Shell Pipeline Company LP
701 Poydras St
New Orleans, LA 70139
greg.smith@shell.com

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June 20, 2018

Mr. Mark Gorog
Bureau of Air Quality
Pennsylvania Department of Environmental Protection
Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222-4745

Subject: *Shell Pipeline Company, LP*
Falcon Ethane Pipeline Project – Monaca Line Integrity Meter Station
Request for Determination of Sources of Minor Significance and Exemption from Plan Approval under PA Code § 127.14

Mr. Gorog:

Shell Pipeline Company, LP (Shell) is pleased to submit this Request for Determination (RFD) to the Pennsylvania Department of Environmental Protection (PADEP) for review and approval.

Shell is requesting exemption from plan approval in accordance with § 127.14(a)(8), # 31 (sources of uncontrolled VOC emissions not addressed elsewhere in this exemption listing modified or newly added, such that emission increases are less than 2.7 tpy) and #35 (sources emitting inert gases only, such as argon, helium, krypton, neon, and xenon; pure constituents of air such as nitrogen, oxygen, or carbon dioxide; or methane or ethane) for the associated equipment, fugitives and temporary flaring at the Monaca Line Integrity Meter Station.

This RFD application contains the following information:

RFD application form;
Potential to Emit (PTE) calculations; and
Area location map.

Please contact Mary Gerschefski, Falcon HSSE Manager, at (832) 762-2585 or Mary.Gerschefski@shell.com if you have any questions or need additional information.

Sincerely,

Greg Smith
Shell Pipeline Company LP
VP Operations

cc: Mary Gerschefski, Shell Pipeline Company LP
Thomas Samarco, Ramboll US Corporation

Intended for:

Shell Pipeline Company, LP

Submitted to:
Pennsylvania Department for Environmental Protection
Bureau of Air Quality

Prepared by:
Ramboll US Corporation

Date:
June 2018

Project Number:
1690007308

REQUEST FOR DETERMINATION OF SOURCES OF MINOR SIGNIFICANCE AND EXEMPTION FROM PLAN APPROVAL UNDER PA CODE § 127.14

Ramboll US Corporation
2009 Mackenzie Way
Suite 100
Cranberry Township, PA 16066
USA
T +1 724 720 9389
www.ramboll-environ.com

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1 Area Location Map

1.0

RFD Application Form

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2700-PM-AQ0017 Rev. 11/2009

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

2COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF AIR QUALITY

Request for Determination of Changes of Minor Significance and Exemption from Plan Approval/Operating Permit Under Pa Code §127.14 or §127.449

A. Type of Request

Exemption from Plan Approval
Select all that apply (see Instructions):
http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-77119/2700-BK-DEP4103.pdf

- ☐ Minor Sources or classes of sources, pursuant to 25 Pa. Code § 127.14(a)(1)-(7).
- ☒ Other sources and classes of sources of minor significance, pursuant to 25 Pa. Code § 127.14(a)(8).
- ☐ Physical changes to sources of minor significance, pursuant to 25 Pa. Code § 127.14(a)(9).
- ☐ Additional physical changes of minor significance that do not add new equipment, pursuant to 25 Pa. Code § 127.14(c)(1).
- ☐ Additional physical changes of minor significance that add new equipment, pursuant to 25 Pa. Code § 127.14(c)(2).
- ☐ Changes due to de minimis increases in emissions, pursuant to 25 Pa. Code § 127.449.

Exemption from Operating Permit
Select all that apply (see Instructions):
http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-77119/2700-BK-DEP4103.pdf

- ☒ Other sources and classes of sources of minor significance, pursuant to 25 Pa. Code § 127.14(a)(8).
- ☐ Physical changes to sources of minor significance, pursuant to 25 Pa. Code § 127.14(a)(9).
- ☐ Additional physical changes of minor significance that do not add new equipment, pursuant to 25 Pa. Code § 127.14(c)(1).
- ☐ Additional physical changes of minor significance that add new equipment, pursuant to 25 Pa. Code § 127.14(c)(2).
- ☐ Changes due to de minimis increases in emissions, pursuant to 25 Pa. Code § 127.449.

(Must have valid operating permit conditions authorizing de minimis increases.)

B. Facility/Company Information

Facility/Company Name: **Shell Pipeline Company, LP**

Plant Name (if applicable): **Monaca Line Integrity Meter Station**

Site Address: **Latitude: 40.66264** **Longitude: -80.33942**

Municipality: **Potter Township**

County: **Beaver**

Mailing Address (if different): **Attn: David Mulkey**
150 North Dairy Ashford Road, Building A, Second Floor, Houston, TX 77079

Federal Employer Identification Number (EIN) (if applicable):

Current Operating Permit No. (if applicable): **N/A**

NAICS Code:

Person Completing Form: Thomas Samarco	**Affiliation: Environmental Consultant**
Address (if different from facility/company): **2009 Mackenzie Way Suite 100, Cranberry Township, PA 16066**	**Telephone: (724) 720 - 9389** **E-Mail: tsamarco@ramboll.com**
Facility/Company Contact Person: Mary Gerschefski	**Title: Project HSSE Manager**
Address (if different from facility/company): **150 North Dairy Ashford Road Houston, TX 77079**	**Telephone: (832) 762 - 2585** **E-Mail: Mary.Gerschefski@shell.com**

C. Project Description

Project Type: ☒ New construction ☐ Modification ☐ Remediation ☐ Other (see Instructions http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-77119/2700-BK-DEP4103.pdf

Total number of sources in project: 3

Description of project (may include process description, site diagram, and any other pertinent information – see Instructions (http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-77119/2700-BK-DEP4103.pdf) and attach supporting documents in Section F. as needed):

The ethane stream produced from the fractionator operations will be moved into the pipeline system as a liquid. The inlet pressure will be adequate to move the desired material to the Pennsylvania Chemical Plant at a delivery pressure meeting the normal inlet of 1160 psig. The minimum inlet pressure to the plant will be 940 psig which will keep the ethane in a liquid state. The nominal discharge pressure from the fractionators will be in the 1400 psig range.

The Pennsylvania Chemical Plant will receive the ethane feedstock via a proposed 97.5-mile pipeline system comprised of two main segments (See Figure 1). One leg starts at the MarkWest Houston Plant approximately 31.36 miles south of Monaca. This segment will be 12" diameter pipeline to the Junction Custody Transfer Meter Station. The segment from the Junction Custody Transfer Meter Station to Monaca Line Integrity Meter Station will be 16" diameter pipeline.

The second leg starts at the MarkWest Cadiz Plant and travels approximately 10.87 miles north to a point where it intersects the Scio pipeline segment traveling in a north-easterly direction. The Cadiz line is a 10" diameter segment and it will connect into the Scio line via a wye connection approximately 2 miles downstream of the Momentum Scio Plant. The Scio segment is 12" diameter pipe along its entire length traversing Ohio, West Virginia and Pennsylvania a distance of 51.55 miles.

At the point where the Scio segment meets the Houston line, the two pipeline segments will be wye connected at the junction point. From the junction into the Pennsylvania Chemical Plant, one 16" diameter line will be used to deliver ethane into the plant. The junction is approximately 3.65 miles south of the plant and this distance is included in the Houston to Monaca pipeline segment length previously mentioned.

Request for Determination of Changes of Minor Significance and Exemption from Plan Approval/Operating Permit Under 25 Pa. Code § 127.14 or §127.449

D. Source Description

Complete a separate sheet for each source included in the project. For projects with more than one source, make additional copies of this page or download from DEP's Air Quality/Permits Web site (www.depweb.state.pa.us, keyword: Request for Determination.)

Source Name: Fugitive Emissions

Source Category Code and Description (2700-BK-DEP4103.pdf): **99.999 Other Miscellaneous Sources**

Source location (if source is portable, submit a separate Request For Determination (RFD) application for each operating location): **Latitude: 40.66264 Longitude: -80.33942**

Type: ☒ Stationary ☐ Portable (Enter number of days in operation at this location: _____)

Is equipment existing or proposed? ☐ **Existing** ☒ **Proposed**

Actual or Planned Date of Installation: **TBD**

Source Description (see Instructions (http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-77119/2700-BK-DEP4103.pdf) for examples of applicable information, attach supporting documents in Section F, and provide separate justification for any document designated as Confidential Business Information):

Fugitive emissions coming from flanges, manual valves, actuated valves, pressure indicators and thermowell analysers.

Is the source subject to any New Source Performance Standards (NSPS) or National Emission Standards for Hazardous Air Pollutants (NESHAP) or Maximum Achievable Control Technology (MACT) standard? If yes, specify federal citation including Subpart.

☐ Yes Subpart: _____ ☒ No

You must enter potential emissions below. If also reporting actual emissions, provide the actual emission amounts and calculations as attachment(s) in Section F. of this RFD.

Pollutant(s) (from Instructions)	Emissions (lbs/hr)*	Emissions (tons/year)*	Calculation Method Code Appendix B
PM	N/A	N/A	---
PM-10	N/A	N/A	---
PM-2.5	N/A	N/A	---
SO_X	N/A	N/A	---
CO	N/A	N/A	---
NO_X	N/A	N/A	---
VOC	**0.01**	**0.06**	**16 (Attachment A)**
Total HAPs**	**0.01**	**0.06**	**16 (Attachment A)**

Will the construction or modification of this source increase emissions from other sources at the facility?

☐ **Yes (Describe and quantify emissions on separate sheet)**

☒ **No**

Is the construction or modification of the source subject to 25 Pa. Code, Chapter 127, Subchapter E, New Source Review (NSR) requirements or Prevention of Significant Deterioration (PSD) of Air Quality regulations at Subchapter D?

☐ **Yes** ☒ **No**

* Must enter value or N/A

** For speciated HAPs (see Instructions (http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-77119/2700-BK-DEP4103.pdf) for required speciated HAPs) or other pollutants, please attach additional sheets in Section F.

D. Source Description

Complete a separate sheet for each source included in the project. For projects with more than one source, make additional copies of this page or download from DEP's Air Quality/Permits Web site (www.depweb.state.pa.us, keyword: Request for Determination.)

Source Name: Pig Receiver

Source Category Code and Description (2700-BK-DEP4103.pdf): **99.999 Other Miscellaneous Sources**

Source location (if source is portable, submit a separate Request For Determination (RFD) application for each operating location): **Latitude: 40.66264 Longitude: -80.33942**

Type: ☒ Stationary ☐ Portable (Enter number of days in operation at this location: _____)

Is equipment existing or proposed? ☐ **Existing** ☒ **Proposed**

Actual or Planned Date of Installation: **TBD**

Source Description (see Instructions (http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-77119/2700-BK-DEP4103.pdf) for examples of applicable information, attach supporting documents in Section F, and provide separate justification for any document designated as Confidential Business Information):

Pig receiver for pipeline segment from Junction Custody Transfer Meter Station to Monaca Line Integrity Meter Station. Emissions from opening and venting pig receiver for pipeline. Assume one pigging operation per year.

Is the source subject to any New Source Performance Standards (NSPS) or National Emission Standards for Hazardous Air Pollutants (NESHAP) or Maximum Achievable Control Technology (MACT) standard? If yes, specify federal citation including Subpart.

☐ Yes Subpart: _____ ☒ No

You must enter potential emissions below. If also reporting actual emissions, provide the actual emission amounts and calculations as attachment(s) in Section F. of this RFD.

Pollutant(s) (from Instructions)	Emissions (lbs/hr)*	Emissions (tons/year)*	Calculation Method Code Appendix B
PM	N/A	N/A	---
PM-10	N/A	N/A	---
PM-2.5	N/A	N/A	---
SO_X	N/A	N/A	---
CO	N/A	N/A	---
NO_X	N/A	N/A	---
VOC	**19.02**	**0.01**	**14 (Attachment A)**
Total HAPs**	**19.02**	**0.01**	**14 (Attachment A)**

Will the construction or modification of this source increase emissions from other sources at the facility?

☐ **Yes (Describe and quantify emissions on separate sheet)**

☒ **No**

Is the construction or modification of the source subject to 25 Pa. Code, Chapter 127, Subchapter E, New Source Review (NSR) requirements or Prevention of Significant Deterioration (PSD) of Air Quality regulations at Subchapter D?

☐ **Yes** ☒ **No**

* Must enter value or N/A

** For speciated HAPs (see Instructions (http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-77119/2700-BK-DEP4103.pdf) for required speciated HAPs) or other pollutants, please attach additional sheets in Section F.

Request for Determination of Changes of Minor Significance and Exemption from Plan Approval/Operating Permit Under 25 Pa. Code § 127.14 or §127.449

D. Source Description

Complete a separate sheet for each source included in the project. For projects with more than one source, make additional copies of this page or download from DEP's Air Quality/Permits Web site (www.depweb.state.pa.us, keyword: Request for Determination.)

Source Name: Flare "Temporary"

Source Category Code and Description (2700-BK-DEP4103.pdf): **99.999 Other Miscellaneous Sources**

Source location (if source is portable, submit a separate Request For Determination (RFD) application for each operating location): **Latitude: 40.66264 Longitude: -80.33942**

Type: ☐ Stationary ☒ Portable (Enter number of days in operation at this location: 1)

Is equipment existing or proposed? ☐ **Existing** ☒ **Proposed**

Actual or Planned Date of Installation: **TBD**

Source Description (see Instructions (http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-77119/2700-BK-DEP4103.pdf) for examples of applicable information, attach supporting documents in Section F, and provide separate justification for any document designated as Confidential Business Information):

A temporary flare will be utilized during the commissioning phase of the pipeline and flaring will occur for no longer than 24 hours. The flare vendor is yet to be chosen but for emission calculation purposes we assumed a Zeeco Sonic flare with a destruction efficiency of 98%.

Is the source subject to any New Source Performance Standards (NSPS) or National Emission Standards for Hazardous Air Pollutants (NESHAP) or Maximum Achievable Control Technology (MACT) standard? If yes, specify federal citation including Subpart.

☐ Yes Subpart: _____ ☒ No

You must enter potential emissions below. If also reporting actual emissions, provide the actual emission amounts and calculations as attachment(s) in Section F. of this RFD.

Pollutant(s) (from Instructions)	Emissions (lbs/hr)*	Emissions (tons/year)*	Calculation Method Code Appendix B
PM	0.66	0.01	16 (Attachment A)
PM-10	0.66	0.01	16 (Attachment A)
PM-2.5	0.66	0.01	16 (Attachment A)
SO_X	N/A	N/A	---
CO	48.64	0.58	16 (Attachment A)
NO_X	5.67	0.07	16 (Attachment A)
VOC	3.97	0.05	16 (Attachment A)
Total HAPs**	3.97	0.05	16 (Attachment A)

Will the construction or modification of this source increase emissions from other sources at the facility?

☐ **Yes (Describe and quantify emissions on separate sheet)**

☒ **No**

Is the construction or modification of the source subject to 25 Pa. Code, Chapter 127, Subchapter E, New Source Review (NSR) requirements or Prevention of Significant Deterioration (PSD) of Air Quality regulations at Subchapter D?

☐ **Yes** ☒ **No**

* Must enter value or N/A

** For speciated HAPs (see Instructions (http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-77119/2700-BK-DEP4103.pdf) for required speciated HAPs) or other pollutants, please attach additional sheets in Section F.

Request for Determination of Changes of Minor Significance and Exemption from Plan Approval/Operating Permit Under 25 Pa Code §127.14 or §127.449

E. Exemption History

Identify all sources exempted within the last five years from plan approval/operating permit requirements for one of the following reasons: 1. Request for Determination (RFD), 2. Exemption List, or 3. De minimis emissions provisions of 25 Pa. Code §127.449 (see Instructions) (http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-77119/2700-BK-DEP4103.pdf):

		Reason for Exemption (check one)		
Source Name	**Date of Installation**	**RFD**	**Exemption List**	**De Minimis**
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐

F. List of Attached Documents (see Instructions) (http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-77119/2700-BK-DEP4103.pdf)

List all supporting documents attached to this application. If any document contains Confidential Business Information (CBI), provide justification on separate attachment (see Instructions) (http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-77119/2700-BK-DEP4103.pdf).

Confidential?	Description of Attachment
☐	**Figure 1 – Area Location Map**
☐	**Attachment A – Emission Calculations**
☐	
☐	
☐	
☐	
☐	
☐	
☐	
☐	

G. Signature of Responsible Person or Authorized Designee (see Instructions) (http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-77119/2700-BK-DEP4103.pdf)

I, Greg Smith, certify under penalty of law as provided in 18 Pa. C.S.A. § 4904 and 35 P.S. § 4009(b)(2) that based on information and belief formed after reasonable inquiry, the statements and information contained in this form are true, accurate, and complete.

Signature: **Title: VP Operations** **Date:** 6/20/2018

Name (typed or printed): **Greg Smith**	**Telephone: (504) 425-4474**
Address (if different from site address): **701 Poydras St** **New Orleans, LA 70139**	**E-Mail Address:** **greg.smith@shell.com**

Note: Please make a copy of this application and all attachments for your records and maintain all information related to this application for review by DEP.

2700-PM-AQ0017 Rev. 11/2009

OFFICIAL USE ONLY

RFD #: 99-00507

Date Received: 6/26/2018

Reviewed By: Edward F. Orris, P.E. ALEXANDER SANDY

☒ A plan approval is not required for this source (See 25 Pa. Code Section 127.14(a)(1)-(9)

☒ An operating permit is not required for this source (See 25 Pa. Code Section 127.443(a))

☐ The source(s) do(es) not qualify for exemption. Applicant is required to submit a plan approval application.

☐ The source(s) do(es) not qualify for exemption. Applicant is required to submit an operating permit application.

Signature

Edward F. Orris PE., Environment Eng Mgr
ALEXANDER SANDY, AQES
Name and Title

Date 3/1/2019

Remarks:

SEE LETTER TO APPLICANT DATED 3/1/2019.

Conditions:

Attachment A

PTE Calculations

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Shell Pipeline Company LP
Monaca Line Integrity Meter Station
Emissions Summary

Emission Source	EPN	VOC		NO_x		CO		PM_{10}		$PM_{2.5}$		CO_2e		C_2H_6	
		lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
Fugitive Emissions	FUG-1	0.01	0.06	–	–	–	–	–	–	–	–	0.04	0.16	0.27	1.16
Pig Receiver	PIG-1	19.02	0.01	–	–	–	–	–	–	–	–	51.86	0.03	369.94	0.18
Temporary Flare	FL-1	3.97	0.05	5.67	0.07	48.64	0.58	0.66	0.01	0.66	0.01	10,370.37	124.37	37.51	0.45
TOTAL EMISSIONS:		**23.01**	**0.12**	**5.67**	**0.07**	**48.64**	**0.58**	**0.66**	**0.01**	**0.66**	**0.01**	**10,422.27**	**124.56**	**407.72**	**1.80**
MAXIMUM OPERATING SCHEDULE:		Hours/Day		24		Days/Week		7		Weeks/Year		52		Hours/Year	8760

Shell Pipeline Company LP
Monaca Line Integrity Meter Station
Facility Information

Site General Information	
Administrative Information	
Company Name	Shell Pipeline Company LP
Facility/Well Name	Monaca Line Integrity Meter Station
Nearest City/Town	Monaca
Latitude/Longitude	40.66264, -80.33942
County	Beaver

Technical Information	
Ethane Flaring (MMSCF/year):	1.18

Equipment/Process Types	How many for this project?
Fugitives	YES
IC Engines	0
Turbines	0
Compressors (electric)	0
Diesel Engines	0
Heaters-Boilers	0
Separators	0
Oil / Condensate Tanks	0
Produced Water Tanks	0
Miscellaneous Tanks	0
Loading Jobs	0
Glycol Units	0
Amine Units	0
Vapor Recovery Units	0
Flares-Vapor Combustors	0
Thermal Oxidizers	0

Shell Pipeline Company LP
Monaca Line Integrity Meter Station
Physical Properties

Process Streams		Flare Pilot	Liquid Ethane	Gas Ethane
Composition	Status:		Solved	Solved
	From Block:		--	VSSL-100
Phase: Total	To Block:		VSSL-100	MIX-100
Std. Vapor Volumetric Flow		**MMSCFD**	**MMSCFD**	**MMSCFD**
Methane		--	0.01	0.01
Ethane		--	1.14	1.14
Propane		1.20E-03	0.01	0.01
Isobutane		--	0.01	0.01
n-Butane		--	0.01	0.01
Isopentane		--	2.36E-03	2.36E-03
n-Pentane		--	2.36E-03	2.36E-03
n-Hexane		--	1.89E-03	1.89E-03
n-Heptane		--	4.72E-04	4.72E-04
Carbon Dioxide		--	1.30E-03	1.30E-03
Oxygen		--	--	--
Mass Fraction		**%**	**%**	**%**
Methane		--	0.52	0.52
Ethane		--	94.46	94.46
Propane		100.00	1.44	1.44
Isobutane		--	0.95	0.95
n-Butane		--	0.95	0.95
Isopentane		--	0.47	0.47
n-Pentane		--	0.47	0.47
n-Hexane		--	0.45	0.45
n-Heptane		--	0.13	0.13
Carbon Dioxide		--	0.16	0.16
Oxygen		--	--	--
Mole Fraction		**%**	**%**	**%**
Methane		--	1.00	1.00
Ethane		--	96.29	96.29
Propane		100.00	1.00	1.00
Isobutane		--	0.50	0.50
n-Butane		--	0.50	0.50
Isopentane		--	0.20	0.20
n-Pentane		--	0.20	0.20
n-Hexane		--	0.16	0.16
n-Heptane		--	0.04	0.04
Carbon Dioxide		--	0.11	0.11
Oxygen		--	--	--
Mass Flow		**lb/h**	**lb/h**	**lb/h**
Methane		--	20.78	20.78
Ethane		--	3,750.82	3,750.82
Propane		5.81	57.12	57.12
Isobutane		--	37.65	37.65
n-Butane		--	37.65	37.65
Isopentane		--	18.69	18.69
n-Pentane		--	18.69	18.69
n-Hexane		--	17.86	17.86
n-Heptane		--	5.19	5.19
Carbon Dioxide		--	6.27	6.27
Oxygen		--	--	--
Temperature	°F	40.00	40.00	65.00
Pressure	psig	1.00	1,160.00	2.00
Molecular Weight	lb/lbmol	44.10	30.65	30.65
Gross Ideal Gas Heating Value	Btu/ft^3	2,572.00	1,797.71	1,797.71
Mass Flow	lb/h	5.81	3,970.73	3,970.73

Shell Pipeline Company LP
Monaca Line Integrity Meter Station
Fugitive Emissions

Background Information

Total fugitive component counts are based on actual equipment counts at the facility.

Emissions Estimate

Liquid Equipment/Service	# Components	SOCMI Emission Factor[a]	Equipment-Specific Bleed Rates[b]	Short-Term TOC Emissions	Annual TOC Emissions
		(lb TOC/hr/component)	scf/min	(lb/hr)	(ton/yr)
Flanges	31	0.0005		0.02	0.07
Manual Valves	14	0.0089		0.12	0.55
Actuated Valves	1	0.0089		0.01	0.04
Automatic Sampler	0	--	0.035	0.00	0.00
CO_2 Moisture Analyzer	0	--	0.07	0.00	0.00
Pressure Indicators	2	0.033		0.07	0.29
Thermowell	2	0.033		0.07	0.29
Basket Strainer	0	0.033		0.00	0.00
Prover Trap	0	0.033		0.00	0.00
Prover Launcher	0	0.033		0.00	0.00
Total				**0.28**	**1.23**

[a] Emission factors taken from EPA document EPA-453/R-95-017; November, 1995; pp. 2-12.

[b] Equipment-Specific bleed rates provided by manufacturer.

Speciated Fugitve Emissions[a]

Component	Total Fugitive Emissions (lb/hr)	Total Fugititve Emissions (ton/year)
Methane	1.47E-03	0.01
Ethane	0.27	1.16
Propane	4.05E-03	0.02
Isobutane	2.67E-03	0.01
n-Butane	2.67E-03	0.01
Isopentane	1.32E-03	0.01
n-Pentane	1.32E-03	0.01
n-Hexane	1.27E-03	0.01
n-Heptane	3.68E-04	1.61E-03
Carbon Dioxide	4.45E-04	1.95E-03
Oxygen	--	--
Total	**0.28**	**1.23**
Total CO_2	**4.45E-04**	**1.95E-03**
Total Methane	**1.47E-03**	**0.01**
Total CO_2e	**0.04**	**0.16**
C_2H_6	**0.27**	**1.16**
TOC	**0.28**	**1.23**
VOC	**0.01**	**0.06**

[a] Fugitive emissions speciation is based on inlet pipeline composition.

Shell Pipeline Company LP
Monaca Line Integrity Meter Station

Pigging Emissions

EPN	PIG-1
Identifier	Pipeline Pig Receiver

Describe this event in detail, include specifically what is being done and how it is being done.	Emissions from the pig launcher. Pipeline from Junction Custody Transfer Meter Station to Monaca Line Integrity Meter Station is 16" diameter and emissions assume one pigging operation per year.

Ideal Gas Constant, [(ft3*psia)/(R*lb-mol)]

10.73159

Actual Volume of the Vented Unit (acf - actual cubic feet)	58.32
Length of Pig Barrel (ft)	37.00
Inside Diameter of Pig Barrel (in)	17.00
Pressure of Gas Inside the Unit Before Venting (psig)	1160
Atmospheric Pressure (psia)	14.78
Pressure of Gas Inside the Unit Before Venting (psia)	1174.78
Temperature of Gas Inside the Unit Before Venting (°F)	40.00
Temperature of Gas Inside the Unit Before Venting (°R)	499.67
Duration of Each Event (hours/event)	1.00
Frequency of Events (events/year)	1.00
Venting Gas Molecular Weight (lb/lb-mol)	30.65
VOC wt %	4.86
CO_2 wt%	0.16
CH_4 wt%	0.52
C_2H_6 wt%	94.46
Are planned vapors (A) uncontrolled; (B) controlled by a flare, vapor combustor, thermal oxidizer, or vapor recovery unit (VRU); or (C) controlled by another type of control device?	(A) uncontrolled

Molecular Weight	30.6510
VOC wt %	4.8570
CO_2 wt %	0.1579
CH_4 wt %	0.5234
C_2H_6 wt %	94.4616

Planned Emissions

	Hourly Emissions (lb/hr)	Annual Emissions (tpy)
VOC Results:	19.02	0.01
CO_2 Results:	0.62	3.09E-04
CH_4 Results:	2.05	1.02E-03
CO_2e Results:	51.86	0.03
C_2H_6 Results:	369.94	0.18

Shell Pipeline Company LP
Monaca Line Integrity Meter Station
FL-1 Hourly

Flare Feed Rates and Composition[a,b]				Flare DRE%	Flare Exhaust Components[c]
Component	Pilot (lb/hr)	Ethane (lb/hr)	Total (lb/hr)	(%)	(lb/hr)
Methane	--	20.78	20.78	99%	**0.21**
Ethane	--	3,750.82	3,750.82	99%	**37.51**
Propane	5.81	57.12	62.93	98%	**1.26**
Isobutane	--	37.65	37.65	98%	**0.75**
n-Butane	--	37.65	37.65	98%	**0.75**
Isopentane	--	18.69	18.69	98%	**0.37**
n-Pentane	--	18.69	18.69	98%	**0.37**
n-Hexane	--	17.86	17.86	98%	**0.36**
n-Heptane	--	5.19	5.19	98%	**0.10**
Carbon Dioxide	--	6.27	6.27	0%	**6.27**
Oxygen	--	--	--	0%	--
Total	**5.81**	**3,970.73**	**3,976.54**	--	**47.96**
Total VOC	**5.81**	**192.86**	**198.67**	--	**3.97**
Total Ethane	--	**3,750.82**	**3,750.82**	--	**37.51**
Heat Value of Stream (Btu/scf)	2,572.00	1,797.71	**1,798.50**		
Molecular Weight	44.10	30.65	--		
SO_2 emissions (lb/hr)	--	--	--		
Volumetric Flow (scf/hr)	50.00	49,160.78	**49,210.78**		
Heat Release (MMBtu/hr)	0.13	88.38	**88.51**		

Criteria Pollutant Emissions[d]		
NO_x factor:	0.0641	lb/MMBtu
CO factor:	0.5496	lb/MMBtu
PM_{10} factor:	7.60	lb/MMscf
$PM_{2.5}$ factor:	7.60	lb/MMscf
NO_x emissions from flare:	**5.67**	**lb/hr**
CO emissions from flare:	**48.64**	**lb/hr**
SO_2 emissions from flare:	**--**	**lb/hr**
PM_{10} emissions from flare:	**0.66**	**lb/hr**
$PM_{2.5}$ emissions from flare:	**0.66**	**lb/hr**
H_2S emissions from flare:	**--**	**lb/hr**

GHG Pollutant Emissions		
GHG CO_2 Factor[e]:	116.98	lb/MMBTU
GHG N_2O Factor[e]:	2.20E-04	lb/MMBTU
GWP CO_2 Equivalent[f]:	1	
GWP CH_4 Equivalent[f]:	25	
GWP N_2O Equivalent[f]:	298	
CO_2 emissions:	10,359.37	**lb/hr**
CH_4 emissions:	0.21	**lb/hr**
N_2O emissions[g]:	0.02	**lb/hr**
CO_2e emissions:	10,370.37	**lb/hr**

[a] Uncontrolled stream properties determined via ProMax.
[b] Hourly emissions based on 1 event per year, lasting 24 hours
[c] Flare Exhaust (lb/hr) = Total Uncontrolled Emissions (lb/hr) x (100-Flare DRE (%)).
[d] Flare CO and NOx emission factors from TCEQ Air Permit Techincal Guidance for Chemical Sources: Flares and Vapor Oxidizers, October 2000 RG-109 (Draft), Table 4, low Btu, 'other' flare type. PM and PM2.5 emission factors from AP-42, Table 1.4-1 and 1.4-2, July 1998.
[e] 40 CFR 98 Subpart C, Table C-1 and C-2. Emission Factor (lb/MMBtu) = Emission factor (kg/MMBtu) * (2.20462 lb/kg)
[f] Global Warming Potentials from Table A-1 of Subpart A of Part 98 for Mandatory Greenhouse Gas Reporting.
[g] 40CFR 98.233 (Subpart W), equation W-40. Mass N2O = (10E-3) x scf x HHV x EF

Shell Pipeline Company LP
Monaca Line Integrity Meter Station
FL-1 Hourly

Sample Calculations

Flare PM emissions were calculated using the following formula:

$$\text{Emissions} = EF / CF * THR$$

where,

Emissions = Flare emissions (lb/hr)
EF = Emission factor (lb/10^6 scf)
CF = 1020 (Btu/scf) Conversion factor from scf to Btu
THR = Total Heat Release (MMBtu/hr)

NO_x, and CO emissions were calculated using the equation below:

$$\text{Emissions} = EF \times THR$$

where,

EF = Emission factor (lb/MMBtu)
THR = Total Heat Release (MMBtu/hr)

VOC and speciated (HAP) emissions were calculated using the equation below:

$$\text{Emissions} = MR_i \times (100\% - DE_{VOC})$$

where,

MR = Mass Rate (lb/hr)
DE_{VOC} = VOC destruction efficiency (%)

H_2S emissions were calculated using the equation below:

$$\text{Emissions} = MR_{H2S} \times (100\% - DE_{H2S})$$

where,

MR_{H2S} = Mass Rate of H_2S (lb/hr)
DE_{H2S} = H_2S destruction efficiency (%)

SO_2 emissions were calculated assuming 100% of the H_2S was converted to SO_2, as shown in the equation below:

$$\text{Emissions} = MR_{H2S} \times MW_{SO2}/MW_{H2S}$$

where,

MR_{H2S} = Mass Rate of H_2S (lb/hr)
MW_{SO2} = Molecular weight of SO_2 (lb/lbmole)
MW_{H2S} = Molecular weight of H_2S (lb/lbmole)

Shell Pipeline Company LP
Monaca Line Integrity Meter Station
FL-1 Annual

Flare Feed Rates and Composition[a,b]				Flare DRE%	Flare Exhaust Components[c]
Component	Pilot (ton/year)	Ethane (ton/year)	Total (ton/year)	(%)	(ton/year)
Methane	–	0.25	0.25	99%	**2.49E-03**
Ethane	–	45.01	45.01	99%	**0.45**
Propane	0.07	0.69	0.76	98%	**0.02**
Isobutane	–	0.45	0.45	98%	**0.01**
n-Butane	–	0.45	0.45	98%	**0.01**
Isopentane	–	0.22	0.22	98%	**4.49E-03**
n-Pentane	–	0.22	0.22	98%	**4.49E-03**
n-Hexane	–	0.21	0.21	98%	**4.29E-03**
n-Heptane	–	0.06	0.06	98%	**1.25E-03**
Carbon Dioxide	–	0.08	0.08	98%	**1.51E-03**
Oxygen	–	–	–	98%	--
Total	**0.07**	**47.65**	**47.72**	--	**0.50**
Total VOC	**0.07**	**2.31**	**2.38**	--	**0.05**
Total Ethane	--	**45.01**	**45.01**	--	**0.45**
Heat Value of Stream (Btu/scf)	2,572.00	1,797.71	**1,798.50**		
Molecular Weight	44.10	30.65	–		
SO_2 emissions (tpy)	–	–	--		
Volumetric Flow (scf/yr)	1,200.00	1,179,858.77	**1,181,058.77**		
Total heat release (MMBtu/yr)	3.09	2,121.04	**2,124.13**		

Criteria Pollutant Emissions[d]		
NO_x factor:	0.0641	lb/MMBtu
CO factor:	0.5496	lb/MMBtu
PM_{10} factor:	7.60	lb/MMscf
$PM_{2.5}$ factor:	7.60	lb/MMscf
NO_x emissions from flare:	**0.07**	**ton/yr**
CO emissions from flare:	**0.58**	**ton/yr**
SO_2 emissions from flare:	**--**	**ton/yr**
PM_{10} emissions from flare:	**0.01**	**ton/yr**
$PM_{2.5}$ emissions from flare:	**0.01**	**ton/yr**
H_2S emissions from flare:	**--**	**ton/yr**

GHG Pollutant Emissions[e,f]		
GHG CO_2 Factor[e]:	116.98	lb/MMBTU
GHG N_2O Factor[e]:	2.20E-04	lb/MMBTU
GWP CO_2 Equivalent[f]:	1	
GWP CH_4 Equivalent[f]:	25	
GWP N_2O Equivalent[f]:	298.00	
CO_2 emissions:	124.24	tpy
CH_4 emissions:	2.49E-03	tpy
N_2O emissions[g]:	2.34E-04	tpy
CO_2e emissions:	124.37	tpy

[a] Uncontrolled stream properties determined via ProMax.
[b] Annual emissions based on 1 event per year
[c] Flare Exhaust (tpy) = Total Uncontrolled Emissions (tpy) x (100-Flare DRE (%)).
[d] Flare CO and NOx emission factors from TCEQ Air Permit Techincal Guidance for Chemical Sources: Flares and Vapor Oxidizers, October 2000 RG-109 (Draft), Table 4, low Btu, 'other' flare type. PM and PM2.5 emission factors from AP-42, Table 1.4-1 and 1.4-2, July 1998. SO2 emissions assume 100% conversion of H2S to SO2.
[e] 40 CFR 98 Subpart C, Table C-1 and C-2. Emission Factor (lb/MMBtu) = Emission factor (kg/MMBtu) * (2.20462 lb/kg)
[f] Global Warming Potentials from Table A-1 of Subpart A of Part 98 for Mandatory Greenhouse Gas Reporting.
[g] 40CFR 98.233 (Subpart W), equation W-40. Mass N2O = (10E-3) x scf x HHV x EF

Figure 1

Area Location Map

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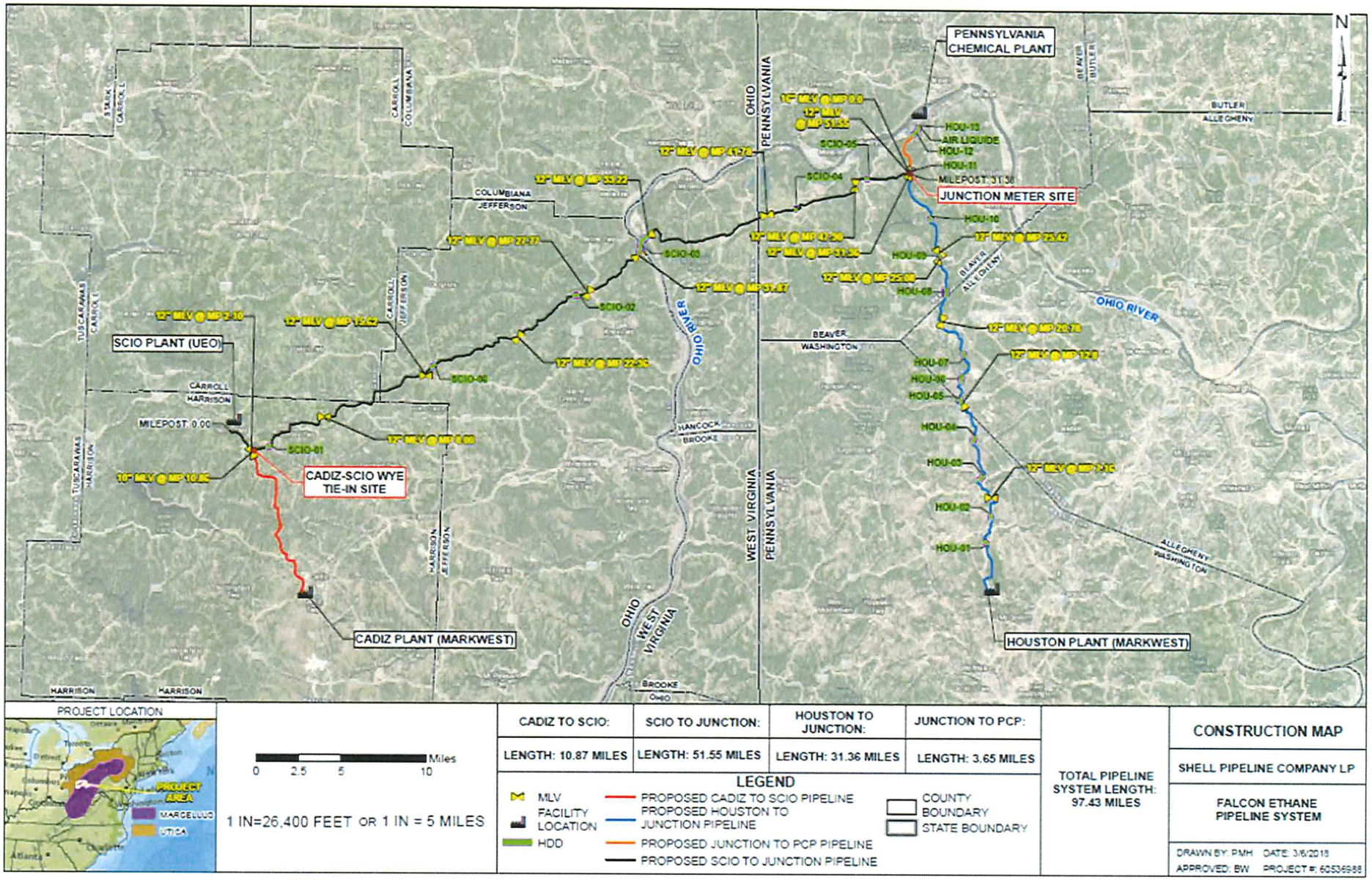

Figure 1- Location Map

Falcon Ethane Pipeline

Shell Pipeline Company, LP

Prepared by: RAMBOLL

June 2018