APPENDIX C

VOC Emissions Data – Truck Loading

C1. VOC Emission Rate Calculations / Data Sheets

C2. Tank Displacement Rate Calculations / Truck Loading Logs

C1. VOC Emission Rate Calculations / Data Sheets

Method 25A Calibration Data Sheet - Total Hydrocarbons

Source Summary			
Facility:	Sprague Searsport		
Source/Location:	Residual Oil Loading Rack		
Start Date	31-Jul-12	End Date:	31-Jul-12
Start Time:	6:22	End Time:	15:40

THC Analyzer Data			
Manufacturer -	VIG		
Model/Serial Number -	200/2660406		
Fuel Pressure -	6.5		
Combustion Air Pressure -	5.5		
Sample Pressure -	2.0		
Range -	0	-	10,000
Calibrant (choose one, x in box)	Propane		x
	Methane		
Cal Gas Molecular Weight:	44.09	g/mol	

Initial Calibration Summary	
Operator:	A. Stratton
Date:	31-Jul-12
Time:	6:15

Initial Calibration Data (Hi / Zero)		
Calibration Gas	Cylinder Conc.	Actual Response
Zero Gas	0.0	0
High Gas	8483	8486
Response Line	1.000	

Where: Response Line = (Ha-Za)/(Hc-Zc)

Initial Calibration Data (Mid / Low)					
Calibration Gas	**Cylinder Conc.**	**Predicted Response**	**Actual Response**	**Calibration Error**	**Acceptance Criteria**
Low Gas	3066	3067	3074	0.2	< 5% of cylinder concentration
Mid Gas	5010	5012	5004	0.2	< 5% of cylinder concentration

Where:

Predicted Response = (Cylinder Concentration) x (Response Line)

Calibration Error = (Actual Response - Predicted Response) / Cylinder Concentration x 100

Post Calibration Summary	
Operator:	A. Stratton
Date:	31-Jul-12
Time:	15:30

Post Calibration Drift Data						
Calibration Gas	**Cylinder Conc.**	**Initial Test Response**	**Final Test Response**	**Calibration Drift**	**Acceptance Criteria**	
Post Cal 1 Zero	0	0	60	**0.60**	< 3% of the measurement range	
Post Cal 1 Upscale	5010	5004	5164	**1.60**	< 3% of the measurement range	
					Test Avg. Conc.	**3,800**

Where:

Calibration Drift = (Final Test Response - Initial Test Response) * 100

Gas Cylinder Data						
Calibration Gas	Required % of Span	Cylinder Conc.	Cylinder Composition	Cylinder Number	Expiration Date	Actual % of Span
Fuel	N/A		UHP H2		N/A	N/A
Combustion Air			UHP Air		N/A	
Zero Gas	<0.1%	0	UHP Air		N/A	0%
Low Gas	25-35	3,066	Propane/Air	SA3275	3/26/2015	31%
Mid Gas	45-55	5,010	Propane/Air	SA20684	3/26/2015	50%
High Gas	80-90	8,483	Propane/Air	CC110684	4/2/2015	85%

System Response Time = 120 seconds

Method 25A Calibration Data Sheet - Methane

Source Summary			
Facility:	Sprague Searsport		
Source/Location:	Residual Oil Loading Rack		
Start Date	31-Jul-12	End Date:	31-Jul-12
Start Time:	6:22	End Time:	15:40

THC Analyzer Data			
Manufacturer -	VIG		
Model/Serial Number -	200/2660406		
Fuel Pressure -	7.0		
Combustion Air Pressure -	5.5		
Carrier Gas Pressure -	22.0		
Range -	0	-	1,000
Calibrant (choose one, x in box)	Propane		
	Methane		x
Cal Gas Molecular Weight:	16.039	g/mol	

Initial Calibration Summary	
Operator:	A. Stratton
Date:	31-Jul-12
Time:	6:15

Initial Calibration Data (Hi / Zero)		
Calibration Gas	Cylinder Conc.	Actual Response
Zero Gas	0.0	0
High Gas	820	828
Response Line	1.010	

Where: Response Line = (Ha-Za)/(Hc-Zc)

Initial Calibration Data (Mid / Low)					
Calibration Gas	**Cylinder Conc.**	**Predicted Response**	**Actual Response**	**Calibration Error**	**Acceptance Criteria**
Low Gas	290	293	289	1.3	< 5% of cylinder concentration
Mid Gas	485	490	486	0.8	< 5% of cylinder concentration

Where:

Predicted Response = (Cylinder Concentration) x (Response Line)

Calibration Error = (Actual Response - Predicted Response) / Cylinder Concentration x 100

Post Calibration Summary	
Operator:	A. Stratton
Date:	31-Jul-12
Time:	15:30

Post Calibration Drift Data						
Calibration Gas	**Cylinder Conc.**	**Initial Test Response**	**Final Test Response**	**Calibration Drift**	**Acceptance Criteria**	
Post Cal 1 Zero	0	0	2	**0.2**	< 3% of the measurement range	
Post Cal 1 Upscale	820	828	810	**1.8**	< 3% of the measurement range	
					Test Avg. Conc.	**527**

Where:

Calibration Drift = (Final Test Response - Initial Test Response) * 100

Gas Cylinder Data						
Calibration Gas	Required % of Span	Cylinder Conc.	Cylinder Composition	Cylinder Number	Expiration Date	Actual % of Span
Fuel	N/A		UHP H2		N/A	N/A
Combustion Air			UHP Air		N/A	
Zero Gas	<0.1%	0	UHP Air		N/A	0%
Low Gas	25-35	290.0	CH4/Air	CC198791	4/2/2015	29%
Mid Gas	45-55	485.0	CH4/Air	SA152203	4/2/2015	49%
High Gas	80-90	820.0	CH4/Air	SA1610	4/2/2015	82%

System Response Time = **120 seconds**

Method 25A Data Sheet (THC)

Client	Sprague
Facility	Searsport, Maine Terminal
Source	Loading Rack - #6 Oil
Test Location	Truck Filling Hatch
Date	31 July 12 - 0615

THC Analyzer Data

Manufacturer	VIG
Model/Serial Number	200 / 2660406
Fuel Pressure	6.5
Combustion Air Pressure	5.5
Sample Pressure	2
Measurement Range	0 - 10000
Response Time	120 Sec.

Test Data

Test Number	1	2	3
Start Time			
Stop Time			
Testers			

Calibration Error Test Data

Calibration Gas	Cylinder Concentration	Actual Response
Zero Gas	0	0
High Gas	8483	8486
Response Line		

Response Line = (Ha/Za)/(Hc-Zc)

Calibration Gas	Cylinder Concentration	Predicted Response	Actual Response	Calibration Error	Criteria Acceptance
Low Gas	3066		3074		< 5% of cylinder concentration
Mid Gas	5010		5004		< 5% of cylinder concentration

Predicted Response = (Cylinder Concentration) x (Response Line)

Calibration Error = (Actual Response - Predicted Response) / Cylinder Concentration x 100

Calibration Drift Test Data

Calibration Gas	Cylinder Concentration	CE Test Response	Actual Response	Calibration Drift	Criteria Acceptance	
Test Run 1 Zero	0		60		< 3% of the measurement range	
Test Run 1 Mid	5010		5163		< 3% of the measurement range	
					Test Run 1 Avg. Conc.	
Test Run 2 Zero					< 3% of the measurement range	
Test Run 2 Mid					< 3% of the measurement range	
					Test Run 2 Avg. Conc.	
Test Run 3 Zero					< 3% of the measurement range	
Test Run 3 Mid					< 3% of the measurement range	
Calibration Drift = (Actual Response - CE Test Response) / Measurement Range * 100					Test Run 3 Avg. Conc.	

Gas Cylinder Data

Calibration Gas	Required % of Span	Cylinder Concentration	Cylinder Composition	Cylinder Number	Expiration Date	Actual % of Span
Fuel			UHP H2			
Combustion Air			UHP Air			
Zero Gas			UHP N2			
Low Gas	25 - 35					
Mid Gas	45 - 55					
High Gas	80 - 90					

Method 25A Data Sheet (Methane Only)

Client	Sprague
Facility	Searsport, Maine Terminal
Source	Loading Rack #6 011
Test Location	Truck Filling Hatch
Date	31 Jul 12 06:15

THC Analyzer Data

Manufacturer	VIG
Model/Serial Number	200 / 2660406
Fuel Pressure	7
Combustion Air Pressure	5.5
Carrier Gas Pressure	22
Measurement Range	0 – 1000
Response Time	120 Sec.

Test Data

Test Number	1	2	3
Start Time			
Stop Time			
Testers			

Calibration Error Test Data

Calibration Gas	Cylinder Concentration	Actual Response
Zero Gas	0	0
High Gas	820	828
Response Line		

Response Line = (Ha/Za)/(Hc-Zc)

Calibration Gas	Cylinder Concentration	Predicted Response	Actual Response	Calibration Error	Criteria Acceptance
Low Gas	290		289		< 5% of cylinder concentration
Mid Gas	485		486		< 5% of cylinder concentration

Predicted Response = (Cylinder Concentration) x (Response Line)

Calibration Error = (Actual Response - Predicted Response) / Cylinder Concentration x 100

Calibration Drift Test Data

Calibration Gas	Cylinder Concentration	CE Test Response	Actual Response	Calibration Drift	Criteria Acceptance	
Test Run 1 Zero	0		2		< 3% of the measurement range	
Test Run 1 Mid	820		~~820~~ 810		< 3% of the measurement range	
					Test Run 1 Avg. Conc.	
Test Run 2 Zero					< 3% of the measurement range	
Test Run 2 Mid					< 3% of the measurement range	
					Test Run 2 Avg. Conc.	
Test Run 3 Zero					< 3% of the measurement range	
Test Run 3 Mid					< 3% of the measurement range	
					Test Run 3 Avg. Conc.	

Calibration Drift = (Actual Response - CE Test Response) / Measurement Range * 100

Gas Cylinder Data

Calibration Gas	Required % of Span	Cylinder Concentration	Cylinder Composition	Cylinder Number	Expiration Date	Actual % of Span
Fuel			UHP H2			
Combustion Air			UHP Air			
Zero Gas			UHP N2			
Low Gas	25 - 35					
Mid Gas	45 - 55					
High Gas	80 - 90					

Emission Rate Calculation Sheet
Total Hydrocarbon Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012 7:21:23 AM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012 7:46:23 AM
Truck No. :	1	**Load Time (hours):**	0.43

Average Concentration:		4,368 ppmvw
Average Flow Rate:		43 scfm
Molecular Weight:	Propane	44.09 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM)	=	**8005.26** mg/m^3
mg/SCF =	(mg/m^3) (m^3/35.31 SCF)	=	**226.71** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**5.00E-04** lb/SCF
THC lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**1.28** lb/hr
CH4 lb/hr =	(lb/SCF * SCFM * 60 min/hr)		**0.103** lb/hr
NMHC lb/hr =			**1.17** lb/hr
NMHC lb/load =			**0.51** lb/load
NMHC ton/load			**2.54E-04** ton/load

Emission Rate Calculation Sheet
Total Hydrocarbon Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012	8:47:23 AM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012	9:11:23 AM
Truck No. :	2	**Load Time (hours):**	0.42	

Average Concentration:		3,904 ppmvw
Average Flow Rate:		44 scfm
Molecular Weight:	Propane	44.09 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM)	=	**7155.94** mg/m^3
mg/SCF =	(mg/m^3) (m^3/35.31 SCF)	=	**202.66** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**4.47E-04** lb/SCF
THC lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**1.19** lb/hr
CH4 lb/hr =	(lb/SCF * SCFM * 60 min/hr)		**0.066** lb/hr
NMHC lb/hr =			**1.12** lb/hr
NMHC lb/load =			**0.47** lb/load
NMHC ton/load			**2.34E-04** ton/load

Emission Rate Calculation Sheet
Total Hydrocarbon Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012 10:02:23 AM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012 10:32:23 AM
Truck No. :	3	**Load Time (hours):**	0.52

Average Concentration:		3,563 ppmvw
Average Flow Rate:		36 scfm
Molecular Weight:	Propane	44.09 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM)	=	**6530.03** mg/m^3
mg/SCF =	(mg/m^3) (m^3/35.31 SCF)	=	**184.93** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**4.08E-04** lb/SCF
THC lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**0.87** lb/hr
CH4 lb/hr =	(lb/SCF * SCFM * 60 min/hr)		**0.042** lb/hr
NMHC lb/hr =			**0.83** lb/hr
NMHC lb/load =			**0.43** lb/load
NMHC ton/load			**2.15E-04** ton/load

Emission Rate Calculation Sheet
Total Hydrocarbon Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012 11:23:23 AM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012 11:46:23 AM
Truck No. :	4	**Load Time (hours):**	0.40

Average Concentration:		4,521 ppmvw
Average Flow Rate:		46 scfm
Molecular Weight:	Propane	44.09 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM)	=	**8285.55** mg/m^3
mg/SCF =	(mg/m^3) $(m^3/35.31$ SCF)	=	**234.65** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**5.17E-04** lb/SCF
THC lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**1.43** lb/hr
CH4 lb/hr =	(lb/SCF * SCFM * 60 min/hr)		**0.182** lb/hr
NMHC lb/hr =			**1.25** lb/hr
NMHC lb/load =			**0.50** lb/load
NMHC ton/load			**2.50E-04** ton/load

Emission Rate Calculation Sheet
Total Hydrocarbon Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012 12:02:23 PM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012 12:26:23 PM
Truck No. :	5	**Load Time (hours):**	0.42

Average Concentration:		3,361 ppmvw
Average Flow Rate:		44 scfm
Molecular Weight:	Propane	44.09 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM)	=	**6160.54** mg/m^3
mg/SCF =	(mg/m^3) (m^3/35.31 SCF)	=	**174.47** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**3.85E-04** lb/SCF
THC lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**1.02** lb/hr
CH4 lb/hr =	(lb/SCF * SCFM * 60 min/hr)		**0.048** lb/hr
NMHC lb/hr =			**0.97** lb/hr
NMHC lb/load =			**0.41** lb/load
NMHC ton/load			**2.03E-04** ton/load

Emission Rate Calculation Sheet
Total Hydrocarbon Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012 12:34:23 PM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012 12:59:23 PM
Truck No. :	6	**Load Time (hours):**	0.43

Average Concentration:		3,531 ppmvw
Average Flow Rate:		43 scfm
Molecular Weight:	Propane	44.09 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM)	=	**6471.28** mg/m^3
mg/SCF =	(mg/m^3) (m^3/35.31 SCF)	=	**183.27** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**4.04E-04** lb/SCF
THC lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**1.03** lb/hr
CH4 lb/hr =	(lb/SCF * SCFM * 60 min/hr)		**0.045** lb/hr
NMHC lb/hr =			**0.99** lb/hr
NMHC lb/load =			**0.43** lb/load
NMHC ton/load			**2.14E-04** ton/load

Emission Rate Calculation Sheet
Total Hydrocarbon Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012 1:08:23 PM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012 1:33:23 PM
Truck No. :	7	**Load Time (hours):**	0.43

Average Concentration:		3,178 ppmvw
Average Flow Rate:		43 scfm
Molecular Weight:	Propane	44.09 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM)	=	**5825.75** mg/m^3
mg/SCF =	(mg/m^3) (m^3/35.31 SCF)	=	**164.99** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**3.64E-04** lb/SCF
THC lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**0.93** lb/hr
CH4 lb/hr =	(lb/SCF * SCFM * 60 min/hr)		**0.038** lb/hr
NMHC lb/hr =			**0.89** lb/hr
NMHC lb/load =			**0.39** lb/load
NMHC ton/load			**1.93E-04** ton/load

Emission Rate Calculation Sheet
Total Hydrocarbon Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012 1:43:23 PM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012 2:07:23 PM
Truck No. :	8	**Load Time (hours):**	0.42

Average Concentration:		3,320 ppmvw
Average Flow Rate:		44 scfm
Molecular Weight:	Propane	44.09 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM)	=	**6085.98** mg/m^3
mg/SCF =	(mg/m^3) (m^3/35.31 SCF)	=	**172.36** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**3.80E-04** lb/SCF
THC lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**1.01** lb/hr
CH4 lb/hr =	(lb/SCF * SCFM * 60 min/hr)		**0.034** lb/hr
NMHC lb/hr =			**0.98** lb/hr
NMHC lb/load =			**0.41** lb/load
NMHC ton/load			**2.04E-04** ton/load

Emission Rate Calculation Sheet
Total Hydrocarbon Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012 2:23:23 PM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012 2:46:23 PM
Truck No. :	9	**Load Time (hours):**	0.40

Average Concentration:		3,264 ppmvw
Average Flow Rate:		46 scfm
Molecular Weight:	Propane	44.09 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM)	=	**5982.45** mg/m^3
mg/SCF =	(mg/m^3) (m^3/35.31 SCF)	=	**169.43** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**3.74E-04** lb/SCF
THC lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**1.04** lb/hr
CH4 lb/hr =	(lb/SCF * SCFM * 60 min/hr)		**0.045** lb/hr
NMHC lb/hr =			**0.99** lb/hr
NMHC lb/load =			**0.40** lb/load
NMHC ton/load			**1.98E-04** ton/load

Emission Rate Calculation Sheet
Total Hydrocarbon Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012 2:55:23 PM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012 3:19:23 PM
Truck No. :	10	**Load Time (hours):**	0.42

Average Concentration:		3,186 ppmvw
Average Flow Rate:		44 scfm
Molecular Weight:	Propane	44.09 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM)	=	**5839.20** mg/m^3
mg/SCF =	(mg/m^3) (m^3/35.31 SCF)	=	**165.37** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**3.65E-04** lb/SCF
THC lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**0.97** lb/hr
CH4 lb/hr =	(lb/SCF * SCFM * 60 min/hr)		**0.034** lb/hr
NMHC lb/hr =			**0.94** lb/hr
NMHC lb/load =			**0.39** lb/load
NMHC ton/load			**1.95E-04** ton/load

Emission Rate Calculation Sheet
Methane Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012	7:21:23 AM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012	7:46:23 AM
Truck No. :	1	**Load Time (hours):**	0.43	

Average Concentration:		969 ppmvw
Average Flow Rate:		42.6 scfm
Molecular Weight:	(Methane)	16.04 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM) =		**646.34** mg/m^3
mg/SCF =	(mg/m^3) $(m^3/35.31$ SCF)	=	**18.30** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**4.03543E-05** lb/SCF
lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**0.103** lb/hr

Emission Rate Calculation Sheet
Methane Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012	8:47:23 AM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012	9:11:23 AM
Truck No. :	2	**Load Time (hours):**	0.42	

Average Concentration:	592 ppmvw
Average Flow Rate:	44 scfm
Molecular Weight: (Methane)	16.04 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM)	=	**394.83** mg/m^3
mg/SCF =	(mg/m^3) $(m^3/35.31$ SCF)	=	**11.18** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**2.46512E-05** lb/SCF
lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**0.066** lb/hr

Emission Rate Calculation Sheet
Methane Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012 10:02:23 AM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012 10:32:23 AM
Truck No. :	3	**Load Time (hours):**	0.52

Average Concentration:	465 ppmvw
Average Flow Rate:	36 scfm
Molecular Weight: (Methane)	16.04 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM) =		**310.35** mg/m^3
mg/SCF =	(mg/m^3) $(m^3/35.31$ SCF)	=	**8.79** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**1.93768E-05** lb/SCF
lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**0.042** lb/hr

Emission Rate Calculation Sheet
Methane Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012 11:23:23 AM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012 11:46:23 AM
Truck No. :	4	**Load Time (hours):**	0.40

Average Concentration:		1,577 ppmvw
Average Flow Rate:		46 scfm
Molecular Weight:	(Methane)	16.04 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM) =		**1051.61** mg/m^3
mg/SCF =	(mg/m^3) $(m^3/35.31$ SCF)	=	**29.78** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**6.56573E-05** lb/SCF
lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**0.182** lb/hr

Emission Rate Calculation Sheet
Methane Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012 12:02:23 PM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012 12:26:23 PM
Truck No. :	5	**Load Time (hours):**	0.42

Average Concentration:		435 ppmvw
Average Flow Rate:		44 scfm
Molecular Weight:	(Methane)	16.04 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM)	=	**289.95**	mg/m^3
mg/SCF =	(mg/m^3) $(m^3/35.31$ SCF)	=	**8.21**	mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**1.81033E-05**	lb/SCF
lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**0.048**	lb/hr

Emission Rate Calculation Sheet
Methane Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012 12:34:23 PM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012 12:59:23 PM
Truck No. :	6	**Load Time (hours):**	0.43

Average Concentration:		423 ppmvw
Average Flow Rate:		43 scfm
Molecular Weight:	(Methane)	16.04 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM) =		**281.74** mg/m^3
mg/SCF =	(mg/m^3) (m^3/35.31 SCF)	=	**7.98** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**1.75904E-05** lb/SCF
lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**0.045** lb/hr

Emission Rate Calculation Sheet
Methane Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012	1:08:23 PM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012	1:33:23 PM
Truck No. :	7	**Load Time (hours):**	0.43	

Average Concentration:		360 ppmvw
Average Flow Rate:		43 scfm
Molecular Weight:	(Methane)	16.04 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM)	=	**240.23** mg/m^3
mg/SCF =	(mg/m^3) $(m^3/35.31$ SCF)	=	**6.80** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**1.49988E-05** lb/SCF
lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**0.038** lb/hr

Emission Rate Calculation Sheet
Methane Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012 1:43:23 PM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012 2:07:23 PM
Truck No. :	8	**Load Time (hours):**	0.42

Average Concentration:		306 ppmvw
Average Flow Rate:		44 scfm
Molecular Weight:	(Methane)	16.04 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM) =		**204.26** mg/m^3
mg/SCF =	(mg/m^3) $(m^3/35.31$ SCF)	=	**5.78** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**1.27533E-05** lb/SCF
lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**0.034** lb/hr

Emission Rate Calculation Sheet
Methane Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012 2:23:23 PM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012 2:46:23 PM
Truck No. :	9	**Load Time (hours):**	0.40

Average Concentration:		387 ppmvw
Average Flow Rate:		46 scfm
Molecular Weight:	(Methane)	16.04 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM)	=	**257.80** mg/m^3
mg/SCF =	(mg/m^3) $(m^3/35.31$ SCF)	=	**7.30** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**1.6096E-05** lb/SCF
lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**0.045** lb/hr

Emission Rate Calculation Sheet
Methane Emissions

Facility :	Sprague Searsport	**Start Date/Time:**	7/31/2012 2:55:23 PM
Source/Location:	Residual Oil Loading Rack	**End Date/Time:**	7/31/2012 3:19:23 PM
Truck No. :	10	**Load Time (hours):**	0.42

Average Concentration:	311 ppmvw
Average Flow Rate:	44 scfm
Molecular Weight: (Methane)	16.04 g/mole

mg/m^3 =	(MW * PPM) / (24.055 l/mol. PPM) =		**207.52** mg/m^3
mg/SCF =	(mg/m^3) (m^3/35.31 SCF)	=	**5.88** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**1.29563E-05** lb/SCF
lb/hr =	(lb/SCF * SCFM * 60 min/hr)	=	**0.034** lb/hr

Instrumental Analyzer Monitoring Data

Facility/Site:	Sprague Searsport
Source:	Residual Oil Loading Rack
Truck	1
Start Date/Time:	7/31/2012 7:21:23 AM
End Date/Time:	7/31/2012 7:46:23 AM
Fill Minutes	26

Date	Time	THC (Propane) (ppm)	Methane (ppm)
7/31/2012	7:21:23 AM	1689	404
7/31/2012	7:22:23 AM	3223	404
7/31/2012	7:23:23 AM	4173	649
7/31/2012	7:24:23 AM	4559	813
7/31/2012	7:25:23 AM	4533	813
7/31/2012	7:26:23 AM	4390	938
7/31/2012	7:27:23 AM	4387	1021
7/31/2012	7:28:23 AM	4424	1021
7/31/2012	7:29:23 AM	4443	1022
7/31/2012	7:30:23 AM	4445	1023
7/31/2012	7:31:23 AM	4528	1023
7/31/2012	7:32:23 AM	4570	1023
7/31/2012	7:33:23 AM	4575	1023
7/31/2012	7:34:23 AM	4666	1023
7/31/2012	7:35:23 AM	4673	484
7/31/2012	7:36:23 AM	4635	1133
7/31/2012	7:37:23 AM	4639	1245
7/31/2012	7:38:23 AM	4605	1203
7/31/2012	7:39:23 AM	4549	1175
7/31/2012	7:40:23 AM	4535	1175
7/31/2012	7:41:23 AM	4490	1124
7/31/2012	7:42:23 AM	4516	1090
7/31/2012	7:43:23 AM	4531	1090
7/31/2012	7:44:23 AM	4577	1093
7/31/2012	7:45:23 AM	4581	1095
7/31/2012	7:46:23 AM	4621	1095

Averages	4368	969

Instrumental Analyzer Monitoring Data

Facility/Site:	Sprague Searsport
Source:	Residual Oil Loading Rack
Truck	2
Start Date/Time:	7/31/2012 8:47:23 AM
End Date/Time:	7/31/2012 9:11:23 AM
Fill Minutes	25

Date	Time	THC (Propane) (ppm)	Methane (ppm)
7/31/2012	8:47:23 AM	2592	102
7/31/2012	8:48:23 AM	3162	160
7/31/2012	8:49:23 AM	3355	160
7/31/2012	8:50:23 AM	3599	328
7/31/2012	8:51:23 AM	3704	425
7/31/2012	8:52:23 AM	3769	425
7/31/2012	8:53:23 AM	3840	511
7/31/2012	8:54:23 AM	3864	560
7/31/2012	8:55:23 AM	3943	560
7/31/2012	8:56:23 AM	3882	633
7/31/2012	8:57:23 AM	3868	675
7/31/2012	8:58:23 AM	3942	675
7/31/2012	8:59:23 AM	4002	691
7/31/2012	9:00:23 AM	4086	700
7/31/2012	9:01:23 AM	4164	700
7/31/2012	9:02:23 AM	4153	719
7/31/2012	9:03:23 AM	4220	730
7/31/2012	9:04:23 AM	4316	730
7/31/2012	9:05:23 AM	4262	781
7/31/2012	9:06:23 AM	4194	810
7/31/2012	9:07:23 AM	4131	810
7/31/2012	9:08:23 AM	4155	756
7/31/2012	9:09:23 AM	4126	725
7/31/2012	9:10:23 AM	4148	725
7/31/2012	9:11:23 AM	4128	712
Averages		3904	592

Instrumental Analyzer Monitoring Data

Facility/Site:	**Sprague Searsport**
Source:	**Residual Oil Loading Rack**
Truck	**3**
Start Date/Time:	**7/31/2012 10:02:23 AM**
End Date/Time:	**7/31/2012 10:32:23 AM**
Fill Minutes	**31**

Date	Time	THC (Propane) (ppm)	Methane (ppm)
7/31/2012	10:02:23 AM	1264	
7/31/2012	10:03:23 AM	2440	
7/31/2012	10:04:23 AM	3196	
7/31/2012	10:05:23 AM	3560	233
7/31/2012	10:06:23 AM	3629	340
7/31/2012	10:07:23 AM	3638	340
7/31/2012	10:08:23 AM	3657	377
7/31/2012	10:09:23 AM	3572	395
7/31/2012	10:10:23 AM	3573	395
7/31/2012	10:11:23 AM	3242	419
7/31/2012	10:12:23 AM	3342	430
7/31/2012	10:13:23 AM	3505	430
7/31/2012	10:14:23 AM	3598	444
7/31/2012	10:15:23 AM	3676	450
7/31/2012	10:16:23 AM	3779	450
7/31/2012	10:17:23 AM	3849	527
7/31/2012	10:18:23 AM	3917	565
7/31/2012	10:19:23 AM	3960	565
7/31/2012	10:20:23 AM	3964	572
7/31/2012	10:21:23 AM	3907	575
7/31/2012	10:22:23 AM	3927	575
7/31/2012	10:23:23 AM	3936	532
7/31/2012	10:24:23 AM	4047	510
7/31/2012	10:25:23 AM	4108	510
7/31/2012	10:26:23 AM	4141	524
7/31/2012	10:27:23 AM	4174	530
7/31/2012	10:28:23 AM	4089	530
7/31/2012	10:29:23 AM	3703	497
7/31/2012	10:30:23 AM	3329	480
7/31/2012	10:31:23 AM	2980	480
7/31/2012	10:32:23 AM	2742	357
Averages		3563	465

Instrumental Analyzer Monitoring Data

Facility/Site:	Sprague Searsport
Source:	Residual Oil Loading Rack
Truck	4
Start Date/Time:	7/31/2012 11:23:23 AM
End Date/Time:	7/31/2012 11:46:23 AM
Fill Minutes	24

Date	Time	THC (Propane) (ppm)	Methane (ppm)
7/31/2012	11:23:23 AM	3074	744
7/31/2012	11:24:23 AM	4153	1115
7/31/2012	11:25:23 AM	4578	1115
7/31/2012	11:26:23 AM	4627	1434
7/31/2012	11:27:23 AM	4698	1590
7/31/2012	11:28:23 AM	4684	1590
7/31/2012	11:29:23 AM	4662	1662
7/31/2012	11:30:23 AM	4710	1695
7/31/2012	11:31:23 AM	4685	1695
7/31/2012	11:32:23 AM	4737	1747
7/31/2012	11:33:23 AM	4642	1770
7/31/2012	11:34:23 AM	4648	1770
7/31/2012	11:35:23 AM	4594	1798
7/31/2012	11:36:23 AM	4575	1810
7/31/2012	11:37:23 AM	4545	1810
7/31/2012	11:38:23 AM	4380	1765
7/31/2012	11:39:23 AM	4436	1745
7/31/2012	11:40:23 AM	4456	1745
7/31/2012	11:41:23 AM	4468	1577
7/31/2012	11:42:23 AM	4458	1505
7/31/2012	11:43:23 AM	4535	1505
7/31/2012	11:44:23 AM	4593	1543
7/31/2012	11:45:23 AM	4743	1560
7/31/2012	11:46:23 AM	4811	1560

Averages	4521	1577

Instrumental Analyzer Monitoring Data

Facility/Site:	Sprague Searsport
Source:	Residual Oil Loading Rack
Truck	5
Start Date/Time:	7/31/2012 12:02:23 PM
End Date/Time:	7/31/2012 12:26:23 PM
Fill Minutes	25

Date Time	THC (Propane) (ppm)	Methane (ppm)
7/31/2012 12:02:23 PM	2259	144
7/31/2012 12:03:23 PM	2630	205
7/31/2012 12:04:23 PM	2977	205
7/31/2012 12:05:23 PM	3161	328
7/31/2012 12:06:23 PM	3292	380
7/31/2012 12:07:23 PM	3330	380
7/31/2012 12:08:23 PM	3243	443
7/31/2012 12:09:23 PM	3279	470
7/31/2012 12:10:23 PM	3256	470
7/31/2012 12:11:23 PM	3357	463
7/31/2012 12:12:23 PM	3439	460
7/31/2012 12:13:23 PM	3506	460
7/31/2012 12:14:23 PM	3555	527
7/31/2012 12:15:23 PM	3580	555
7/31/2012 12:16:23 PM	3611	555
7/31/2012 12:17:23 PM	3661	513
7/31/2012 12:18:23 PM	3645	495
7/31/2012 12:19:23 PM	3628	495
7/31/2012 12:20:23 PM	3519	506
7/31/2012 12:21:23 PM	3538	510
7/31/2012 12:22:23 PM	3521	510
7/31/2012 12:23:23 PM	3529	465
7/31/2012 12:24:23 PM	3536	445
7/31/2012 12:25:23 PM	3608	445
7/31/2012 12:26:23 PM	3368	442
Averages	3361	435

Instrumental Analyzer Monitoring Data

Facility/Site:	Sprague Searsport
Source:	Residual Oil Loading Rack
Truck	6
Start Date/Time:	7/31/2012 12:34:23 PM
End Date/Time:	7/31/2012 12:59:23 PM
Fill Minutes	26

Date	Time	THC (Propane) (ppm)	Methane (ppm)
7/31/2012	12:34:23 PM	2496	
7/31/2012	12:35:23 PM	3161	193
7/31/2012	12:36:23 PM	3465	275
7/31/2012	12:37:23 PM	3609	275
7/31/2012	12:38:23 PM	3682	370
7/31/2012	12:39:23 PM	3711	410
7/31/2012	12:40:23 PM	3758	410
7/31/2012	12:41:23 PM	3811	456
7/31/2012	12:42:23 PM	3800	475
7/31/2012	12:43:23 PM	3766	475
7/31/2012	12:44:23 PM	3830	486
7/31/2012	12:45:23 PM	3697	490
7/31/2012	12:46:23 PM	3659	490
7/31/2012	12:47:23 PM	3616	497
7/31/2012	12:48:23 PM	3603	500
7/31/2012	12:49:23 PM	3586	500
7/31/2012	12:50:23 PM	3561	469
7/31/2012	12:51:23 PM	3560	455
7/31/2012	12:52:23 PM	3501	455
7/31/2012	12:53:23 PM	3498	399
7/31/2012	12:54:23 PM	3547	375
7/31/2012	12:55:23 PM	3606	375
7/31/2012	12:56:23 PM	3656	417
7/31/2012	12:57:23 PM	3675	435
7/31/2012	12:58:23 PM	3593	435
7/31/2012	12:59:23 PM	2350	446
Averages		3531	423

Instrumental Analyzer Monitoring Data

Facility/Site:	Sprague Searsport
Source:	Residual Oil Loading Rack
Truck	7
Start Date/Time:	7/31/2012 1:08:23 PM
End Date/Time:	7/31/2012 1:33:23 PM
Fill Minutes	26

Date	Time	THC (Propane) (ppm)	Methane (ppm)
7/31/2012	1:08:23 PM	1487	47
7/31/2012	1:09:23 PM	2066	65
7/31/2012	1:10:23 PM	2434	65
7/31/2012	1:11:23 PM	2681	198
7/31/2012	1:12:23 PM	2891	250
7/31/2012	1:13:23 PM	3004	250
7/31/2012	1:14:23 PM	3188	334
7/31/2012	1:15:23 PM	3279	365
7/31/2012	1:16:23 PM	3363	365
7/31/2012	1:17:23 PM	3403	416
7/31/2012	1:18:23 PM	3429	435
7/31/2012	1:19:23 PM	3474	435
7/31/2012	1:20:23 PM	3512	465
7/31/2012	1:21:23 PM	3506	475
7/31/2012	1:22:23 PM	3523	475
7/31/2012	1:23:23 PM	3446	475
7/31/2012	1:24:23 PM	3591	475
7/31/2012	1:25:23 PM	3585	475
7/31/2012	1:26:23 PM	3523	479
7/31/2012	1:27:23 PM	3421	480
7/31/2012	1:28:23 PM	3396	480
7/31/2012	1:29:23 PM	3372	400
7/31/2012	1:30:23 PM	3319	370
7/31/2012	1:31:23 PM	3363	370
7/31/2012	1:32:23 PM	3419	363
7/31/2012	1:33:23 PM	2965	360
Averages		3178	360

Instrumental Analyzer Monitoring Data

Facility/Site:	Sprague Searsport
Source:	Residual Oil Loading Rack
Truck	8
Start Date/Time:	7/31/2012 1:43:23 PM
End Date/Time:	7/31/2012 2:07:23 PM
Fill Minutes	25

Date	Time	THC (Propane) (ppm)	Methane (ppm)
7/31/2012	1:43:23 PM	2112	
7/31/2012	1:44:23 PM	2786	133
7/31/2012	1:45:23 PM	3151	180
7/31/2012	1:46:23 PM	3330	180
7/31/2012	1:47:23 PM	3400	301
7/31/2012	1:48:23 PM	3420	345
7/31/2012	1:49:23 PM	3464	345
7/31/2012	1:50:23 PM	3478	367
7/31/2012	1:51:23 PM	3453	375
7/31/2012	1:52:23 PM	3419	375
7/31/2012	1:53:23 PM	3423	368
7/31/2012	1:54:23 PM	3416	365
7/31/2012	1:55:23 PM	3382	365
7/31/2012	1:56:23 PM	3373	351
7/31/2012	1:57:23 PM	3329	345
7/31/2012	1:58:23 PM	3351	345
7/31/2012	1:59:23 PM	3348	305
7/31/2012	2:00:23 PM	3342	290
7/31/2012	2:01:23 PM	3376	290
7/31/2012	2:02:23 PM	3345	290
7/31/2012	2:03:23 PM	3386	290
7/31/2012	2:04:23 PM	3446	290
7/31/2012	2:05:23 PM	3459	287
7/31/2012	2:06:23 PM	3504	285
7/31/2012	2:07:23 PM	3518	285
Averages		3320	306

Instrumental Analyzer Monitoring Data

Facility/Site:	Sprague Searsport
Source:	Residual Oil Loading Rack
Truck	9
Start Date/Time:	7/31/2012 2:23:23 PM
End Date/Time:	7/31/2012 2:46:23 PM
Fill Minutes	24

Date	Time	THC (Propane) (ppm)	Methane (ppm)
7/31/2012	2:23:23 PM	2285	122
7/31/2012	2:24:23 PM	2699	165
7/31/2012	2:25:23 PM	2894	165
7/31/2012	2:26:23 PM	3070	275
7/31/2012	2:27:23 PM	3183	315
7/31/2012	2:28:23 PM	3269	315
7/31/2012	2:29:23 PM	3366	396
7/31/2012	2:30:23 PM	3441	425
7/31/2012	2:31:23 PM	3450	425
7/31/2012	2:32:23 PM	3414	469
7/31/2012	2:33:23 PM	3469	485
7/31/2012	2:34:23 PM	3495	485
7/31/2012	2:35:23 PM	3491	493
7/31/2012	2:36:23 PM	3472	495
7/31/2012	2:37:23 PM	3479	495
7/31/2012	2:38:23 PM	3415	473
7/31/2012	2:39:23 PM	3397	465
7/31/2012	2:40:23 PM	3355	465
7/31/2012	2:41:23 PM	3305	421
7/31/2012	2:42:23 PM	3244	405
7/31/2012	2:43:23 PM	3246	405
7/31/2012	2:44:23 PM	3269	380
7/31/2012	2:45:23 PM	3312	370
7/31/2012	2:46:23 PM	3315	370
Averages		3264	387

Instrumental Analyzer Monitoring Data

Facility/Site:	Sprague Searsport
Source:	Residual Oil Loading Rack
Truck	10
Start Date/Time:	7/31/2012 2:55:23 PM
End Date/Time:	7/31/2012 3:19:23 PM
Fill Minutes	25

Date	Time	THC (Propane) (ppm)	Methane (ppm)
7/31/2012	2:55:23 PM	2156	
7/31/2012	2:56:23 PM	2708	138
7/31/2012	2:57:23 PM	2950	180
7/31/2012	2:58:23 PM	3083	180
7/31/2012	2:59:23 PM	3221	287
7/31/2012	3:00:23 PM	3295	321
7/31/2012	3:01:23 PM	3311	321
7/31/2012	3:02:23 PM	3319	366
7/31/2012	3:03:23 PM	3350	380
7/31/2012	3:04:23 PM	3344	380
7/31/2012	3:05:23 PM	3394	384
7/31/2012	3:06:23 PM	3421	385
7/31/2012	3:07:23 PM	3366	385
7/31/2012	3:08:23 PM	3309	370
7/31/2012	3:09:23 PM	3314	365
7/31/2012	3:10:23 PM	3285	365
7/31/2012	3:11:23 PM	3275	331
7/31/2012	3:12:23 PM	3253	321
7/31/2012	3:13:23 PM	3218	321
7/31/2012	3:14:23 PM	3211	286
7/31/2012	3:15:23 PM	3189	275
7/31/2012	3:16:23 PM	3223	275
7/31/2012	3:17:23 PM	3275	283
7/31/2012	3:18:23 PM	3295	285
7/31/2012	3:19:23 PM	2880	285
Averages		3186	311