



Transcontinental Gas Pipe Line Company, LLC

Well and Spring Monitoring Plan

Atlantic Sunrise Project

August 2017

1 INTRODUCTION

This Well and Spring Monitoring Plan (Plan) provides Transcontinental Gas Pipe Line Company's, L.L.C. (Transco) proposed measures to determine if pipeline construction activities connected with the Atlantic Sunrise Project (Project) result in impacts to groundwater yields and water quality of wells and springs. The term "wells" as used in this plan include all drilled and dug wells, and any surface spring used as a potable water source.

2 SAMPLING LOCATIONS

2.1 GENERAL PROJECT AREA

Transco will offer landowners pre-and post-construction monitoring of well yield and water quality of wells within 150 feet of the construction workspace and, in areas of known karst terrain, of wells within 500 feet of construction workspaces. Transco identified wells in areas of known karst using civil and environmental field surveys where available; however, surveys did not extend 500 feet in all areas. Transco supplemented its survey data with publicly available data in these areas. A list of these wells is included in Appendix A of this Plan. Transco will confirm the well locations with the landowners prior to construction.

Water samples will be collected prior to construction to obtain baseline water quality and yield data for each sampling location. Transco will conduct post-construction sampling to determine the effects of construction on the water source. Sampling methods, locations, and analytical parameters of the post-construction sampling will be consistent with that of the pre-construction sampling.

2.1 HORIZONTAL DIRECTIONAL DRILL AREAS

Transco will identify all landowners within 450 feet of a horizontal directional drill (HDD) alignment, and offer landowners the opportunity to have their water supplies located within 450 feet of the HDD alignment sampled before, during, and after the HDD in accordance with the analytical parameters identified in Section 3. A list of the planned HDDs is provided in Table 1.

At least fifteen (15) days prior to the commencement of a HDD, Transco will send a letter by certified mail to all landowners within 450 feet of the HDD. The letters will be sent to the landowner at the address associated with the property. Additionally, if Transco has another address for the landowner, it will make a good faith effort to send a copy of the letter to that address as well. The notice will advise the landowner that Transco is willing to test the

landowners water supply wells within 450 feet of the HDD to evaluate the HDD alignment to evaluate any potential impacts from the HDD on the water quality.

Project Component / County	Begin Milepost	End Milepost
CPL North		
Luzerne	M-0163 0.0	M-0163 0.61
Luzerne	M-0164 0.0	M-0164 0.45
Wyoming	34.85	35.56
CPL South		
Lancaster	12.06	12.78
Columbia	99.28	100.02
Columbia	M-0423 3.03	M-0423 3.37

3 SAMPLE COLLECTION

The general sampling procedures for pre- and post-construction testing of water wells are discussed below. The actual testing procedures for individual wells may vary depending upon well construction, well condition, well capacity, and associated plumbing details.

A letter/questionnaire/consent form will be sent to the well owner requesting information on the well, which may include the following: well type, diameter, year installed, total depth, aquifer, estimated yield, potential access issues, associated plumbing, usage, and proximity to other domestic and/or municipal wells. Wells for which landowner approval has been received will undergo pre-construction baseline sampling.

Sampling will occur upstream of any water treatment system such as water softeners or purifiers. Static water levels will be collected from the well prior to sampling using a decontaminated hand-held water level probe. The well owner will be asked to avoid all use of water throughout the testing process. The actual testing procedure for individual wells may vary depending upon well construction, well condition, well capacity, and associated plumbing details. In general, well purging is expected to take approximately one to two hours.

Once initial static water levels have been determined, a pump will be activated, preferably discharging through an outdoor spigot and short hose section. A submersible pump will be used for wells not fitted with operating pumps. The water yield will be determined by timing the fill rate of a calibrated container of a known volume, then dividing the volume in gallons by minutes. The water level will be measured periodically using the water-level probe. A relatively stable rate of pumping will be continued for a minimum of one hour or until water

levels have reached stabilization. Several water-quality parameters will also be collected and recorded (e.g., specific conductivity, pH, and temperature) to verify that well volume has been purged and that stabilization with the aquifer has occurred.

Once stabilization has been reached and/or sufficient information has been collected to assess the capacity of the well (static water level, total drawdown, pumping rate), the pump will be shut down (valve closed), and water-level recovery will be monitored with the hand-held probe. Recovery monitoring should be continued for a minimum of 30 minutes, or until water levels have approached static levels (i.e. recovering by 95% of total drawdown achieved during the final test rate).

Samples collected for water quality analysis will be tested using the Pennsylvania Department of Environmental Protection (PADEP) Recommended Basic Oil and Gas pre-Drill Parameters which is a list of minimum parameters recommended by PADEP for homeowners for water testing prior to well site drilling and earth disturbance (PADEP 2016). The parameter list includes the following:

- Inorganics consisting of alkalinity, chloride, conductivity, hardness, bromide, pH, sulfate, total dissolved solids, turbidity, and total suspended solids. Transco will also record the water level or flow rate, horsepower of the existing pump, date and time, location, weather (if outside), and number of samples collected.
- Trace metals consisting of barium, calcium, iron, magnesium, manganese, potassium, sodium, strontium, arsenic, zinc, aluminum, lithium, copper, vanadium, boron, chromium, and selenium.
- Organics consisting of methane, ethane, propane, ethylene glycol, total petroleum hydrocarbons, and BTEX.
- Additional suggested testing consisting of total coliform bacteria.

4 METHODS OF SAMPLING AND ANALYSIS

Transco sampling methods will adhere to the prevailing U.S. Environmental Protection Agency (EPA) and state sampling and laboratory analytical procedures in place at the time of construction. All samples will be collected in properly preserved containers supplied by a certified analytical laboratory, stored in coolers maintained with ice at 4°C, and delivered to the laboratory with chain-of-custody documents. The samples will be analyzed by a certified analytical laboratory within the holding times required by the EPA and applicable state groundwater quality

standards. Once Transco obtains the final analytical laboratory report, the landowner will be sent a copy of the results.

5 MITIGATION FOR WELLS IMPACTED BY CONSTRUCTION

If an impact occurs on the groundwater supply or the water quality as a result of construction, Transco will work with the landowner to ensure a temporary supply of water, and if necessary, Transco will replace the permanent water supply. Mitigation measures will need to be coordinated with the individual landowner in order to meet the landowner's specific needs. However, the likely solutions will be accomplished by transporting potable water to the site or by drilling a new well.

Within 30 days of placing Project facilities in-service, Transco will file with the Federal Energy Regulatory Commission and PADEP a report describing any complaints received regarding water well yield or quality, the results of any water quality or yield testing that was performed, and how the complaint was resolved.

6 REFERENCE

Pennsylvania Department of Environmental Protection. 2016. PA-DEP Recommended Basic Oil and Gas Pre-Drill Parameters.
<http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-112316/8000-FS-DEP4300.pdf>. Accessed August 17, 2017.

Appendix A

Private Water Supply Wells and Springs Within 150 Feet of the Construction Work Area

Appendix A					
Private Water Supply Wells and Springs Within 150 Feet ^a of the Construction Work Area for the Atlantic Sunrise Project					
Facility/Nearest Milepost	Township	County ^b	Supply Type	Distance from Workspace (feet)	Direction from Workspace
CPL North					
1.1	Sugarloaf	Columbia	Private well	70	North
1.4	Sugarloaf	Columbia	Private spring	51	South
2.3	Sugarloaf	Columbia	Private spring	Within	Not applicable
8.2	Fairmount	Columbia	Private well	79	South
9.7	Fairmount	Luzerne	Private well	23	South
11.3	Ross	Luzerne	Private spring	17	North
12.2	Ross	Luzerne	Private spring	Within	Not applicable
13.1	Ross	Luzerne	Private spring	Within	Not applicable
13.4	Ross	Luzerne	Private well	70	North
13.6	Ross	Luzerne	Private spring	Within	Not applicable
16.1	Lake	Luzerne	Private well	61	South
17.3	Lake	Luzerne	Private well	122	North
19.8	Lehman	Luzerne	Private spring	71	North
19.8	Lehman	Luzerne	Private spring	104	North
19.8	Lehman	Luzerne	Private spring	112	North
20.0	Lehman	Luzerne	Private well	120	South
20.8	Lehman	Luzerne	Private well	110	South
21.6	Lehman	Luzerne	Private spring	Within	Not applicable
M-0060 1.0	Dallas	Luzerne	Private spring	1	Not applicable
M-0060 1.0	Dallas	Luzerne	Private spring	128	North
M-0060 1.0	Dallas	Luzerne	Private spring	Within	Not applicable
24.9	Dallas	Luzerne	Private spring	17	East
M-0150 0.0	Dallas	Luzerne	Private well	132	North
M-0179 2.0	Monroe	Wyoming	Private well	65	East
M-0179 2.2	Monroe	Wyoming	Private well	132	East
M-0179 2.3	Monroe	Wyoming	Private well	144	East
M-0179 4.7	Northmoreland	Wyoming	Private well	128	West
M-0179 4.8	Northmoreland	Wyoming	Private well	59	North
M-0071 1.2	Northmoreland	Wyoming	Private well	51	West
M-0071 2.5	Eaton	Wyoming	Private well	95	West
35.1	Falls	Wyoming	Private spring	74	South
35.8	Falls	Wyoming	Private well	74	West
37.1	Falls	Wyoming	Private spring	41	North
38.0	Overfield	Wyoming	Private well	58	West
38.0	Overfield	Wyoming	Private well	66	East
39.6	Overfield	Wyoming	Private well	15	North
40.9	Overfield	Wyoming	Private well	53	East
M-0051 0.1	Nicholson	Wyoming	Private well	101	East
M-0080 1.1	Nicholson	Wyoming	Private spring	63	East
52.0	Lenox	Susquehanna	Private spring	100	East
54.8	Lenox	Susquehanna	Private well	107	West
56.8	Lenox	Susquehanna	Private spring	5	Not applicable
M-0062 0.2	Lenox	Susquehanna	Private spring	15	East
57.0	Lenox	Susquehanna	Private well	102	West
CPL South					
2.0	Martic	Lancaster	Private well	145	South
M-0184 0.9	Martic	Lancaster	Private well	86	East
4.4	Martic	Lancaster	Private well	67	South
M-0417 0.1 ^c	Conestoga	Lancaster	Private well	428	South
11.3 ^c	Conestoga	Lancaster	Private well	75	West
11.3 ^c	Conestoga	Lancaster	Private well	291	West
11.4 ^c	Conestoga	Lancaster	Private well	53	East

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11.4	Conestoga	Lancaster	Private well	94	East
12.3 ^c	Conestoga	Lancaster	Private well	178	East
12.4 ^c	Manor	Lancaster	Private well	90	North
12.7 ^c	Manor	Lancaster	Private well	98	South
12.7 ^c	Manor	Lancaster	Private well	233	North
12.7 ^c	Manor	Lancaster	Private well	300	North
M-0248 0.1 ^c	Manor	Lancaster	Private well	18	South
M-0365 0.2 ^c	Manor	Lancaster	Private well	194	North
15.5	Manor	Lancaster	Private well	Within	Not applicable
16.0 ^c	Manor	Lancaster	Private well	170	West
17.4 ^c	Manor	Lancaster	Private well	104	East
18.0 ^c	Manor	Lancaster	Private well	205	East
18.4 ^c	Manor	Lancaster	Private well	325	West
18.4 ^c	Manor	Lancaster	Private well	88	West
18.4 ^c	Manor	Lancaster	Private well	138	West
20.2	West Hempfield	Lancaster	Private well	148	West
M-0396 0.0 ^c	West Hempfield	Lancaster	Private well	340	West
22.6	West Hempfield	Lancaster	Private well	55	East
22.6	West Hempfield	Lancaster	Private well	134	North
M-0192 0.1	West Hempfield	Lancaster	Private well	90	North
22.8	West Hempfield	Lancaster	Private well	139	South
25.3 ^c	Rapho	Lancaster	Private well	73	East
29.7	Rapho	Lancaster	Private well	63	West
37.4	South Londonderry	Lebanon	Private well	75	North
42.0 ^c	South Annville	Lebanon	Private spring	Within	Not applicable
42.7 ^c	South Annville	Lebanon	Private well	145	East
M-0183 1.5 ^c	North Annville	Lebanon	Private well	137	North
M-0183 1.8	North Annville	Lebanon	Private well	136	West
47.6	North Annville	Lebanon	Private well	108	East
47.9	North Annville	Lebanon	Private well	80	West
49.8	North Lebanon	Lebanon	Private well	45	East
51.1	East Hanover	Lebanon	Private well	25	West
52.6	East Hanover	Lebanon	Private well	123	East
52.7	East Hanover	Lebanon	Private well	144	East
52.7	East Hanover	Lebanon	Private well	110	East
53.4	Union	Lebanon	Private well	80	East
53.8	Union	Lebanon	Private well	11	East
53.8	Union	Lebanon	Private well	32	East
M-0199 0.2	Union	Lebanon	Private well	148	East

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Facility/Nearest Milepost	Township	County ^b	Supply Type	Distance from Workspace (feet)	Direction from Workspace
54.9	Union	Lebanon	Private well	Within	Not applicable
54.9	Union	Lebanon	Private well	44	East
56.7	Union	Lebanon	Private well	75	East
58.5	Union	Lebanon	Private spring	62	West
58.7	Union	Lebanon	Private well	44	East
58.7	Union	Lebanon	Private well	65	East
58.7	Union	Lebanon	Private well	Within	West
62.0	Union	Lebanon	Private well	92	South
62.1	Union	Lebanon	Private well	87	North
63.4	Union	Lebanon	Private springs	18	South
65.2	Pine Grove	Schuylkill	Private well	22	North
65.2	Pine Grove	Schuylkill	Private well	125	South
65.2	Pine Grove	Schuylkill	Private well	120	North
65.3	Pine Grove	Schuylkill	Private well	13	South
65.4	Pine Grove	Schuylkill	Private well	142	North
67.8	Pine Grove	Schuylkill	Private well	139	East
68.9	Pine Grove	Schuylkill	Private springs	72	East
M-0223 0.0	Pine Grove	Schuylkill	Private well	100	North
M-0181 0.0	Tremont	Schuylkill	Private well	56	East
M-0181 0.0	Tremont	Schuylkill	Private well	42	East
M-0181 0.0	Tremont	Schuylkill	Private well	80	West
M-0181 0.1	Tremont	Schuylkill	Private well	Within	Not applicable
M-0181 0.2	Tremont	Schuylkill	Private well	Within	Not applicable
M-0181 0.3	Tremont	Schuylkill	Private well	138	East
74.0	Frailey	Schuylkill	Private well	Within	Not applicable
74.0	Frailey	Schuylkill	Private well	34	West
74.9	Porter	Schuylkill	Private well	50	West
M-0170 0.1	Hegins	Schuylkill	Private well	Within	Not applicable
M-0170 0.1	Hegins	Schuylkill	Private well	90	East
78.4	Hegins	Schuylkill	Private well	87	West
80.5	Eldred	Schuylkill	Private well	49	East
83.2	East Cameron	Northumberland	Private spring	Within	Not applicable
88.9	Coal	Northumberland	Private spring	Within	West
89.1	Coal	Northumberland	Private spring	Within	East
95.0	Cleveland	Columbia	Private well	93	West
M-0460 0.0	Montour	Columbia	Private well	65	West
M-0423 3.1 _c	Hemlock	Columbia	Private well	23	East
M-0423 3.1 _c	Hemlock	Columbia	Private well	122	West
M-0423 3.9 _c	Hemlock	Columbia	Private well	50	West
M-0423 3.1	Hemlock	Columbia	Private well	50	East
M-0214 0.2	Mount Pleasant	Columbia	Private spring	110	East
M-0214 0.2	Mount Pleasant	Columbia	Private spring	123	East
109.7	Mount Pleasant	Columbia	Private well	118	East
110.2	Mount Pleasant	Columbia	Private springs	30	West
110.2	Mount Pleasant	Columbia	Private springs	11	West
110.5	Greenwood	Columbia	Private well	112	East
116.0	Greenwood	Columbia	Private spring	80	West
116.2	Greenwood	Columbia	Private well	90	West
122.5	Jackson	Columbia	Private well	112	East

Appendix A					
Private Water Supply Wells and Springs Within 150 Feet ^a of the Construction Work Area for the Atlantic Sunrise Project					
Facility/Nearest Milepost	Township	County ^b	Supply Type	Distance from Workspace (feet)	Direction from Workspace
Chapman Loop					
L185.9	Chapman	Clinton	Private well	73	Northeast
L187.5	Chapman	Clinton	Private well	Within	Not applicable
Unity Loop					
L123.2	Franklin	Lycoming	Private well	26	North
M-0015 0.1	Penn	Lycoming	Private well	75	North
M-0015 0.1	Penn	Lycoming	Private spring	78	North
^a	Within areas of known karst, wells were identified within 500 feet of the construction work area. Wells were identified				
in	these areas using civil and environmental field survey data where available. However, surveys did not extend 500 feet in all areas. In these areas, publicly available data was used.				
^b	All counties are in Pennsylvania.				
^c	Well is within areas of known karst.				