	23.2 ft.	9	23.2 ft.	15	23.2 ft.	21	23.2 ft.	27	
4	23.2 ft.	10	23.2 ft.	16	23.2 ft.	22	23.2 ft.	28	
5	23.2 ft.	11	23.2 ft.	17	23.2 ft.	23	23.2 ft.	29	
6	23.2 ft.	12	23.2 ft.	18	23.2 ft.	24	23.2 ft.	30	

#JOINTS 26

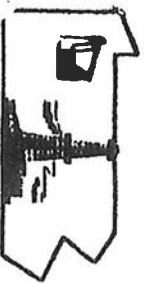
CEMENT CO. Universal

SACKS 124

RETURNS 6 Barrels

PLUG DOWN 9:45 a.m.

CEMENT DATE 1/23/2008

OPERATOR: SenecaWELL NAME: Fee-SRC WT 377WELL # : 38281PERMIT # : 37-047-23884-1

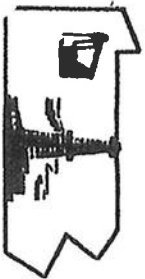
NATURAL OIL & GAS CORP.

1410 WEST WARREN ROAD, BRADFORD, PENNSYLVANIA 167

Telephone: (814) 362-6890 Fax (814) 362-6120

WELL DEPTH	TIME	MINUTES	FORMATION	WELL DEPTH	TIME	MINUTES	FORMATION
45	4:30		Gravel, Shale	645	10:40	10	Shale
75	4:56		Shale	675	8:02	12	Shale
105	6:00		Shale	705	8:11	9	Shale
135	6:11		SandStone	735	8:21	10	Shale
165	6:21		SS/Shale	765	8:31	10	RedRock
195	6:34		Shale	795	8:43	12	RR/Shale
225	6:45		Shale	825	8:53	10	Shale
255	6:58		Sand	855	9:04	11	Shale
285	7:10		Shale	885	9:16	12	Shale
315	7:25		Sand	915	9:27	11	Shale
345	7:37		Shale	945	9:40	13	Shale
375	8:49		RedRock	975	9:55	15	RedRock
405	9:00		RedRock	1005	10:05	10	Shale
435	9:12		RR/Shale	1035	10:15	10	Shale
465	9:26		Sand/Shale	1065	10:26	11	RedRock
495	9:40		Shale	1095	10:37	11	RedRock
525	9:52		Shale	1125	10:50	13	RedRock
555	10:04		Shale	1155	11:02	12	Shale
585	10:17		Sand/Shale	1185	11:13	11	RR/Shale
615	10:30		Shale	1215	11:23	10	Shale

COMMENTS:



NATURAL OIL & GAS CORP.

OPERATOR: Seneca

WELL NAME: Fee-SRC WT 37

WELL # : 38281

PERMIT # : 37-047-23884

1410 WEST WARREN ROAD, BRADFORD, PENNSYLVANIA 167

Telephone: (814) 362-6890

Fax: (814) 362-6120

WELL DEPTH	TIME	MINUTES	FORMATION	WELL DEPTH	TIME	MINUTES	FORMATION
1245	11:33	10	RedRock	1845	7:25	11	Shale
1275	11:43	10	Shale	1875	7:39		Sand (Cooper 4-0)
1305	11:56	13	Shale	1905	7:52	13	Sand/Shale
1335	12:30		Shale	1935	8:03	11	Sand/Shale
1365	3:00		RR/Shale	1965	8:16		Sand (Cooper 6-0)
1395	4:20		Shale	1995	8:28	12	Sand/Shale
1425	4:30	10	Shale	2025	8:38	10	Shale
1455	4:43	13	Shale	2055	8:49	11	Shale
1485	4:55	12	Shale	2085	9:00	11	Shale
1515	5:05	10	Shale	2115	9:12	12	Shale
1545	5:20	15	Shale	2145	9:22	10	Shale
1575	5:34		Sand (Spechley 2-0)	2175	9:33	11	Shale
1605	5:45	11	Sand/Shale	2205	9:43	10	Shale
1635	5:58	13	Shale	2235	9:56	13	Sand (Elk 1-0)
1665	6:12		Sand (Spechley 6-0)	2265	10:09	13	Sand/Shale
1695	6:25	13	Sand/Shale	2295	10:20	11	Shale
1725	6:40	15	Sand (Tiona 1-0)	2325	10:31	11	Shale
1755	6:53	13	Sand/Shale	2355	10:45	14	Sand (Elk 3-0)
1785	7:04	11	RR/Shale	2385	10:48	13	Sand/Shale
1785	7:14	10	RR/Shale	2415	11:00	12	Sand/Shale

COMMENTS:

GEOLOGIC DATA

MAXIMUM INJECTION PRESSURE CALCULATIONS

Maximum Injection Pressure (MIP) Calculations for Seneca Well #38268

1) Frac Gradient Based on Well #38268

$FG = [ISIP + (.433 \times SG \times D)] / D$

Where:

ISIP = 1580 psi

SG = 1.0

D = 2354

Well #	ISIP (psi)*	Hydrostatic Factor (psi/ft)	SG	D (ft)	Fracture Gradient (psi/ft)
Well #38268	1580	0.433	1	2354	1.104

2) Maximum Injection Pressure (MIP) Using Average Frac Gradient From Well #38268

$MIP = [FG - (.433 \times SG)] \times D$

FG	SG	Depth	MIP
1.104	1.14	2354	1437

Top Perf	2354	Top of Perforations Used For Calculation
Bottom Perf	2403	

Operating Data

The proposed brine disposal well will primarily be utilized to inject produced and flowback water from wells completed in the Marcellus Shale, the Elk 3 Sand and other natural gas and oil producing formations. Other oil and gas related wastewaters associated with the production of oil and natural gas or natural gas storage operations, which are approved by EPA for injection under a UIC Class II D injection well, may also be injected. According to Title 40 Chapter I Sec. 144.6 (b)(1), such fluids include those "Which are brought to the surface in connection with natural gas storage operations, or conventional oil or natural gas production and may be commingled with waste waters from gas plants which are an integral part of production operations, unless those waters are classified as a hazardous waste at the time of injection."

Injection Rate

Injectivity testing performed on the proposed injection well (Seneca #38268 indicated the well may be capable of sustaining an injection rate of greater than 2 bpm (approximately 3000 bpd) with pressures remaining under the likely UIC Class IID permit limits for maximum injection pressure. A maximum injection rate of 3,000 bbl/day is proposed for operation of the facility, with an average injection rate of 2,000 bbl/day expected.

Maximum Allowable Surface Injection Pressure (MASIP) and Average Surface Injection Pressure

MASIP calculations based on EPA approved equations are included in the "Geologic Data" section of this application. Based on these calculations, the proposed MASIP is 1437 psi. It is estimated that the average surface injection pressure will be approximately 1000 psi.

Laboratory Analysis of Injection Fluid Samples

A summary of laboratory analytical results for samples representative of the types of brine which will be injected into the proposed injection well are attached. Samples were collected from produced water generated from gas wells in the vicinity of the injection well. The samples are characterized by an average specific gravity of approximately 1.14, pH of 6.08, and conductivity of 194.09.

Monitoring of Injection Fluid Samples and Well

The following identifies the UIC Class II underground injection well regulatory requirements and operational procedures which will be conducted to meet the subject requirements:

1. **Monitoring of the nature of injected fluids at time intervals sufficiently frequent to yield data representative of their characteristics.** An initial sample of fluid will be collected and

analyzed from initial loads proposed for disposal. In addition, samples will be collected for analysis from new types of sources (e.g., from different geologic formations, geographic regions, etc.) which would be expected to differ significantly from brine previously characterized for disposal at the facility. Samples will be analyzed for the following parameters at a minimum: specific gravity, total dissolved solids, total organic carbon, and pH.

2. **Observation of injection pressure, flow rate, and cumulative volume at least weekly based on the regulatory requirements for produced fluid disposal operations.** Injection pressures, flow rate, and cumulative volume will be continuously recorded electronically.
3. **A demonstration of mechanical integrity pursuant to 40 CFR Sec. 146.8 at least once every five years during the life of the injection well.** A mechanical integrity test will be performed prior to initiating injection and at least once every five years.
4. **Maintenance of the results of all monitoring until the next permit review.** All monitoring records will be maintained throughout the life of the well.

Reporting requirements consist of the following:

An annual report will be submitted to EPA summarizing the results of the required monitoring, including monthly records of injected fluids, and any major changes in characteristics or sources of injected fluid.

Proposed Annulus Fluid

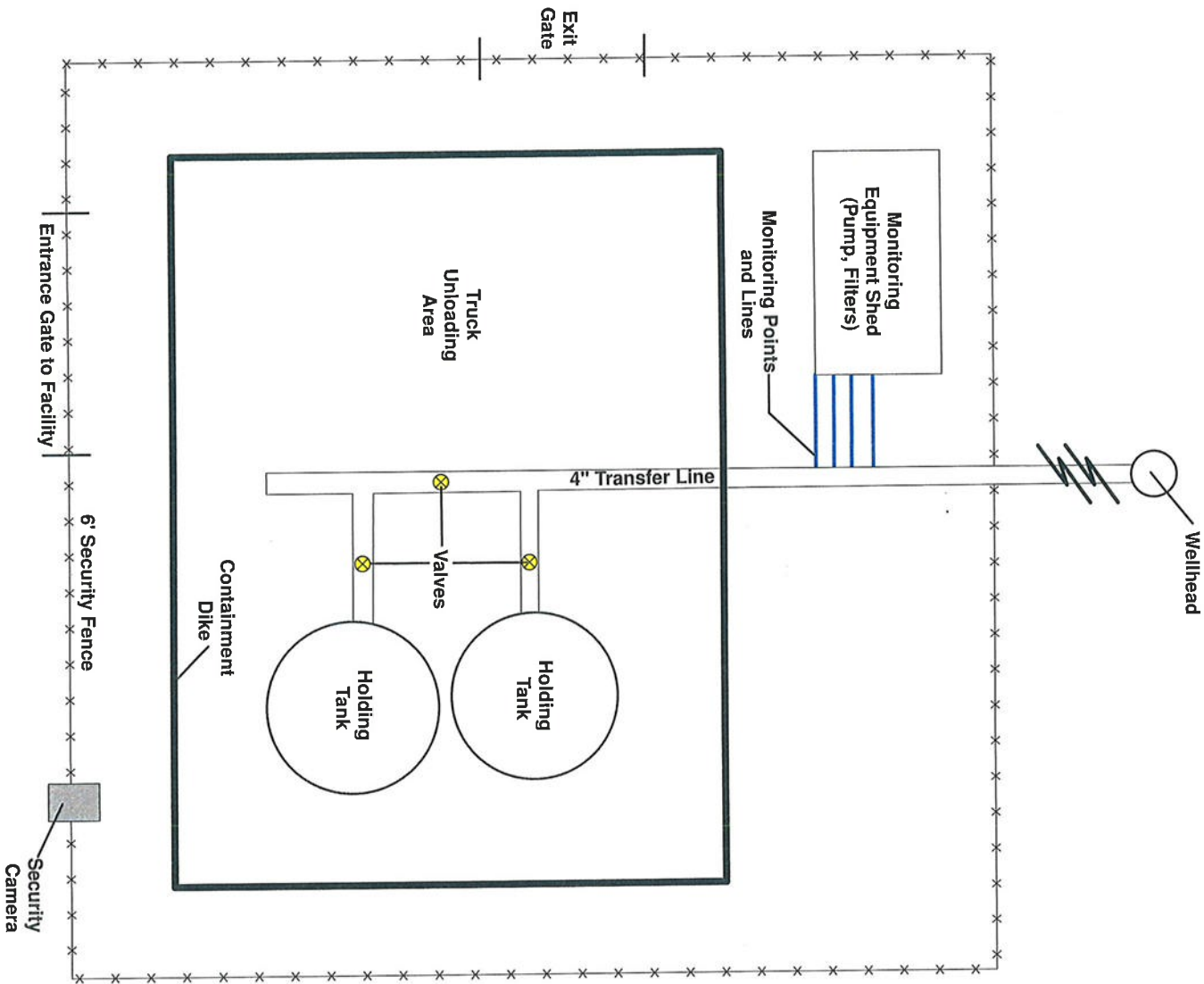
The proposed annulus fluid for the proposed injection well will consist of fresh water and a water soluble corrosion inhibitor. The corrosion inhibitor will be mixed in accordance with the manufacturer's recommendations then loaded into the well annulus prior to conducting injection operations. Product information for the type of corrosion inhibitor which will be utilized is attached. A similar type product may be used instead of the example product referenced.

Facility Layout and Operation

As indicated in the attached facility layout diagram, the injection well facility will include a truck unloading area and holding tanks connected by piping with associated valves, all of which will be situated in a diked containment area. The containment area will be properly sized to account for the entire volume of the largest container, plus 10% freeboard, in the event of a leak. The brine will be transferred to the injection well utilizing injection pumps situated in the Equipment Shed along with filters and monitoring equipment. Automatic shut-off valves will be incorporated into the tank design to prevent overflow during filling

operations. The facility will be surrounded by a fence having locking entrance and exit gates. A security camera will also be strategically situated on the site. The facility will be continually manned during unloading and injection operations. As indicated above, injection rate, cumulative volume and pressures will be continuously measured and recorded.

OPERATING DATA
SURFACE FACILITY SCHEMATIC



DRAWN BY S. PAXTON		DATE 06/04/12	CONTRACT NUMBER TETRA TECH	
CHECKED BY E. BERKLIITE		DATE 06/04/12	APPROVED BY	
REVISED BY		DATE	APPROVED BY	
SCALE NOT TO SCALE			FIGURE NO.	REV 0
SENECA RESOURCES CORPORATION SURFACE FACILITY SCHEMATIC WELL # 38268 ELK COUNTY, PENNSYLVANIA				

OPERATING DATA
TYPICAL BRINE LABORATORY ANALYSIS

<u>Date</u>	<u>W.O. #</u>	<u>Type Of Fluid</u>	<u>From</u>	<u>To</u>	<u>Well Hole</u>	<u>Secific Gravity</u>	<u>Weight (lb/gal)</u>	<u>pH</u>	<u>Conductivity</u>
FO5323									
01/09/12	26757	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks	1.15	9.6	5.87	212
01/08/12	18693	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks				
N5963									
01/07/12	18497	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks	1.15	9.6	5.82	207
01/07/12	30558	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks				
FO5314									
12/21/11	22010	Flowback	Collins Pine Pad G frac tanks	James City Pad A	Frac Tanks	1.13	9.4	7.51	184.1
12/21/11	22015	Flowback	Collins Pine Pad G frac tanks	James City Pad A	Frac Tanks				
FO5327									
01/06/12	18689	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks	1.13	9.45	6.26	191
01/05/12	26756	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks				
FO5324									
01/07/12	18691	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks	1.16	9.65	5.77	210.2
01/07/12	18497	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks				
FO5315									
01/11/12	18376	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks	1.11	9.2	6.01	158.3
01/11/12	18696	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks				
01/09/12	26757	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks				
FO5215									
01/09/12	18500	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks	1.125	9.35	5.94	183.9
FO5289									
01/05/12	30553	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks	1.135	9.45	5.92	193.6
01/05/12	30554	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks				
01/05/12	18684	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks				
01/08/12	15104	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks				
FO5322									
01/08/12	18693	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks	1.15	9.6	5.96	205.2
01/08/12	18499	Flowback	Boone Mtn Pad A frac tanks	James City Pad A	Frac Tanks				
FO5316									
nothing						1.13	9.4	5.93	189.4
N5234									
12/20/11		Flowback	Collins Pine Pad G	James City Pad A		1.15	9.6	5.92	200.3

Report of Analysis

Name: Seneca Resources
51 Zents Boulevard
Brookville, PA 15825

Sample Start Date: 2/28/2012 11:45 AM
Receipt Date: 2/28/2012 2:10 PM
Report Date: 4/3/2012
Sample Site: 26R Waste Profile

Sample ID#: 12 08933
Sample Type: Water
Sample Source: Grab
Sampler: SM (Lab employee)
Client Sample ID: James SWD

Analyte	Analyst	Analysis Date	Analysis Time	Sample Result	Units	Data Qualifier	Method	RPL
Acidity to pH=8.3	BH	03/01	n/a	269	mg/l as CaCO3	n/a	SM2310B	2
Alkalinity to pH=4.5	BH	03/03	n/a	22	mg/l as CaCO3	n/a	SM2320B	20
Biological Oxygen Demand 05	CJ	02/29	9:44 AM	59.1	mg/l	n/a	SM5210B	2.0
Chemical Oxygen Demand	AJD	02/29	n/a	1162.5	mg/l	D	SM5220 D	500.0
vdrogen Sulfide	SM	02/28	n/a	ND	mg/l	n/a	Hach	0.0
.ammonia as N / Distilled	BM	02/29	n/a	194.68	mg/l	n/a	SM4500NH3B & D	9.59
Bromide	BM	03/06	n/a	1910.00	mg/l	D	D1246-99	100.00
Chloride	KL	03/08	n/a	136446.00	mg/l	D	SM4500CID	5.00
Dissolved Oxygen	SM	02/28	n/a	4.0	mg/l	n/a	SM4500 O-G	2.0
Kjeldahl Nitrogen as N	ZTR	03/14	n/a	320.8	mg/l	n/a	SM4500Norg-CJD	59.4
pH (SM)	BH	03/03	n/a	5.89	SU	R	SM 4500H-B	0.01
Sulfate ASTM	ZTR	03/13	n/a	ND	mg/l	D	D516-02	10
Total Nitrate + Nitrite as N	SR	03/01	n/a	0.08	mg/l	n/a	SM4500NO3E	0.05
Aluminum - ICP	BE	03/13	n/a	ND	mg/l	D	200.7/6010	1.000
Arsenic-ICP	BE	03/13	n/a	ND	mg/l	D	200.7/6010	1.000
Barium - ICP	BE	03/13	n/a	371.700	mg/l	D	200.7/6010	0.500
Beryllium - ICP	BE	03/13	n/a	ND	mg/l	D	200.7/6010	0.500
Boron	ZTR	02/29	n/a	2.8	mg/l	D	SM 4500B-B	1.0
Cadmium - ICP	BE	03/14	n/a	ND	mg/l	D	200.7/6010	0.500
Calcium - ICP	BE	03/13	n/a	20307.000	mg/l	D	200.7/6010	50.000

Comments: Due to matrix of sample, a 1:2 dilution was required for sulfate analysis resulting in a ND. ZTR
03/13/2012

ND=Not Detected

DEP Certification #s 32-00382

D - Indicates an identified compound in an analysis that has been diluted R - Received out of recommended hold time.

Approved By: _____

Laboratory Supervisor





**ENVIRONMENTAL
SERVICE LABORATORIES, INC.**
1803 Philadelphia St., Indiana, PA 15701
(724) 463-1511 (724) 465-4209

Report of Analysis

Name: Seneca Resources
51 Zents Boulevard
Brookville, PA 15825
Sample Start Date: 2/28/2012 11:45 AM
Receipt Date: 2/28/2012 2:10 PM
Report Date: 4/3/2012
Sample Site: 26R Waste Profile

Sample ID#: 12 08933
Sample Type: Water
Sample Source: Grab
Sampler: SM (Lab employee)
Client Sample ID: James SWD

Analyte	Analyst	Analysis Date	Analysis Time	Sample Result	Units	Data Qualifier	Method	RPL
Chromium - ICP	BE	03/13	n/a	ND	mg/l	D	200.7/6010	0.500
Cobalt - ICP	BE	03/13	n/a	ND	mg/l	D	200.7/6010	0.500
Copper - ICP	BE	03/13	n/a	ND	mg/l	D	200.7/6010	0.500
Hardness	BE	03/13	n/a	58691	mg/l	n/a	SM2340B	1
Iron - ICP	BE	03/13	n/a	59.800	mg/l	D	200.7/6010	1.000
n, Dissolved-ICP	BE	03/13	n/a	26.600	mg/l	D	200.7/6010	1.000
Lead-ICP	BE	03/13	n/a	ND	mg/l	D	200.7/6010	0.500
Lithium - ICP	BE	03/13	n/a	98.200	mg/l	D	200.7/6010	50.000
Magnesium-ICP	BE	03/13	n/a	1939.000	mg/l	D	200.7/6010	50.000
Manganese - ICP	BE	03/13	n/a	9.100	mg/l	D	200.7/6010	0.500
Mercury	SS	03/09	n/a	ND	mg/l	n/a	245.1	0.0010
Molybdenum - ICP	BE	03/13	n/a	ND	mg/l	D	200.7/6010	0.500
Nickel - ICP	BE	03/13	n/a	ND	mg/l	D	200.7/6010	0.500
Selenium-ICP	BE	03/13	n/a	ND	mg/l	D	200.7/6010	1.000
Silver-ICP	BE	03/13	n/a	ND	mg/l	D	200.7/6010	0.500
Sodium - ICP	BE	03/15	n/a	35620.000	mg/l	D	200.7/6010	250.000
Strontium - ICP	BE	03/15	n/a	3242.500	mg/l	D	200.7/6010	5.000
Zinc - ICP	BE	03/13	n/a	0.800	mg/l	D	200.7/6010	0.500
Detergents, MBAS	LAW	02/29	8:30 AM	1.110	mg/l	n/a	SM5540C	0.200
Ethylene Glycol	EAC	03/01	n/a	ND	ug/L	D	SW846 8015B	2500

Comments: Due to matrix of sample, a 1:2 dilution was required for sulfate analysis resulting in a ND. ZTR
03/13/2012

ND=Not Detected

DEP Certification #: 32-00382
D - Indicates an identified compound in an analysis that has been diluted R - Received out of recommended hold time.

Approved By: _____
Laboratory Supervisor

John J. York

Report of Analysis

Name: Seneca Resources
51 Zents Boulevard
Brookville, PA 15825
Sample Start Date: 2/28/2012 11:45 AM
Receipt Date: 2/28/2012 2:10 PM
Report Date: 4/3/2012
Sample Site: 26R Waste Profile

Sample ID#: 12 08933
Sample Type: Water
Sample Source: Grab
Sampler: SM (Lab employee)
Client Sample ID: James SWD

Analyte	Analyst	Analysis Date	Analysis Time	Sample Result	Units	Data Qualifier	Method	RPL
Oil and Grease - HEM	SGT	03/05	n/a	125.5	mg/l	n/a	1664A	5.0
Phenolics, as Phenol	SR	02/29	n/a	ND	mg/l	D	420.1	0.050
pH- Field	SM	02/28	n/a	5.76	SU	n/a	SM 4500H-B	0.00
Specific Conductance	BH	03/03	n/a	176784	umhos/cm	n/a	SM 2510B	1
Total Dissolved Solids (TDS)	LMB	02/29	n/a	212500	mg/l	n/a	SM 2540C	25
Total Suspended Solids	LMB	02/29	n/a	238	mg/l	n/a	SM 2540D	5
1) Benzene	RO	03/03	n/a	4.64	ug/L	n/a	624/8260B	1.00
47) Toluene	RO	03/03	n/a	4.00	ug/L	n/a	624/8260B	1.00

Comments: Due to matrix of sample, a 1:2 dilution was required for sulfate analysis resulting in a ND. ZTR
03/13/2012

ND=Not Detected

DEP Certification #s 32-00382
D - Indicates an identified compound in an analysis that has been diluted R - Received out of recommended hold time.

Approved By: _____
Laboratory Supervisor

Shane J. Taylor



**ENVIRONMENTAL
SERVICE LABORATORIES, INC.**
1803 Philadelphia St., Indiana, PA 15701
(724) 463-1EST (724) 465-4209

Report of Analysis

Name: Seneca Resources
51 Zents Boulevard
Brookville, PA 15825
Sample Start Date: 2/28/2012 11:45 AM
Receipt Date: 2/28/2012 2:10 PM
Report Date: 4/2/2012
Sample Site: 26R Waste Profile

Sample ID#: 12 08934
Sample Type: Water
Sample Source: Grab
Sampler: SM (Lab employee)
Client Sample ID: James SWD

Analyte	Analyst	Analysis Date	Analysis Time	Sample Result	Units	Data Qualifier	Method	RPL
Radium 226	Bnchnrk	03/21	n/a	*	pCi/L	n/a	RAD-CTDHS	0.000
Radium 228	Bnchnrk	03/13	n/a	*	pCi/L	n/a	RAD-CTDHS	0.000
Thorium	Bnchnrk	03/23	n/a	*	pCi/L	n/a	RAD-CTDHS	-1.000
Uranium	Bnchnrk	03/23	n/a	*	pCi/L	n/a	RAD-CTDHS	-1.000

Comments: Radiologicals done by Benchmark Analytical, PADEP Lab ID: 39-00401

ND=Not Detected

DEP Certification #s 32-00382

Approved By:

Laboratory Supervisor

LAB ID: 39-00401 *CV

BENCHMARK ANALYTICS, INC.
4777 Saucon Creek Road
Center Valley, PA 18034-9004

PHONE (610) 974-8100
FAX (610) 974-8104

SEND DATA TO:

NAME: Jean M. Cole
COMPANY: Environmental Service Laboratories, Inc
ADDRESS: 1803 Philadelphia St
Indiana, PA 15701

WO#: 12030411
PAGE: 1 of 7
PO#:

PHONE: (724) 463-8378
FAX: (724) 465-4209

TEST REPORT

PWS ID#

12 08934-09155-09160-09166-09172-09190-09193

RECEIVED FOR LAB BY: GMD

DATE: 03/05/2012 9:45

Page 1 of 7

SAMPLE: 12 08934

Lab ID: 12030411-001A Grab

SAMPLED BY: Client

Sample Time 02/28/2012 11:45

Test	Result	Uncert.	MDA	Units	Method	MCL	Analysis Start	Analysis End	Analyst *
Radium, Combined (Ra226 + Ra228)	5396			pCi/L	Calculation		03/26/12 10:38		BH-CV
Radium-226	4690	± 139.80	194.00	pCi/L	EPA 903.0		03/07/12 17:10	03/21/12	BH-CV
Carrier Recovery	108			%	EPA 903.0		03/07/12 17:10	03/21/12	BH-CV
SAMPLE: 12 08934 Lab ID: 12030411-001B Grab									
SAMPLED BY: Client Sample Time 02/28/2012 11:45									
Test	Result	Uncert.	MDA	Units	Method	MCL	Analysis Start	Analysis End	Analyst *
Radium-228	706.1	± 110.10	137.70	pCi/L	EPA 904.0		03/08/12 8:30	03/13/12	NLB-CV
Carrier Recovery	118			%	EPA 904.0		03/08/12 8:30	03/13/12	NLB-CV

REMARKS:

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of NELAP unless otherwise noted on the Analytical Report.

* CV = Benchmark Analytics, Inc. Center Valley, PA; SA = Benchmark Analytics, Inc. Sayre, PA

N Analyte detected in the associated Method Blank
N Parameter is not NELAC certified

MANAGER

Chimel

DATE:

3/27/2012

LAB ID: 39-00401 *CV
LAB ID: 08-00380 *SA

Benchmark Analytics, Inc.

4777 Saucon Creek Road
Center Valley, PA 18034

Work Order: 12030411

Phone: (610) 974-8100
Fax: (610) 974-8104

SEND DATA TO:

NAME: Jean M. Cole
COMPANY: Environmental Service Laboratories, Inc
ADDRESS: 1803 Philadelphia St
Indiana, PA 15701

WO#: 12030411
PAGE: 1 of 2
PO#:

PHONE: (724) 463-8378
FAX: (724) 465-4209

TEST REPORT

PWS ID#

12 08934-09155-09160-09166-09172-09190-09193

DATE: 03/05/2012 9:45

Page 1 of 2

RECEIVED FOR LAB BY: GMD

SAMPLE: 12 08934

Lab ID: 12030411-001C

Grab

SAMPLED BY: Client

Sample Time: 02/28/2012 11:45

Test	Result	Method	Reg. Limit	Analysis Start	Analysis End	Analyst *
Thorium	< 12.50 µg/L	EPA 200.8		03/15/12 10:40	03/23/12	JRA-CV
Uranium	< 0.63 µg/L	EPA 200.8	30	03/15/12 10:40	03/23/12	JRA-CV
Uranium	< 0.43 pc/L	EPA 200.8		03/15/12 10:40	03/23/12	JRA-CV

REMARKS:

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of NELAP unless otherwise noted on the Analytical Report.
*CV = Benchmark Analytics, Inc. Center Valley, PA. SA = Benchmark Analytics, Inc. Sayre, PA

MANAGER

SlimeL

DATE: 3/27/2012

ENVIRONMENTAL SERVICE LABORATORIES, INC.

SAMPLE REQUEST & CHAIN OF CUSTODY

HEADQUARTERS:
1803 Philadelphia St.
Indiana, PA 15701
(724) 463-TEST
(724) 465-4209



SOUTHERN DIVISION:
1276 Bentleyville Road
Van Voorhis, PA 15366
(724) 258-TEST
(724) 258-8376



FOR INTERNAL LABORATORY USE ONLY

Sample Identification	ESL#	Sample Type				Matrix	# of Containers	Container Type Preservative	Analysis Requested
		Composite		Grab					
		Date on/off	Time on/off	Date	Time				
James SWD	128933	/	/	2/28/12	1145	FIELD	FIELD	Hydrogen Sulfide <u>PA 5.76</u> DO <u>4.03</u>	
		/	/			WW	1 ✓	Plastic Liter none pH, SO ₄ , Chloride, Sulfate, Alkalinity, Acidity, Bromide	
		/	/			WW	2 ✓	Plastic Liter none TSS, TDS, Dissolved Iron, BOD, COD, MBAS Surfactants	
		/	/			WW	1 ✓	Plastic Liter HNO ₃ Al, As, Ba, Bi, Cd, Cr, Co, Cu, Fe, Hg, Mg, Mn, Ni, Pb, Se, Ag, Sr, Zn, Li, Na, Ca, Mg, hardness	
		/	/			WW	1 ✓	Plastic Liter H ₂ SO ₄ Nitrate, Nitrite, TRN, Ammonia, COD	
	128934	/	/			WW	3 ✓	Plastic Liter HNO ₃ Radium 226, Radium 228 Thorium, Uranium	
		/	/			WW	1 ✓	Amber Glass L HCl Oil & Grease	
		/	/			WW	1 ✓	Amber Glass L H ₂ SO ₄ Total Phenolics	
		/	/			WW	2 ✓	Amber VOA Vials none Ethylene Glycol	
		/	/			WW	2 ✓	Amber VOA Vials HCl Benzene, Toluene	
TRIP BLANK	128935	/	/			Water	2	Amber VOA Vials HCl Benzene, Toluene	

THE UNDERSIGNED PURCHASER HEREBY AGREES TO PAY SERVICE CHARGES ON ACCOUNTS OVER 31 DAYS OLD.
1. THESE SERVICE CHARGES WILL ACCRUE AT THE RATE OF 1 1/2% PER MONTH (18% PER ANNUM OR THE MAXIMUM ALLOWED BY LAW.)
2. THE UNDERSIGNED PURCHASER AGREES TO PAY, IN THE EVENT HIS ACCOUNT BECOMES DELINQUENT AND IS TURNED OVER TO ANY ATTORNEY FOR COLLECTION, REASONABLE ATTORNEY'S FEES PLUS ALL COURT AND ATTENDANT COLLECTION COSTS.

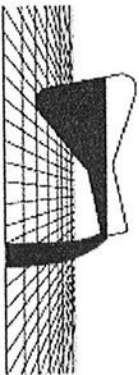
Project Notes:
26R Waste Profile

Sampled By: (Signature) [Signature] Date/ Time 2/28/12 1145
Relinquished By: (Signature) [Signature] Date/ Time 2/28/12 1410
Relinquished By: (Signature) _____ Date/ Time _____
Relinquished By: (Signature) _____ Date/ Time _____

Received By: (Signature) [Signature] Date/ Time 2-28-12 1419
Received By: (Signature) _____ Date/ Time _____
Received By: (Signature) _____ Date/ Time _____

Company/Name: **Seneca Resources**
Address: **51 Zents Boulevard
Brookville, PA 15825**
Contact Person: **Ms. Marisa Dollinger**
Phone: **(814) 849-4555**
Fax: **(814) 849-4795**
Email: **DollingerM@srcx.com**

PRESERVATION (Y) / N CONTAINER (Y) / N TEMP (C) / (F) / N / NA



**ENVIRONMENTAL
SERVICE LABORATORIES, INC.**
1803 Philadelphia St., Irkutana, PA 15701
(724) 463-TEST (724) 465-4209

Report of Analysis

Name: Seneca Resources
51 Zents Boulevard
Brookville, PA 15825
Sample Start Date: 8/16/2012 11:00 AM
Receipt Date: 8/17/2012 2:50 PM
Report Date: 8/27/2012

Sample ID#: 12 40681
Sample Type: Waste Water
Sample Source: Grab
Sampler: CLIENT (Client)
Client Sample ID: James City

Analyte	Analyst	Analysis Date	Analysis Time	Sample Result	Units	Data Qualifier	Method	RPL
Total Organic Carbon	ZTR	08/20	n/a	5.49	mg/l	n/a	SM5310C	0.50

Comments:

ND=Not Detected

Note: DEP Certification #s 32-00382

Approved By:

Laboratory Supervisor

OPERATING DATA
TYPICAL CORROSION INHIBITOR

AQUACLEAR PRODUCT INFORMATION

7801 Virginia Street East, Chardon, OH 44024-2155
800-822-4792 Fax: 330.244.5035



- HOME
- PRODUCTS
- CONTACT
- SEEDLINGS
- ABOUT



Corrosion Inhibitor Sticks™

WHAT ARE CORROSION INHIBITOR STICKS™?

Corrosion Inhibitor Sticks™ are water soluble or oil soluble sticks that contain a blend of Imidazolines which have excellent filming characteristics and low emulsion tendencies. This unique blend gives effective corrosion control for most oil field corrosion problems.

CORROSION INHIBITOR STICK™ USES

Corrosion Inhibitor Sticks™ are primarily used to control common corrosion problems found in producing oil and gas well systems. They can be used to treat hard to reach 'dead' areas such as the annulus space above the packer, rat-hole, or the bottom of water supply tanks.

ADVANTAGES OF CORROSION INHIBITOR STICK™

Corrosion Inhibitor Sticks™ can provide corrosion control throughout the entire production system.

Regular usage will help control corrosion at the point they begin - down-hole.

They are available in two different formulations (oil soluble and water dispersible) or (water soluble and oil dispersible). The oil soluble type is soluble in oil, condensate and wet gas and can slowly disperse inhibitor into the water phase. The water soluble type is soluble in water and can slowly disperse inhibitor into the oil phase.

Corrosion Inhibitor Sticks™ can effectively inhibit corrosion in wells that produce both water and distillate or oil phases. In this case, it may be desirable to treat the well with both types of sticks by first dropping water soluble sticks and allowing them to fall through the oil into the water, thus dissolving and releasing inhibitor in

TREATMENT DETERMINATION

The number of Corrosion Inhibitor Sticks™ used is based on the volume of total fluid produced (oil or condensate plus water). Field experience indicates that for most corrosive environments the best results are achieved by using a larger initial slug treatment (80 PPM daily) until the problem is under control then reduce to smaller periodic treatments (40 PPM daily) thereafter. **EXAMPLE:** An initial slug treatment of 80 PPM would require 0.64 lbs of Corrosion Inhibitor Stick™ per 24 BBL (1000 gallons) of total fluid produced.

COR. INH. STICK™ SIZES	STICKS PER BBL
SENIOR (1 5/8" x 18")	1 per 58 bbls
JUNIOR (1 3/8" x 16")	1 per 40 bbls
JUNIOR (1 1/4" x 15")	1 per 29 bbls
THRIFTY (1" x 15")	1 per 18 bbls
MIDGET (5/8" x 15")	1 per 7 bbls

NOTE: To successfully control any corrosion problem, the inhibitor insertion into the fluid stream must be constant. For intermittent treatment or extreme corrosive environments increase the number of sticks accordingly.

THE MOST COMMON PROCEDURE for producing wells is to shut-in well and drop sticks through lubricator. Leave well shut until sticks fall to the bottom. The time in minutes for the sticks to fall to the bottom (assuming well is shut-in with fluid at surface) is equal to the depth divided by 100. (Time, min. = Depth, ft / 100).

FOR WATER INJECTION SYSTEMS drop the sticks into the water supply tank to inhibit more of the system.

the water column). Then drop the oil soluble sticks which will "FLOAT" at where the oil and water contact thus slowly dissolving and releasing inhibitor in the oil column.

The sticks are economical when compared to conventional corrosion control operations and therefore save investment in pumps, drums of chemical, and equipment maintenance.

Corrosion Inhibitor Sticks^T may be used in wells with bottom hole temperatures (BHT) of up to 375 degrees Fahrenheit.

PRODUCTION SPECIFICATIONS

OIL SOLUBLE: The stick will dissolve in 20 to 120 minutes (in moving diesel) depending on temperature, salt content, and relative fluid motion. The stick will melt at 135 degrees Fahrenheit and the specific gravity is 0.95.

WATER SOLUBLE: The stick will dissolve in 12 to 24 hours (in 60.00 PPMmoving brine water) depending on temperature, salt content, and relative fluid motion. The stick will melt at 125 degrees Fahrenheit and the specific gravity is 1.10.

PRODUCT PACKAGING

SENIOR	1.55 lb/stick	24/case	31/pail	48/chest
JUNIOR(1)	1.20 lb/stick	36/case	n/a	72/chest
JUNIOR(2)	0.76 lb/stick	36/case	52/pail	72/chest
THRIFTY	0.49 lb/stick	49/case	72/pail	98/chest
MIDGET	0.19 lb/stick	108/case	204/pail	216/chest

WHERE TO BUY

All good oil field supply stores carry Aqua-Clear, Inc. Corrosion Inhibitor Sticks[™], but you can also buy direct from us.

Ordering Information

Should you wish to speak to a sales representative about any of our products, you can call or email Tommy Halloran Jr., Ronald "Buster" Wilson, or Russell Cook directly:

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