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**PREPARED FOR:**

Mr. Keith Moreland  
CDM

**A. INFORMATION PROVIDED BY CATERPILLAR**

Engine:	G3516 LE
DIM Sheet:	DM8618-00
Compression Ratio:	8.0:1
Load:	100%
RPM:	1400
Horsepower:	1340
Fuel:	Natural Gas
Piping size:	14"
Annual Operating Hours:	8760
Exhaust Flow:	7664 CFM
Exhaust Temperature:	13132 °F
Allowable Engine Backpressure:	27" WC

**Emission Data**

NO <sub>x</sub> :	1.50	g/bhp-hr
CO:	1.86	g/bhp-hr
THC:	2.64	g/bhp-hr
NMNEHC (VOC's):	0.26	g/bhp-hr
HCHO:	0.26	g/bhp-hr
Oxygen:	8.10	%

**B. POST CATALYST EMISSIONS TO BE ACHIEVED BY EMISSION CONTROL EQUIPMENT**

NO <sub>x</sub> :	Unaffected by Oxidation Catalyst
CO:	0.18 g/bhp-hr
VOC:	0.13 g/bhp-hr
HCHO:	0.026 g/bhp-hr

## C. CONTROL EQUIPMENT

### CATALYTIC CONVERTER/SILENCER UNIT

Model	201V0-3-6112
Catalyst Type	Oxidation, Precious group metals
Manufacturer	GT Exhaust Systems, Inc.
Catalyst Elements	0
Catalyst Installation	Accessible Housing
Configuration	Assume End In / End Out
Silencer	Integrated

### CATALYST ELEMENT

Model	RT-2515-Z
Catalyst Type	Oxidation, Precious group metals
Manufacturer	EMIT Technologies, Inc.
Element Size	24.75" x 15.44" x 3.5"
Element Shape	Rectangle
Quantity Required	2

#### D. WARRANTY

EMIT Technologies, Inc. warrants that the goods supplied will be free from defects in workmanship by EMIT Technologies, Inc. for a period of one (1) year from date of shipment. EMIT Technologies, Inc. will not be responsible for any defects which result from improper use, neglect, failure to properly maintain or which are attributable to defects, errors or omissions in any drawings, specifications, plans or descriptions, whether written or oral, supplied to EMIT Technologies, Inc. by Buyer.

Catalyst performance will be guaranteed for a period of 1 year from installation, or 8760 operating hours, whichever comes first. The catalyst shall be operated with an automatic air/fuel ratio controller. The performance guarantee shall not cover the effects of excessive ash masking due to operation at low load, improper engine maintenance, or inappropriate lubrication oil. The performance guarantee shall not cover the effects of continuous engine misfires (cylinder or ignition) exposing the catalyst to excessive exothermic reaction temperatures.

The exhaust temperature operating range at the converter inlet is 600°F minimum for oxidation catalyst and 750 °F for NSCR catalyst and 1250°F maximum.

If a high temperature shut down switch is not installed, thermal deactivation of catalyst at temperatures above 1300 °F is not covered.

The catalyst conversion efficiencies (% reduction) will be guaranteed for engine loads of 50 to 100 percent.

Engine lubrication oil shall contain less than 0.6% ash (by weight) with a maximum allowable specific oil consumption of 0.01 gal/bhp-hr. The maximum ash loading on the catalyst shall be limited to 350 g/m<sup>3</sup>. Phosphorous and zinc additives are limited to 0.03% (by weight).

The catalyst must not be exposed to the following know poisoning agents, including: iron, nickel, sodium, chromium, arsenic, zinc, lead, phosphorous, silicon, potassium, magnesium, copper, tin, and mercury. Total poison concentrations in the gas are limited to 0.3 ppm.

**ATTACHMENT D-2**  
**SUPPORTING DOCUMENTS**

**MODELING OUTPUT**

**DEHYDRATION UNITS**

- GRI-GLYCalc V4.0 – 25 MMscfd Dehydration Unit

**STORAGE TANKS**

- E+P TANK V2.0 – 150 bbl Tanks (2X)
- E+P TANK V2.0 – 100 bbl Tank
- E+P TANK V2.0 – 24 bbl Tank

## GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Springhill Dehy PTE Emissions

File Name: C:\Documents and Settings\kmaley\My Documents\LMM\Applications and Permits\Springhill\05-2011\Springhill PTE Emissions 05-25-2011.ddf

Date: June 03, 2011

## DESCRIPTION:

Description: Springhill Compressor Station 25MMscfd TEG  
dehydrator. Anticipated worst-case  
operating parameters. October 2010 extended  
gas analysis.

Annual Hours of Operation: 8760.0 hours/yr

## WET GAS:

Temperature: 70.00 deg. F  
Pressure: 800.00 psig  
Wet Gas Water Content: Saturated

Component	Conc. (vol %)
Carbon Dioxide	0.2350
Nitrogen	0.4510
Methane	96.7360
Ethane	2.2410
Propane	0.2080
Isobutane	0.0300
n-Butane	0.0430
Isopentane	0.0160
n-Pentane	0.0120
n-Hexane	0.0042
Cyclohexane	0.0005
Other Hexanes	0.0079
Heptanes	0.0053
Benzene	0.0001
Toluene	0.0001
Xylenes	0.0001
C8+ Heavies	0.0100

## DRY GAS:

Flow Rate: 25.0 MMSCF/day  
Water Content: 7.0 lbs. H2O/MMSCF

## LEAN GLYCOL:

Glycol Type: TEG  
Water Content: 1.5 wt% H2O  
Flow Rate: 3.5 gpm

## PUMP:

Glycol Pump Type: Gas Injection  
Gas Injection Pump Volume Ratio: 0.080 acfm gas/gpm glycol

## GRI-GLYCalc VERSION 4.0 - EMISSIONS SUMMARY

Case Name: Springhill Dehy PTE Emissions

File Name: C:\Documents and Settings\kmaley\My Documents\LMM\Applications and Permits\Springhill\05-2011\Springhill PTE Emissions 05-25-2011.ddf

Date: June 03, 2011

## UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	46.3385	1112.123	202.9624
Ethane	2.5899	62.157	11.3437
Propane	0.4333	10.400	1.8979
Isobutane	0.1004	2.410	0.4398
n-Butane	0.1714	4.114	0.7507
Isopentane	0.0814	1.955	0.3567
n-Pentane	0.0740	1.776	0.3241
n-Hexane	0.0477	1.145	0.2090
Cyclohexane	0.0213	0.510	0.0931
Other Hexanes	0.0713	1.710	0.3121
Heptanes	0.1247	2.993	0.5462
Benzene	0.0357	0.856	0.1562
Toluene	0.0632	1.517	0.2769
Xylenes	0.1236	2.967	0.5415
C8+ Heavies	0.7753	18.608	3.3959
Total Emissions	51.0517	1225.240	223.6064
Total Hydrocarbon Emissions	51.0517	1225.240	223.6064
Total VOC Emissions	2.1233	50.960	9.3002
Total HAP Emissions	0.2702	6.485	1.1836
Total BTEX Emissions	0.2225	5.340	0.9745

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*****
*      Project Setup Information      *
*****
Project File       : \\tsclient\C\projects2\wfs\LMM\Springhill\Springhill 150 bbl Produced Water Tank.ept
Flowsheet Selection : Oil Tank with Separator
Calculation Method  : AP42
Control Efficiency  : 100.0%
Known Separator Stream : Low Pressure Oil
Entering Air Composition : No

Filed Name         : Marcellus Shale
Well Name          : Springhill Compressor Station
Well ID            : 150 bbl Produced Water Tank
Date               : 2011.05.31

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*****
*      Data Input                    *
*****
Separator Pressure : 23.00[psig]
Separator Temperature : 60.00[F]
Ambient Pressure    : 14.70[psia]
Ambient Temperature : 70.00[F]
C10+ SG             : 0.8990
C10+ MW             : 166.00

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-- Low Pressure Oil -----
No.   Component      mol %
1     H2S             0.0298
2     O2              0.0000
3     CO2             0.0813
4     N2              0.0006
5     C1              0.1429
6     C2              0.3200
7     C3              1.6601
8     i-C4            1.0163
9     n-C4            4.3102
10    i-C5            3.0783
11    n-C5            5.0568
12    C6              4.2584
13    C7              10.6399
14    C8              11.1525
15    C9              5.6739
16    C10+            47.3307
17    Benzene         0.5815
18    Toluene         0.2191
19    E-Benzene       0.0732
20    Xylenes         0.6999
21    n-C6            3.6746
22    224Trimethylp   0.0000

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-- Sales Oil -----
Production Rate      : 5.8[bbl/day]
Days of Annual Operation : 365 [days/year]
API Gravity          : 46.0
Reid Vapor Pressure  : 7.70[psia]
Bulk Temperature     : 60.00[F]

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-- Tank and Shell Data -----
Diameter             : 10.00[ft]
Shell Height         : 15.00[ft]
Cone Roof Slope      : 0.06
Average Liquid Height : 6.00[ft]
Vent Pressure Range   : 0.06[psi]
Solar Absorbance     : 0.89

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