

September 8, 2016

Mr. Fred Durham, Director  
West Virginia Department of Environmental Protection  
Division of Air Quality  
601 57th Street, SE  
Charleston, WV 25304

Phone: (304) 926-0499  
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Re: SWN Production Company, LLC  
Mike Ryniawec Pad  
NSR (45CSR13) Permit No. R13-2984D  
Request for Permit Evaluation



To Whom It May Concern:

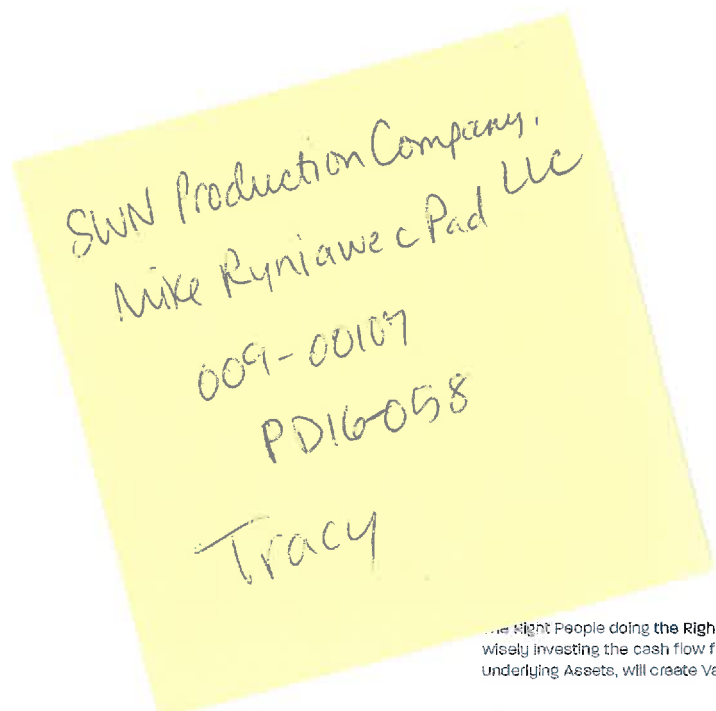
SWN Production Company, LLC (SWN) operates the above-referenced production facility under Permit No. R13-2984D. SWN requests a permit evaluation regarding the replacement of one (1) 1.5-mmBtu/hr line heater with one (1) 0.5-mmBtu/hr heater treater. Emission increases as a result of this project would be less than modification thresholds and do not involve any emission unit listed in Table 45-13B. This permit evaluation request is submitted as detailed by 45CSR13, Section 5.13. A summary of the change in criteria and hazardous air pollutant emissions and the heater treater emission calculations are attached.

If you have any questions regarding the information in this application, please contact Travis Lee at (501) 548-6728 or at [Travis.Lee@swn.com](mailto:Travis.Lee@swn.com).

Sincerely,

Carla Suszkowski  
Regulatory Manager – West Virginia Division

Enclosures: Emission Estimates



SWM Production Company, LLC  
 Mike Rynlawec Pad  
 Summary of Hazardous Air Pollutants

Equipment	Unit ID	Estimated Emissions (lb/ft <sup>3</sup> )										Total HAPs	
		Acetalde- hyde	Acrolein	Benzene	Ethyl- benzene	Formalde- hyde	Methanol	n-Hexane	Toluene	Xylenes			
1.0-mmBtu/hr GPU Burner	EU-GPU1	-	-	<0.01	-	<0.01	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
0.50-mmBtu/hr Heater Treater - Add	EU-HT1	-	-	<0.01	-	<0.01	-	<0.01	<0.01	<0.01	-	<0.01	<0.01
1.5-mmBtu/hr Line Heater - Remove	EU-LH1	-	-	0.00	-	0.00	-	0.00	0.00	0.00	-	0.00	0.00
Three (3) 400-bbl Condensate Tanks Routed to Vapor Combustor	EU-TANKS-COND	-	-	<0.01	0.01	-	0.01	-	0.01	0.10	0.02	0.01	0.14
Three (3) 400-bbl Produced Water Tanks Routed to Vapor Combustor	EU-TANKS-PW	-	-	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01
Condensate Truck Loading w/ Vapor Return Routed to Vapor Combustor	EU-LOAD-COND	-	-	<0.01	<0.01	-	<0.01	-	<0.01	0.01	<0.01	<0.01	0.02
Produced Water Truck Loading w/ Vapor Return Routed to Vapor Combustor	EU-LOAD-PW	-	-	<0.01	<0.01	-	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01
One (1) 15.0-mmBtu/hr Vapor Combustor	APC-COMB-TKLD	-	-	<0.01	0.01	-	0.01	-	0.01	0.10	0.02	0.01	0.13
Vapor Combustor Pilot	EU-PILOT	-	-	<0.01	-	<0.01	-	<0.01	-	<0.01	-	<0.01	<0.01
Fugitive Emissions - Revise	EU-FUG	-	-	<0.01	<0.01	-	<0.01	-	0.02	0.02	<0.01	<0.01	0.02
Fugitive Haul Road Emissions	EU-HR	-	-	-	-	-	-	-	-	-	-	-	-
Post-Modification Allowable Emissions =		0.00	0.00	<0.01	0.02	<0.01	0.00	0.23	0.01	0.05	0.05	0.01	0.31
Current Permit Allowable Emissions =		0.00	0.00	0.00	0.02	0.00	0.00	0.23	0.01	0.05	0.05	0.01	0.31
Net Allowable Emissions =		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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SWN Production Company, LLC  
 Mike Rynlawec Pad  
 Summary of Hazardous Air Pollutants (Continued)

Equipment	Unit ID	Estimated Emissions (TPY)										Total HAPs
		Acetalde- hyde	Acrolein	Benzene	Ethyl- benzene	Formalde- hyde	Methanol	n-Hexane	Toluene	Xylenes		
1.0-mmBtu/hr GPU Burner	EU-GPU1	-	-	<0.01	-	<0.01	-	0.01	<0.01	-	<0.01	0.01
0.50-mmBtu/hr Heater Treater - Add	EU-HT1	-	-	<0.01	-	<0.01	-	<0.01	-	-	<0.01	<0.01
1.5-mmBtu/hr Line Heater - Remove	EU-LH1	-	-	0.00	-	0.00	-	0.00	-	-	0.00	0.00
Three (3) 400-bbl Condensate Tanks Routed to Vapor Combustor	EU-TANKS-COND	-	-	0.01	0.03	-	-	0.43	0.03	0.11	0.60	0.60
Three (3) 400-bbl Produced Water Tanks Routed to Vapor Combustor	EU-TANKS-PW	-	-	<0.01	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01
Condensate Truck Loading w/ Vapor Return Routed to Vapor Combustor	EU-LOAD-COND	-	-	<0.01	<0.01	-	-	0.05	<0.01	0.01	0.07	0.07
Produced Water Truck Loading w/ Vapor Return Routed to Vapor Combustor	EU-LOAD-PW	-	-	<0.01	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01
One (1) 15.0-mmBtu/hr Vapor Combustor	APC-COMB-TKLD	-	-	0.01	0.03	-	-	0.44	0.03	0.09	0.59	0.59
Vapor Combustor Pilot	EU-PILOT	-	-	<0.01	-	<0.01	-	<0.01	<0.01	-	<0.01	<0.01
Fugitive Emissions - Revise	EU-FUG	-	-	<0.01	<0.01	-	-	0.06	<0.01	0.02	0.09	0.09
Fugitive Haul Road Emissions	EU-HR	-	-	-	-	-	-	-	-	-	-	-
Post-Modification Allowable Emissions =		0.00	0.00	0.01	0.07	<0.01	0.00	0.99	0.06	0.22	1.36	1.36
Current Permit Allowable Emissions =		0.00	0.00	0.01	0.07	0.00	0.00	0.99	0.06	0.22	1.36	1.36
Net Allowable Emissions =		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SWN Production Company, LLC  
 Mike Ryniawec Pad  
 Heater Treater Emissions Calculations - Criteria Air Pollutants

Equipment Information

Unit ID:	<u>EU-HT1</u>
Description:	Heater Treater
Number of Units:	1
Burner Design (mmBtu/hr):	0.50
Fuel HHV (Btu/scf):	905
Annual Fuel Use (mmscf):	4.84
Annual Operating Hours:	8,760

Criteria Air Pollutant Emissions

Unit ID: EU-HT1

Pollutant	lb/hr	TPY
NO <sub>x</sub>	0.06	0.26
CO	0.05	0.22
VOC	<0.01	0.01
SO <sub>2</sub>	<0.01	<0.01
PM <sub>10/2.5</sub>	<0.01	0.01
PM <sub>COND</sub>	<0.01	<0.01
PM <sub>TOT</sub>	<0.01	0.02

AP-42 Emission Factors for Units <100 mmBtu/hr (lb/mmscf)<sup>1</sup>

Pollutant	1.4-1, -2 (7/98)
NO <sub>x</sub>	100.0
CO	84.0
VOC	5.5
SO <sub>2</sub>	0.6
PM <sub>10/2.5</sub>	5.7
PM <sub>COND</sub>	1.9
PM <sub>TOT</sub>	7.6

Notes:

<sup>1</sup> All PM (total, condensable and filterable) is assumed to be <1 micrometer in diameter. Total PM is the sum of filterable PM and condensable PM.

SWN Production Company, LLC  
 Mike Ryniawec Pad  
 Heater Treater Emissions Calculations - Hazardous Air Pollutants

Equipment Information

Unit ID:	<u>EU-HT1</u>
Description:	Heater Treater
Number of Units:	1
Burner Design (mmBtu/hr):	0.50
Fuel HHV (Btu/scf):	905
Annual Fuel Use (mmscf):	4.84
Annual Operating Hours:	8,760

Hazardous Air Pollutant Emissions

Unit ID: EU-HT1

Pollutant	lb/hr	TPY
n-Hexane	<0.01	<0.01
Formaldehyde	<0.01	<0.01
Benzene	<0.01	<0.01
Toluene	<0.01	<0.01
<b>Total HAPs =</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>

AP-42 Emission Factors (lb/mmscf)

Pollutant	1.4-3 (7/98)
n-Hexane	1.80E+00
Formaldehyde	7.50E-02
Benzene	2.10E-03
Toluene	3.40E-03

SWN Production Company, LLC  
 Mike Ryniawec Pad  
 Fugitive Emissions Calculations - Criteria and Hazardous Air Pollutants and Greenhouse Gases

Equipment Information

Source Type/Service	Number of Sources <sup>1</sup>	Em. Factor (lb/hr/source) <sup>2</sup>	Control Efficiency	TOC lb/hr	TOC TPY	VOC Wt %
Valves - Gas	17	9.92E-03	0.00%	0.17	0.74	24.18%
Flanges - Gas	72	8.60E-04	0.00%	0.06	0.26	24.18%
Compressor Seals - Gas	0	1.94E-02	0.00%	0.00	0.00	24.18%
Relief Valves - Gas	9	1.94E-02	0.00%	0.17	0.74	24.18%
Open-Ended Lines - Gas	0	4.41E-03	0.00%	0.00	0.00	24.18%
<b>Total TOC (Gas Components) =</b>				<b>0.40</b>	<b>1.74</b>	-
Valves - Light Oil	38	5.51E-03	0.00%	0.21	0.92	94.29%
Flanges - Light Oil	146	2.43E-04	0.00%	0.04	0.18	94.29%
Pump Seals - Light Oil	0	2.87E-02	0.00%	0.00	0.00	94.29%
Other - Light Oil	0	1.65E-02	0.00%	0.00	0.00	94.29%
<b>Total TOC (Liquid Components) =</b>				<b>0.25</b>	<b>1.10</b>	-

VOC and Greenhouse Gas Emissions

Source Type/Service	VOC		CH <sub>4</sub>		CO <sub>2</sub>	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Valves - Gas	0.04	0.18	0.09	0.38	<0.01	<0.01
Flanges - Gas	0.01	0.07	0.03	0.14	<0.01	<0.01
Compressor Seals - Gas	0.00	0.00	0.00	0.00	0.00	0.00
Relief Valves - Gas	0.04	0.18	0.09	0.38	<0.01	<0.01
Open-Ended Lines - Gas	0.00	0.00	0.00	0.00	0.00	0.00
<b>Components in Gas Service =</b>	<b>0.10</b>	<b>0.43</b>	<b>0.21</b>	<b>0.90</b>	<b>&lt;0.01</b>	<b>0.01</b>
Valves - Light Oil	0.20	0.86	<0.01	0.02	<0.01	<0.01
Flanges - Light Oil	0.03	0.15	<0.01	<0.01	<0.01	<0.01
Pump Seals - Light Oil	0.00	0.00	0.00	0.00	0.00	0.00
Other - Light Oil	0.00	0.00	0.00	0.00	0.00	0.00
<b>Components in Liquid Service =</b>	<b>0.24</b>	<b>1.04</b>	<b>0.00</b>	<b>0.02</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>
<b>Total (Gas + Liquid Components) =</b>	<b>0.34</b>	<b>1.47</b>	<b>0.21</b>	<b>0.92</b>	<b>&lt;0.01</b>	<b>0.01</b>

SWN Production Company, LLC  
 Mike Ryniawec Pad  
 Fugitive Emissions Calculations (Continued)

**Hazardous Air Pollutant (HAP) Emissions (lb/hr)**

Source Type/Service	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	2,2,4-Tri.	Total
Valves - Gas	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	<0.01
Flanges - Gas	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	<0.01
Compressor Seals - Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Relief Valves - Gas	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	<0.01
Open-Ended Lines - Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Components in Gas Service =</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>0.00</b>	<b>&lt;0.01</b>
Valves - Light Oil	0.01	<0.01	<0.01	<0.01	<0.01	0.00	0.02
Flanges - Light Oil	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	<0.01
Pump Seals - Light Oil	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other - Light Oil	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Components in Liquid Service =</b>	<b>0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>0.00</b>	<b>0.02</b>
<b>Total (Gas + Liquid Components) =</b>	<b>0.02</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>0.00</b>	<b>0.02</b>

**Hazardous Air Pollutant (HAP) Emissions (TPY)**

Source Type/Service	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylenes	2,2,4-Tri.	Total
Valves - Gas	0.00	<0.01	<0.01	<0.01	<0.01	0.00	<0.01
Flanges - Gas	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	<0.01
Compressor Seals - Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Relief Valves - Gas	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	<0.01
Open-Ended Lines - Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Components in Gas Service =</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>0.00</b>	<b>&lt;0.01</b>
Valves - Light Oil	0.05	<0.01	<0.01	<0.01	0.01	0.00	0.07
Flanges - Light Oil	0.01	<0.01	<0.01	<0.01	<0.01	0.00	0.01
Pump Seals - Light Oil	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other - Light Oil	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Components in Liquid Service =</b>	<b>0.06</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>0.02</b>	<b>0.00</b>	<b>0.08</b>
<b>Total (Gas + Liquid Components) =</b>	<b>0.06</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>0.02</b>	<b>0.00</b>	<b>0.09</b>

SWN Production Company, LLC  
 Mike Ryniawec Pad  
 Fugitive Emissions Calculations (Continued)

Typical Component Count per Equipment Type based on Representative Facility<sup>3</sup>

Source Type/Service	WH	GPU	HT	LPT	FGC	OT	TT-O
Valves - Gas	12	3	2	5	5	0	0
Flanges - Gas	37	15	9	24	33	3	2
Compressor Seals - Gas	0	0	0	0	3	0	0
Relief Valves - Gas	1	3	1	1	1	1	1
Open-Ended Lines - Gas	0	0	0	0	0	0	0
Valves - Light Oil	0	5	6	12	3	6	9
Connectors - Light Oil	0	20	24	48	12	24	30
Pump Seals - Light Oil	0	0	0	0	0	0	0
Other - Light Oil	0	0	0	0	0	0	0

Equipment Type	WH	GPU	HT	LPT	FGC	OT	TT-O
Number of Each Type On Pad =	1	1	1	0	0	3	1



SWN Production Company, LLC  
 Mike Ryniawec Pad  
 Fugitive Emissions Calculations (Continued)

Speciated Gas Analysis

Component	Molecular Weight	Mole %	Equiv. Wt. Basis	Weight %	HC Weight %	lb/hr	TPY
Hydrogen Sulfide	34.082	0.0000%	0.0000	0.0000%	-	0.00	0.00
Carbon Dioxide	44.010	0.1490%	0.0656	0.2946%	-	<0.01	0.01
Nitrogen	28.013	0.5130%	0.1437	0.6456%	-	<0.01	0.01
Methane	16.042	71.4270%	11.4583	51.4791%	51.9678%	0.21	0.90
Ethane	30.069	17.4910%	5.2594	23.6289%	23.8532%	0.10	0.42
Propane	44.096	6.8020%	2.9994	13.4755%	13.6034%	0.05	0.24
i-Butane	58.122	0.6680%	0.3883	1.7443%	1.7609%	0.01	0.03
n-Butane	58.122	1.8280%	1.0625	4.7734%	4.8187%	0.02	0.08
i-Pentane	72.149	0.3270%	0.2359	1.0600%	1.0700%	<0.01	0.02
n-Pentane	72.149	0.4400%	0.3175	1.4262%	1.4398%	0.01	0.03
n-Hexane	86.175	0.1070%	0.0922	0.4143%	0.4182%	<0.01	0.01
Other Hexanes	86.175	0.1350%	0.1163	0.5227%	0.5276%	<0.01	0.01
Heptanes (as n-Heptane)	100.202	0.0780%	0.0782	0.3511%	0.3545%	<0.01	0.01
Benzene	78.114	0.0010%	0.0008	0.0035%	0.0035%	<0.01	<0.01
Toluene	92.141	0.0020%	0.0018	0.0083%	0.0084%	<0.01	<0.01
Ethylbenzene	106.167	0.0002%	0.0002	0.0010%	0.0010%	<0.01	<0.01
Xylenes	106.167	0.0010%	0.0011	0.0048%	0.0048%	<0.01	<0.01
2,2,4-Trimethylpentane	114.230	0.0000%	0.0000	0.0000%	0.0000%	0.00	0.00
Octanes (as n-Octane)	114.229	0.0220%	0.0251	0.1129%	0.1140%	<0.01	<0.01
Nonanes (as n-Nonane)	128.255	0.0060%	0.0077	0.0346%	0.0349%	<0.01	<0.01
Decanes (as n-Decane)	142.282	0.0030%	0.0043	0.0192%	0.0194%	<0.01	<0.01
<b>TOTAL =</b>		<b>100.00%</b>	<b>22.26</b>	<b>100.00%</b>	<b>100.00%</b>	<b>0.40</b>	<b>1.76</b>
		<b>TOTAL HC =</b>	<b>22.05</b>	<b>TOTAL VOC =</b>	<b>24.18%</b>	<b>0.09</b>	<b>0.43</b>
				<b>TOTAL HAP =</b>	<b>0.44%</b>	<b>&lt;0.01</b>	<b>0.01</b>

SWN Production Company, LLC  
 Mike Ryniawec Pad  
 Fugitive Emissions Calculations (Continued)

Speciated Liquids Analysis

Component	Molecular Weight	Mole %	Equiv. Wt. Basis	Weight %	HC Weight %	lb/hr	TPY
Hydrogen Sulfide	34.082	0.000%	0.000	0.0000%	-	0.00	0.00
Carbon Dioxide	44.010	0.013%	0.006	0.0074%	-	<0.01	<0.01
Nitrogen	28.013	0.026%	0.007	0.0094%	-	<0.01	<0.01
Methane	16.042	8.861%	1.421	1.8359%	1.8362%	<0.01	0.02
Ethane	30.069	9.965%	2.996	3.8700%	3.8707%	0.01	0.04
Propane	44.096	11.708%	5.163	6.6680%	6.6692%	0.02	0.07
i-Butane	58.122	2.480%	1.441	1.8617%	1.8620%	<0.01	0.02
n-Butane	58.122	9.597%	5.578	7.2043%	7.2055%	0.02	0.08
i-Pentane	72.149	3.683%	2.657	3.4320%	3.4326%	0.01	0.04
n-Pentane	72.149	6.541%	4.719	6.0952%	6.0963%	0.02	0.07
n-Hexane	86.175	5.195%	4.477	5.7821%	5.7830%	0.01	0.06
Other Hexanes	86.175	5.393%	4.647	6.0024%	6.0035%	0.02	0.07
Heptanes (as n-Heptane)	100.202	10.008%	10.028	12.9521%	12.9543%	0.03	0.14
Benzene	78.114	0.069%	0.054	0.0696%	0.0696%	<0.01	<0.01
Toluene	92.141	0.328%	0.302	0.3903%	0.3904%	<0.01	<0.01
Ethylbenzene	106.167	0.307%	0.326	0.4210%	0.4210%	<0.01	<0.01
Xylenes	106.167	1.044%	1.108	1.4316%	1.4318%	<0.01	0.02
2,2,4-Trimethylpentane	114.230	0.000%	0.000	0.0000%	0.0000%	0.00	0.00
Octanes (as n-Octane)	114.229	7.566%	8.643	11.1624%	11.1643%	0.03	0.12
Nonanes (as n-Nonane)	128.255	4.597%	5.896	7.6149%	7.6162%	0.02	0.08
Decanes (as n-Decane)	142.282	12.619%	17.955	23.1895%	23.1934%	0.06	0.26
<b>TOTAL =</b>	<b>142.282</b>	<b>100.00%</b>	<b>77.43</b>	<b>100.00%</b>	<b>100.00%</b>	<b>0.25</b>	<b>1.10</b>
		<b>TOTAL HC =</b>	<b>77.41</b>	<b>TOTAL VOC =</b>	<b>94.29%</b>	<b>0.24</b>	<b>1.04</b>
				<b>TOTAL HAP =</b>	<b>8.10%</b>	<b>0.02</b>	<b>0.09</b>

Notes:

<sup>1</sup> Component counts taken by equipment type at representative facility and made site-specific according to the number of each equipment type at this site.

<sup>2</sup> Emission Factor Source: EPA-453/R-95-017. TOC multiplied by pollutant content of streams (weight %) to obtain pollutant emissions.

<sup>3</sup> Equipment Type Key: WH = Well Head, GPU = Gas Production Unit, HT = Heater Treater, LPT = Low-Pressure Tower, FGC = Flash Gas Compressor, OT = Oil Tank, TT-O = Tank Truck - Oil