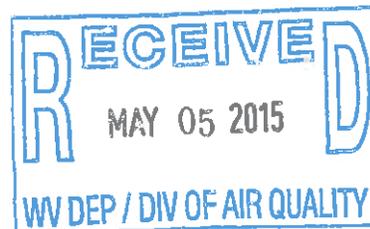


Ed  
13-28780  
103-00042



MarkWest Energy Appalachia, L.L.C.  
1515 Arapahoe Street  
Tower 1, Suite 1600  
Denver, CO 80202-2137  
(800) 730-8388  
(303) 290-8700  
(303) 825-0920 Fax



May 1, 2015

Mr. Fred Durham, Director  
West Virginia Department of Environmental Protection  
Division of Air Quality  
Charleston, WV 25304

**Re: MarkWest Liberty Midstream & Resources L.L.C.  
Mobley Gas Plant  
Application for Modification Permit (R13-2878C)**

Dear Mr. Benedict:

MarkWest Liberty Midstream & Resources L.L.C. (MarkWest) is submitting the enclosed Modification application in accordance with the West Virginia Air Pollution Control Act and Title 45 Series 13 (45CSR13) for the Mobley Gas Plant in Wetzel County.

This package contains the required application forms, emission calculations and supporting documentation for the referenced project. A check in the amount of \$2,000 for the Modification Permit fee is included with this application. The public notice for the proposed construction will be published in *The Wetzel Chronicle*. MarkWest will forward the Affidavit of Publication to your attention once it is received from the publisher.

If you have any questions or comments, please call me (303) 542-0686 or e-mail [nwheldon@markwest.com](mailto:nwheldon@markwest.com) at your earliest convenience.

Sincerely,

A handwritten signature in black ink that reads "Nathan M. Wheldon".

Nathan M. Wheldon, P.E.  
Environmental Manager

Enclosures (Original + Three Copies)

**MARKWEST LIBERTY MIDSTREAM & RESOURCES L.L.C.**

**MOBLEY GAS PLANT**

---

**45CSR13 NSR PERMIT MODIFICATION APPLICATION**

**SUBMITTED TO WVDEP DIVISION OF AIR QUALITY  
May 2015**

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## INTRODUCTION

MarkWest Liberty Midstream & Resources L.L.C. (MarkWest) requests authorization for a Modification Permit for the Mobley Gas Plant (Permit R13-2878B), in accordance with the West Virginia Air Pollution Control Act and Title 45 Series 13 (45CSR13).

### **Project Description**

The Mobley Gas Plant is currently used for processing natural gas and is capable of doing so at a rate of 765 mmscf/d. MarkWest intends to build a fifth processing plant, capable of 200 mmscf/d, that will increase facility processing capacity to 965 mmscf/d with a built-in deethanizer to remove ethane from the stream. With this addition, another two heaters will be required: a 7.69 mmBtu/hr regeneration gas heater (H-5741), and one 26.2 mmBtu/hr heat medium oil heater (H-5781) to be shared by the processing plant and deethanizer. Also, the fugitive component counts have been modified and the emission rates for several classes of fugitive components have been updated to reflect the NSPS Subpart OOOO monitoring program that has been implemented at the facility.

### **Proposed Emissions**

Emission calculations for the project are presented in Attachment N. Attachment N includes a summary of the new potential to emit, the previous potential to emit, a summary of the difference, emission calculations for the new heaters, and calculations for the modified fugitive emissions.

**WVDEP APPLICATION FOR NSR PERMIT**

## APPLICATION CHECKLIST

	<p><b>A complete application is demonstrated when all of the information required below is properly prepared, completed and attached. The items listed below are required information which must be submitted with a 45CSR13 permit application. Any submittal will be considered incomplete if the required information is not included. The applicant must submit a complete application in order to receive a 45CSR13 permit.</b></p>
<input checked="" type="checkbox"/>	<p><b>Class I legal advertisement published in a newspaper certified to accept legal advertisements and original affidavit submitted for Class II administrative updates, temporary and relocation permits, and general permit registrations.</b></p>
<input checked="" type="checkbox"/>	<p><b>\$1,000 application fee for construction, modification, relocation or temporary permit; \$300 application fee for Class II administrative update. Additional applicable fees:</b></p> <ul style="list-style-type: none"> <li>• \$1,000 NSPS</li> <li>• \$5,000 Major Modification</li> <li>• \$2,500 NESHAP</li> <li>• \$10,000 Major Construction</li> <li>• \$2,500 45CSR27 Pollutant</li> </ul>
<input checked="" type="checkbox"/>	<p><b>Original and three (3) copies of the application.</b></p>
<input checked="" type="checkbox"/>	<p><b>File organization – application pages are numbered and in correct order, application is bound in some way, etc.</b></p>
<input checked="" type="checkbox"/>	<p><b>Confidential Business Information is properly identified.</b></p>
<input checked="" type="checkbox"/>	<p><b>General application forms signed by a responsible official.</b></p>
	<p><b>Authority form – required if application is signed by someone other than a responsible official – one of the following:</b></p> <ul style="list-style-type: none"> <li>• Authority of Corporation if application is not signed by the President or CEO;</li> <li>• Authority of Partnership if application is not signed by a general partner or proprietor;</li> <li>• Authority of Limited Partnership if application is not signed by general partner or proprietor; or</li> <li>• Authority of Governmental Agency if application is not signed by</li> </ul>

	<b>principal elected officer or ranking elected official.</b>
<input checked="" type="checkbox"/>	<b>Copy of current Business Registration Certificate.</b>
<input checked="" type="checkbox"/>	<b>Process description, including equipment and emission point identification numbers.</b>
<input checked="" type="checkbox"/>	<b>Process flow diagram, including equipment and emission point identification numbers.</b>
<input checked="" type="checkbox"/>	<b>Plot plan, including equipment and emission point identification numbers.</b>
<input checked="" type="checkbox"/>	<b>Area map with directions and location marked.</b>
	<b>Applicable technical forms completed and submitted:</b>
<input checked="" type="checkbox"/>	<ul style="list-style-type: none"><li>• <b>Emission Point Data Summary Sheets</b></li><li>• <b>Emission Unit Data sheets</b></li><li>• <b>Air Pollution Control Device Sheets</b></li><li>• <b>Equipment List Form</b></li></ul>
<input checked="" type="checkbox"/>	<b>Emission calculations – emission factors, references, source identification numbers, etc.</b>



WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION  
**DIVISION OF AIR QUALITY**  
 601 57<sup>th</sup> Street, SE  
 Charleston, WV 25304  
 (304) 926-0475  
[www.dep.wv.gov/daq](http://www.dep.wv.gov/daq)

**APPLICATION FOR NSR PERMIT  
 AND  
 TITLE V PERMIT REVISION  
 (OPTIONAL)**

PLEASE CHECK ALL THAT APPLY TO NSR (45CSR13) (IF KNOWN):

- CONSTRUCTION     MODIFICATION     RELOCATION  
 CLASS I ADMINISTRATIVE UPDATE     TEMPORARY  
 CLASS II ADMINISTRATIVE UPDATE     AFTER-THE-FACT

PLEASE CHECK TYPE OF 45CSR30 (TITLE V) REVISION (IF ANY):

- ADMINISTRATIVE AMENDMENT     MINOR MODIFICATION  
 SIGNIFICANT MODIFICATION

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS ATTACHMENT S TO THIS APPLICATION

**FOR TITLE V FACILITIES ONLY:** Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

**Section I. General**

1. Name of applicant (as registered with the WV Secretary of State's Office): MarkWest Liberty Midstream & Resources, L.L.C		2. Federal Employer ID No. (FEIN): 300528059	
3. Name of facility (if different from above): Mobley Gas Plant		4. The applicant is the: <input type="checkbox"/> OWNER <input type="checkbox"/> OPERATOR <input checked="" type="checkbox"/> BOTH	
5A. Applicant's mailing address: 1515 Arapahoe Street, Tower 1, Suite 1600  Denver, CO 80202-2137		5B. Facility's present physical address:	
6. West Virginia Business Registration. Is the applicant a resident of the State of West Virginia? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO - If YES, provide a copy of the Certificate of Incorporation/Organization/Limited Partnership (one page) including any name change amendments or other Business Registration Certificate as Attachment A. - If NO, provide a copy of the Certificate of Authority/Authority of L.L.C./Registration (one page) including any name change amendments or other Business Certificate as Attachment A.			
7. If applicant is a subsidiary corporation, please provide the name of parent corporation:			
8. Does the applicant own, lease, have an option to buy or otherwise have control of the proposed site? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO - If YES, please explain:    Applicant owns the property. - If NO, you are not eligible for a permit for this source.			
9. Type of plant or facility (stationary source) to be constructed, modified, relocated, administratively updated or temporarily permitted (e.g., coal preparation plant, primary crusher, etc.): Natural gas processing plant		10. North American Industry Classification System (NAICS) code for the facility:  211112	
11A. DAQ Plant ID No. (for existing facilities only): 103-00042		11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only): R13-2878C	

**All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.**

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
- For **Construction** or **Relocation permits**, please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B**.

From W Virginia 20S, turn onto CO Rd 7/8 (2.8 mi), continue onto CO Rd 80 (0.8 mi), turn left onto CO Rd 7/4 (0.4 mi), turn right onto CO Rd 7/4/Sheep Run (0.8 mi). Turn left onto CO Rd 7/7, arrive at destination.

12.B. New site address (if applicable):

14624 North Fork Rd

12C. Nearest city or town:

Smithfield

12D. County:

Wetzel

12.E. UTM Northing (KM): 4378315.20

12F. UTM Easting (KM): 538098.82

12G. UTM Zone: 17S

13. Briefly describe the proposed change(s) at the facility:

Add a third and fourth processing plant with two regeneration gas heaters, one heat medium oil heater and fugitive emissions.

14A. Provide the date of anticipated installation or change: Summer/Fall 2013

- If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: / /

14B. Date of anticipated Start-Up if a permit is granted:

November/December 2013

14C. Provide a **Schedule** of the planned **Installation of/Change** to and **Start-Up** of each of the units proposed in this permit application as **Attachment C** (if more than one unit is involved).

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:

Hours Per Day 24 Days Per Week 7 Weeks Per Year 52

16. Is demolition or physical renovation at an existing facility involved?  YES  NO

17. **Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see [www.epa.gov/ceppo](http://www.epa.gov/ceppo)), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

18. **Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process (*if known*). A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance (*if known*). Provide this information as **Attachment D**.

### **Section II. Additional attachments and supporting documents.**

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

20. Include a **Table of Contents** as the first page of your application package.

21. Provide a **Plot Plan**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as **Attachment E** (Refer to **Plot Plan Guidance**).

- Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F**.

23. Provide a **Process Description as Attachment G.**

- Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

*All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.*

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H.**

- For chemical processes, provide a MSDS for each compound emitted to the air.

25. Fill out the **Emission Units Table** and provide it as **Attachment I.**

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 2)** and provide it as **Attachment J.**

27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as **Attachment K.**

28. Check all applicable **Emissions Unit Data Sheets** listed below:

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> Bulk Liquid Transfer Operations | <input type="checkbox"/> Haul Road Emissions     | <input type="checkbox"/> Quarry  |
| <input type="checkbox"/> Chemical Processes              | <input type="checkbox"/> Hot Mix Asphalt Plant   | <input type="checkbox"/> Solid Materials Sizing, Handling and Storage Facilities |
| <input type="checkbox"/> Concrete Batch Plant            | <input type="checkbox"/> Incinerator             | <input type="checkbox"/> Storage Tanks   |
| <input type="checkbox"/> Grey Iron and Steel Foundry     | <input type="checkbox"/> Indirect Heat Exchanger |  |
- General Emission Unit, specify Process heaters

Fill out and provide the **Emissions Unit Data Sheet(s)** as **Attachment L.**

29. Check all applicable **Air Pollution Control Device Sheets** listed below:

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> Absorption Systems | <input type="checkbox"/> Baghouse                   | <input type="checkbox"/> Flare                 |
| <input type="checkbox"/> Adsorption Systems | <input type="checkbox"/> Condenser                  | <input type="checkbox"/> Mechanical Collector  |
| <input type="checkbox"/> Afterburner        | <input type="checkbox"/> Electrostatic Precipitator | <input type="checkbox"/> Wet Collecting System |
- Other Collectors, specify

Fill out and provide the **Air Pollution Control Device Sheet(s)** as **Attachment M.**

30. Provide all **Supporting Emissions Calculations** as **Attachment N**, or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O.**

- Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and **Example Legal Advertisement** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

33. **Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

- YES       NO

- If YES, identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's "**Precautionary Notice – Claims of Confidentiality**" guidance found in the **General Instructions** as **Attachment Q.**

### Section III. Certification of Information

**34. Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below:

- |  |   |
|--|---|
| <input type="checkbox"/> Authority of Corporation or Other Business Entity | <input type="checkbox"/> Authority of Partnership         |
| <input type="checkbox"/> Authority of Governmental Agency                  | <input type="checkbox"/> Authority of Limited Partnership |

Submit completed and signed **Authority Form** as **Attachment R**.

*All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.*

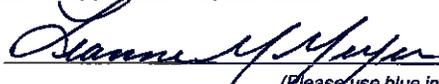
**35A. Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

**Certification of Truth, Accuracy, and Completeness**

I, the undersigned  **Responsible Official** /  **Authorized Representative**, hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

**Compliance Certification**

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE   
*(Please use blue ink)*

DATE: 5-1-15  
*(Please use blue ink)*

35B. Printed name of signee: Leanne Meyer

35C. Title: VP of EH&S

35D. E-mail: lmeyer@markwest.com

35E. Phone: 303-925-9299

35F. FAX: 303-825-0920

36A. Printed name of contact person (if different from above): Nathan Wheldon

36B. Title: Environmental Manager

36C. E-mail:  
nwheldon@markwest.com

36D. Phone: 303-542-0686

36E. FAX: 303-825-0920

**PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:**

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Attachment A: Business Certificate               | <input checked="" type="checkbox"/> Attachment K: Fugitive Emissions Data Summary Sheet |
| <input type="checkbox"/> Attachment B: Map(s)  | <input checked="" type="checkbox"/> Attachment L: Emissions Unit Data Sheet(s)          |
| <input checked="" type="checkbox"/> Attachment C: Installation and Start Up Schedule | <input type="checkbox"/> Attachment M: Air Pollution Control Device Sheet(s)            |
| <input checked="" type="checkbox"/> Attachment D: Regulatory Discussion              | <input checked="" type="checkbox"/> Attachment N: Supporting Emissions Calculations     |
| <input type="checkbox"/> Attachment E: Plot Plan                                     | <input type="checkbox"/> Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans |
| <input type="checkbox"/> Attachment F: Detailed Process Flow Diagram(s)              | <input checked="" type="checkbox"/> Attachment P: Public Notice                         |
| <input checked="" type="checkbox"/> Attachment G: Process Description                | <input type="checkbox"/> Attachment Q: Business Confidential Claims                     |
| <input type="checkbox"/> Attachment H: Material Safety Data Sheets (MSDS)            | <input type="checkbox"/> Attachment R: Authority Forms                                  |
| <input checked="" type="checkbox"/> Attachment I: Emission Units Table               | <input type="checkbox"/> Attachment S: Title V Permit Revision Information              |
| <input checked="" type="checkbox"/> Attachment J: Emission Points Data Summary Sheet | <input checked="" type="checkbox"/> Application Fee                                     |

*Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.*

**FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:**

- Forward 1 copy of the application to the Title V Permitting Group and:**
- For Title V Administrative Amendments:**
  - NSR permit writer should notify Title V permit writer of draft permit,**
- For Title V Minor Modifications:**
  - Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,**
  - NSR permit writer should notify Title V permit writer of draft permit.**
- For Title V Significant Modifications processed in parallel with NSR Permit revision:**
  - NSR permit writer should notify a Title V permit writer of draft permit,**
  - Public notice should reference both 45CSR13 and Title V permits,**
  - EPA has 45 day review period of a draft permit.**

**All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.**

## **ATTACHMENT C: INSTALLATION/START-UP SCHEDULE**

Construction of the fifth plant is expected to commence in the spring 2015. Startup is expected to occur in the fall/winter of 2015.

## **ATTACHMENT D: REGULATORY DISCUSSION**

The following regulations will be applicable for operation of the fifth plant-deethanizer. All requirements on existing equipment are still applicable with one exception. MarkWest had submitted an application to administratively restrict fuel usage to reduce GHG emissions. MarkWest requests that all restrictions on fuel usage be lifted at this time.

### **45 CSR 30 - REQUIREMENTS FOR OPERATING PERMITS:**

Emissions from the fifth plant and deethanizer are not sufficient to trigger PSD requirements. The combination of emissions from the entire facility will exceed 100 tpy of NO<sub>x</sub>; therefore, the facility will be a Title V source. Additionally, the combination of plants will exceed 100,000 tons of CO<sub>2</sub>(e) emission so it will also be a major source of GHG emissions.

### **40 CFR PART 60 SUBPART OOOO – STANDARDS OF PERFORMANCE FOR CRUDE OIL AND NATURAL GAS PRODUCTION, TRANSMISSION, AND DISTRIBUTION:**

This subpart establishes emission standards and compliance schedules for the control of VOC emissions from affected facilities that commence construction, modification or reconstruction after August 23, 2011. As natural gas processing plants constructed after the applicable date, the Mobley V plant will be subject to requirements under this rule. Only portions of the deethanizer will be in VOC service and subject to the rule. Pneumatic controllers at the proposed facilities will be air-driven devices to comply with the rule. In addition, the facilities will be subject to equipment leak standards under §60.5400 - §60.5402.

## **ATTACHMENT G: PROCESS DESCRIPTION**

Mobley Gas Plant V will be similar in service to Mobley Gas Plants I-IV as a natural gas processing plant for gas wells throughout West Virginia. The natural gas will enter one or more molecular sieve(s), designed to remove liquids from the gas stream through contact. Heaters will be employed to regenerate the molecular sieve(s) on a regular basis. After passing through the molecular sieve(s) the gas will be cooled through a cryogenic plant with mechanical refrigeration, which serves to remove propane and heavier hydrocarbons known as natural gas liquids (NGLs) in the gas stream. Dependent upon several market conditions and contractual obligations a portion or all of the recovered liquids will pass through a deethanization tower, which will remove ethane as a purity product from the liquid stream by adding heat and driving the ethane into a gaseous phase. The ethane will be transferred off-site via pipeline to market. The remaining NGLs will be transported via pipeline to another facility; therefore, there will be no on-site liquids storage tanks or loading facilities. The remaining residue gas stream is ready for compression prior to entering the downstream pipeline for transmission/distribution. An existing emergency flare may be used to burn vapors released from emergency and/or upset conditions at the facility.

## ATTACHMENT I: EMISSION UNITS TABLE

## Attachment I

### Emission Units Table

(includes all emission units and air pollution control devices  
that will be part of this permit application review, regardless of permitting status)

Emission Unit ID <sup>1</sup>	Emission Point ID <sup>2</sup>	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type <sup>3</sup> and Date of Change	Control Device <sup>4</sup>
CM-1001	CM-1001	Waukesha P9390 GSI Engine	2012	1,980-hp	Existing	NSCR
CM-1002	CM-1002	Waukesha P9390 GSI Engine	2012	1,980-hp	Existing	NSCR
CM-1003	CM-1003	Waukesha P9390 GSI Engine	2012	1,980-hp	Existing	NSCR
CM-1004	CM-1004	Waukesha P9390 GSI Engine	2012	1,980-hp	Existing	NSCR
CM-1005	CM-1005	Waukesha P9390 GSI Engine	2012	1,980-hp	Existing	NSCR
CM-1006	CM-1006	Waukesha P9390 GSI Engine	2012	1,980-hp	Existing	NSCR
C-102	C-102	Caterpillar G3616 LE Engine	2012	4,735-hp	Existing	Oxid. Cat.
C-103	C-103	Caterpillar G3616 LE Engine	2012	4,735-hp	Existing	Oxid. Cat.
H-741	H-741	Regeneration Gas Heater	2012	6.84 mmBtu/hr	Existing	None
H-781	H-781	Heat Medium Oil Heater	2012	18.05 mmBtu/hr	Existing	None
H-1741	H-1741	Regeneration Gas Heater	2012	8.12 mmBtu/hr	Existing	None
H-1781	H-1781	Heat Medium Oil Heater	2012	26.0 mmBtu/hr	Existing	None
FL-991	FL-991	Emergency Flare	2012	68,600 scf/min	Existing	None
H-3741	H-3741	Regeneration Gas Heater	2013	7.69 mmBtu/hr	Existing	None
H-4741	H-4741	Regeneration Gas Heater	2014	7.69 mmBtu/hr	Existing	None
H-3781	H-3781	Heat Medium Oil Heater	2013	16.07 mmBtu/hr	Existing	None
H-5741	H-5741	Regeneration Gas Heater	Proposed	7.69 mmBtu/hr	New	None
H-5781	H-5781	Heat Medium Oil Heater	Proposed	26.2 mmBtu/hr	New	None
FUG-004	FUG-004	Fugitive Equipment Leaks	Proposed	N/A	Modification	None

<sup>1</sup> For Emission Units (or Sources) use the following numbering system: 1S, 2S, 3S,... or other appropriate designation.

<sup>2</sup> For Emission Points use the following numbering system: 1E, 2E, 3E, ... or other appropriate designation.

<sup>3</sup> New, modification, removal

<sup>4</sup> For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

**ATTACHMENT J: EMISSION POINTS DATA SUMMARY SHEET**

## EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data															
Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type <sup>1</sup>	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		Vent Time for Emission Unit (chemical processes only)		All Regulated Pollutants - Chemical Name/CAS <sup>3</sup> (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions <sup>4</sup>		Maximum Potential Controlled Emissions <sup>5</sup>		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used <sup>6</sup>	Emission Concentration (ppmv or mg/m <sup>4</sup> )
		ID No.	Source	ID No.	Device Type	Short Term <sup>2</sup>	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
H-5741	Upward Vertical Stack	H-5741	H-5741	N/A	None	N/A	N/A	NOx CO VOC PM <sub>10</sub> HAP SO <sub>2</sub>	0.408 0.315 0.041 0.057 0.014 0.005	1.785 1.381 0.182 0.251 0.062 0.020	0.408 0.315 0.041 0.057 0.014 0.005	1.785 1.381 0.182 0.251 0.062 0.020	Gas/Vapor	Manuf. Spec.	—
H-5781	Upward Vertical Stack	H-5781	H-5781	N/A	None	N/A	N/A	NOx CO VOC PM <sub>10</sub> HAP SO <sub>2</sub>	2.569 2.158 0.141 0.195 0.048 0.015	11.25 9.45 0.619 0.855 0.212 0.067	2.569 2.158 0.141 0.195 0.048 0.015	11.25 9.45 0.619 0.855 0.212 0.067	Gas/Vapor	AP-42	—
FUG-004	FUG-004	N/A	None	N/A	None	N/A	N/A	VOC HAP	1.109 0.107	4.859 0.470	1.109 0.107	4.859 0.470	Gas/Vapor	EPA 453/ R-95-017	—

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

<sup>1</sup> Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

<sup>2</sup> Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (i.e., 15 min/hr). Indicate as many rates as needed

to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).

3 List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS<sub>2</sub>, VOCs, H<sub>2</sub>S, Inorganics, Lead, Organics, O<sub>3</sub>, NO, NO<sub>2</sub>, SO<sub>2</sub>, SO<sub>3</sub>, all applicable Greenhouse Gases (including CO<sub>2</sub> and methane), etc. DO NOT LIST H<sub>2</sub>, H<sub>2</sub>O, N<sub>2</sub>, O<sub>2</sub>, and Noble Gases.

4 Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

5 Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

6 Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

7 Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m<sup>3</sup>) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO<sub>2</sub>, use units of ppmv (See 45CSR10).

## Attachment J EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data

Emission Point ID No. (Must match Emission Units Table)	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (°F)	Volumetric Flow <sup>1</sup> (acfm) at operating conditions	Velocity (fps)	Ground Level (Height above mean sea level)	Stack Height <sup>2</sup> (Release height of emissions above ground level)	Northing	Easting
H-5741	~2.0	550	4961	26.3	1235	16	4378315.20	538098.82
H-5781	~3.0	730	32,237	76	1235	20	4378315.20	538098.82
FUG-004	N/A	Ambient	N/A	N/A	1235	NA	4378315.20	538098.82

<sup>1</sup> Give at operating conditions. Include inerts.

<sup>2</sup> Release height of emissions above ground level.

**ATTACHMENT K: FUGITIVE EMISSIONS POINTS DATA SUMMARY SHEET**

## Attachment K

### FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS
1.) Will there be haul road activities? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.) Will there be Storage Piles? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.) Will there be Liquid Loading/Unloading Operations? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.
6.) Will there be General Clean-up VOC Operations? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.) Will there be any other activities that generate fugitive emissions? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.
If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."

FUGITIVE EMISSIONS SUMMARY		All Regulated Pollutants Chemical Name/CAS <sup>1</sup>	Maximum Potential Uncontrolled Emissions <sup>2</sup>		Maximum Potential Controlled Emissions <sup>3</sup>		Est. Method Used <sup>4</sup>
			lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads							
Unpaved Haul Roads							
Storage Pile Emissions							
Loading/Unloading Operations							
Wastewater Treatment Evaporation & Operations							
Equipment Leaks		VOC HAP	1.11 0.107	4.86 0.47	1.11 0.107	4.86 0.47	O (EPA 453/R- 95-017)
General Clean-up VOC Emissions							
Other							

<sup>1</sup> List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS<sub>2</sub>, VOCs, H<sub>2</sub>S, Inorganics, Lead, Organics, O<sub>3</sub>, NO, NO<sub>2</sub>, SO<sub>2</sub>, SO<sub>3</sub>, all applicable Greenhouse Gases (including CO<sub>2</sub> and methane), etc. DO NOT LIST H<sub>2</sub>, H<sub>2</sub>O, N<sub>2</sub>, O<sub>2</sub>, and Noble Gases.

<sup>2</sup> Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

<sup>3</sup> Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

<sup>4</sup> Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

## **ATTACHMENT L: EMISSION UNIT DATA SHEETS**

EUDS –Process Heaters – H-5741, H-5781

EUDS –Fugitive Emissions

**Attachment L  
EMISSIONS UNIT DATA SHEET  
GENERAL**

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): H-5741

<p>1. Name or type and model of proposed affected source:</p> <p>Heatec Process Heater, 7.69 MMBtu/hr</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>Natural gas, 7.69 MMBtu/hr</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>Natural gas, 7.69 MMBtu/hr</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>Combustion of natural gas</p>

\* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Natural gas, 59.93 mmscf/yr

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

Sulfur and ash are insignificant.

(c) Theoretical combustion air requirement (ACF/unit of fuel):

Unknown @ °F and psia.

(d) Percent excess air: Unknown

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

Eclipse WiNOx forced draft burner, 7.69 mmBtu/hr

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

N/A

(g) Proposed maximum design heat input: 7.69 × 10<sup>6</sup> BTU/hr.

7. Projected operating schedule:

Hours/Day	24	Days/Week	7	Weeks/Year	52
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8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:			
@	-550	°F and	14.5 psia
a. NO <sub>x</sub>	0.408	lb/hr	grains/ACF
b. SO <sub>2</sub>	0.005	lb/hr	grains/ACF
c. CO	0.315	lb/hr	grains/ACF
d. PM <sub>10</sub>	0.057	lb/hr	grains/ACF
e. Hydrocarbons	N/A	lb/hr	grains/ACF
f. VOCs	0.041	lb/hr	grains/ACF
g. Pb	N/A	lb/hr	grains/ACF
h. Specify other(s)			
HAP	0.014	lb/hr	grains/ACF
CO <sub>2</sub> (e)	991.489	lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing

Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING

None Proposed

RECORDKEEPING

Record Operating hours

REPORTING

As Required

TESTING

N/A

**MONITORING.** PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

**RECORDKEEPING.** PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

**REPORTING.** PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

**TESTING.** PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

**Attachment L**  
**EMISSIONS UNIT DATA SHEET**  
**GENERAL**

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): H-5781

<p>1. Name or type and model of proposed affected source:</p> <p>Heatec Process Heater, 26.2 MMBtu/hr</p>
<p>2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.</p>
<p>3. Name(s) and maximum amount of proposed process material(s) charged per hour:</p> <p>Natural gas, 26.2 MMBtu/hr</p>
<p>4. Name(s) and maximum amount of proposed material(s) produced per hour:</p> <p>Natural gas, 26.2 MMBtu/hr</p>
<p>5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:</p> <p>Combustion of natural gas</p>

\* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Natural gas, 204.2 mmscf/yr

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

Sulfur and ash are insignificant.

(c) Theoretical combustion air requirement (ACF/unit of fuel):

Unknown @ °F and psia.

(d) Percent excess air: Unknown

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

Forced draft Eclipse RM3000 burner, 26.2 mmBtu/hr

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

N/A

(g) Proposed maximum design heat input: 26.2 × 10<sup>6</sup> BTU/hr.

7. Projected operating schedule:

Hours/Day	24	Days/Week	7	Weeks/Year	52
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8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@	~730	°F and	14.7	psia
a. NO <sub>x</sub>	2.569	lb/hr		grains/ACF
b. SO <sub>2</sub>	0.0154	lb/hr		grains/ACF
c. CO	2.158	lb/hr		grains/ACF
d. PM <sub>10</sub>	0.195	lb/hr		grains/ACF
e. Hydrocarbons	N/A	lb/hr		grains/ACF
f. VOCs	0.141	lb/hr		grains/ACF
g. Pb	N/A	lb/hr		grains/ACF
h. Specify other(s)				
HAP	0.0485	lb/hr		grains/ACF
CO <sub>2</sub> (e)	3,375	lb/hr		grains/ACF
		lb/hr		grains/ACF
		lb/hr		grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing  
 Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

<p><b>MONITORING</b></p> <p>None Proposed</p>	<p><b>RECORDKEEPING</b></p> <p>Record Operating hours</p>
<p><b>REPORTING</b></p> <p>As Required</p>	<p><b>TESTING</b></p> <p>N/A</p>

**MONITORING.** PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

**RECORDKEEPING.** PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

**REPORTING.** PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

**TESTING.** PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

**Attachment L  
EMISSIONS UNIT DATA SHEET  
CHEMICAL PROCESS**

For chemical processes please fill out this sheet and all supplementary forms (see below) that apply. Please check all supplementary forms that have been completed.

- Emergency Vent Summary Sheet*
- Leak Sources Data Sheet*
- Toxicology Data Sheet*
- Reactor Data Sheet*
- Distillation Column Data Sheet*

1. Chemical process area name and equipment ID number (as shown in *Equipment List Form*)  
**Components in natural gas and light liquid service**

2. Standard Industrial Classification Codes (SICs) for process(es)  
**1321**

3. List raw materials and  attach MSDSs  
**Natural gas and natural gas liquids**

4. List Products and Maximum Production and  attach MSDSs

Description and CAS Number	Maximum Hourly (lb/hr)	Maximum Annual (ton/year)

5. Complete the *Emergency Vent Summary Sheet* for all emergency relief devices.

6. Complete the *Leak Source Data Sheet* and describe below or attach to application the leak detection or maintenance program to minimize fugitive emissions. Include detection instruments, calibration gases or methods, planned inspection frequency, and record-keeping, and similar pertinent information. If subject to a rule requirement (e.g. 40CFR60, Subpart VV), please list those here.

**The purpose of the LDAR program is to detect and reduce/eliminate fugitive leaks from facility components (e.g., valves, pump seals, connectors, flanges, open-ended lines, and others), consistent with the provisions of 40 CFR Part 60, Subpart OOOO, and Method 21. Instruments meeting the specifications in Method 21 will be used to detect leaks, on a monitoring frequency consistent with the regulatory provisions stated above.**

7. Clearly describe below or attach to application Accident Procedures to be followed in the event of an accidental spill or release.

**In the event of an accidental spill or release, personnel will be protected, emergency response personnel will be notified and immediate steps to stop the spill or release will be implemented. More details are contained in the Emergency Response manual**

8A. Complete the *Toxicology Data Sheet* or attach to application a toxicology report (an up-to-date material safety data sheets (MSDS) may be used) outlining the currently known acute and chronic health effects of each compound or chemical entity emitted to the air. If these compounds have already been listed in Item 3, then a duplicate MSDS sheet is not required. Include data such as the OSHA time weighted average (TWA) or mutagenicity, teratogenicity, irritation, and other known or suspected effects should be addressed. Indicate where these are unknown, and provide references.

8B. Describe any health effects testing or epidemiological studies on these compounds that are being or may be conducted by the company or required under TSCA, RCRA or other federal regulations. Discuss the persistence in the environment of any emission (e.g. pesticides, etc.).

9. **Waste Products** - Waste products status: (If source is subject to RCRA or 45CSR25, please contact the Hazardous Waste Section of WVDEP, OAQ at (304) 926-3647.)

9A. Types and amounts of wastes to be disposed:

9B. Method of disposal and location of waste disposal facilities:  
Carrier: \_\_\_\_\_ Phone: \_\_\_\_\_

9C. Check here if approved USEPA/State Hazardous Waste Landfill will be used

10. Maximum and Projected Typical Operating Schedule for process or project as a whole (circle appropriate circle units: \_\_\_\_\_)

circle units:	(hrs/day) (hr/batch)	(days), (batches/day), (batches/week)	(days/yr), (weeks/year)
10A. Maximum			
10B. Typical			

11. Complete a *Reactor Data Sheet* for each reactor in this chemical process.

12. Complete a *Distillation Column Data Sheet* for each distillation column in this chemical process.

13. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**  
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING As specified in Method 21 and 40 CFR Part 60 Subpart OOOO	RECORDKEEPING Same
REPORTING Same	TESTING Same

**MONITORING.** Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment operation or air pollution control

**RECORDKEEPING.** Please describe the proposed recordkeeping that will accompany the monitoring.

**REPORTING.** Please describe the proposed frequency of reporting of the recordkeeping.

**TESTING.** Please describe any proposed emissions testing for this process equipment or air pollution control

14. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

### LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components <sup>1</sup>	Number of Components Monitored by Frequency <sup>2</sup>	Average Time to Repair (days) <sup>3</sup>	Estimated Annual Emission Rate (lb/yr) <sup>4</sup>
Pumps <sup>5</sup>	light liquid VOC <sup>6,7</sup>	10	40 CFR Subpart 0000 Method 21	15	148.33
	heavy liquid VOC <sup>8</sup>				
	Non-VOC <sup>9</sup>				
Valves <sup>10</sup>	Gas VOC	1,000	40 CFR Subpart 0000 Method 21	15	2,133.15
	Light Liquid VOC	2,500	40 CFR Subpart 0000 Method 21	15	4,505.48
	Non-VOC				
Open-ended Lines <sup>12</sup>	VOC				
	Non-VOC				
	VOC				
Sampling Connections <sup>13</sup>	VOC				
	Non-VOC				
	VOC	500	40 CFR Subpart 0000 Method 21	15	586.69
Flanges	Light Liquid	500	40 CFR Subpart 0000 Method 21	15	165.48
	Non-VOC				
	VOC				
Connectors	Gas VOC	1,250	40 CFR Subpart 0000 Method 21	15	691.99
	Light liquid VOC	1,250	40 CFR Subpart 0000 Method 21	15	691.99
	VOC	30	40 CFR Subpart 0000 Method 21	15	794.29
Other	Non-VOC				
	VOC				

1 - 13 See notes on the following page.

## Notes for Leak Source Data Sheet

1. For VOC sources include components on streams and equipment that contain greater than 10% w/w VOC, including feed streams, reaction/separation facilities, and product/by-product delivery lines. Do not include certain leakless equipment as defined below by category.
2. By monitoring frequency, give the number of sources routinely monitored for leaks, using a portable detection device that measures concentration in ppm. Do not include monitoring by visual or soap-bubble leak detection methods. "M/Q(M)/Q/SA/A/O" means the time period between inspections as follows:  
  
Monthly/Quarterly, with Monthly follow-up of repaired leakers/Quarterly/Semi-annual/Annually/Other (specify time period)  
  
If source category is not monitored, a single zero in the space will suffice. For example, if 50 gas-service valves are monitored quarterly, with monthly follow-up of those repaired, 75 are monitored semi-annually, and 50 are checked bimonthly (alternate months), with non checked at any other frequency, you would put in the category "valves, gas service:" 0/50/0/75/0/50 (bimonthly).
3. Give the average number of days, after a leak is discovered, that an attempt will be made to repair the leak.
4. Note the method used: MB - material balance; EE - engineering estimate; EPA - emission factors established by EPA (cite document used); O - other method, such as in-house emission factor (specify).
5. Do not include in the equipment count sealless pumps (canned motor or diaphragm) or those with enclosed venting to a control device. (Emissions from vented equipment should be included in the estimates given in the Emission Points Data Sheet.)
6. Volatile organic compounds (VOC) means the term as defined in 40 CFR §51.100 (s).
7. A light liquid is defined as a fluid with vapor pressure equal to or greater than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if 20% w/w or more of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20 °C, then the fluid is defined as a light liquid.
8. A heavy liquid is defined as a fluid with a vapor pressure less than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if less than 20% w/w of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20 °C, then the fluid is defined as a heavy liquid.
9. LIST CO, H<sub>2</sub>S, mineral acids, NO, NO<sub>2</sub>, SO<sub>3</sub>, etc. DO NOT LIST CO<sub>2</sub>, H<sub>2</sub>, H<sub>2</sub>O, N<sub>2</sub>, O<sub>2</sub>, and Noble Gases.
10. Include all process valves whether in-line or on an open-ended line such as sample, drain and purge valves. Do not include safety-relief valves, or leakless valves such as check, diaphragm, and bellows seal valves.
11. Do not include a safety-relief valve if there is a rupture disk in place upstream of the valve, or if the valve vents to a control device.
12. Open-ended lines include purge, drain and vent lines. Do not include sampling connections, or lines sealed by plugs, caps, blinds or second valves.
13. Do not include closed-purge sampling connections.

## ATTACHMENT N: SUPPORTING EMISSIONS CALCULATIONS

### EXAMPLE CALCULATIONS

#### **g/hp-hr Emission Factors:**

Emission Factor (g/hp-hr) \* Engine Rating (hp) \* 1 lb/453.6 g = lb/hr

#### **lb/mmBtu Emission Factors:**

Emission Factor (lb/mmBtu) \* Engine Rating (hp) \* Fuel Use (Btu/hp-hr) \* 1 mmBtu/1000000 Btu = lb/hr

#### **lb/mmscf Emission Factors:**

Emission Factor (lb/mmscf) \* Heater Rating (mmBtu/hr) \* 1/Fuel Heating Value (Btu/scf) = lb/hr

#### **Tons per Year (TPY) Conversion:**

lb/hr \* Hours/Year \* 1 ton/2000 lb = TPY

MarkWest Liberty Midstream & Resources L.L.C.  
Moble Gas Plant - Phase V

Summary of Potential Emissions

Criteria Pollutant Potential Emissions

Process/Facility	Potential Emissions (lb/hr)						
	NOx	CO	VOC	SO <sub>2</sub>	PM <sup>1</sup>	HAPs	
Waukesha P939OGSI Compressor Engines (6) (Existing)	5.22	6.84	3.12	0.06	1.8	1.26	
CAT 3616 Compressor Engines (2) (Existing)	10.44	2.88	5.26	0.04	0.7	1.76	
Regeneration Heater H-741 (8.12 MMBtu/hr) (Existing)	0.43	0.33	0.04	0.00	0.05	0.01	
Hot Medium Oil Heater H-781 (26.0 MMBtu/hr) (Existing)	2.31	1.94	0.13	0.01	0.18	0.04	
Regeneration Heater H-1741 (6.84 MMBtu/hr) (Existing)	0.36	0.28	0.03	0.00	0.05	0.01	
Hot Medium Oil Heater H-1781 (18.05 MMBtu/hr) (Existing)	1.61	1.35	0.09	0.01	0.12	0.03	
Regeneration Heaters H-3741 and H-4741 (7.69 MMBtu/hr) (Existing)	0.82	0.63	0.08	0.01	0.11	0.03	
Hot Medium Oil Heater H-3781 (16.07 MMBtu/hr) (Existing)	1.58	1.32	0.09	0.01	0.12	0.03	
Regeneration Heaters H-5741 (7.69 MMBtu/hr) (New)	0.41	0.32	0.04	0.00	0.06	0.01	
Regeneration Heater H-5781 (26.2 MMBtu/hr) (New)	2.57	2.16	0.14	0.02	0.20	0.05	
Emergency Flare (Existing)	0.11	0.09	0.01	0.01	0.01	0.08	
Fugitives (Modified)	--	--	1.11	--	--	0.11	
<b>Future Site-Wide Emissions (lb/hr)</b>	<b>25.85</b>	<b>18.14</b>	<b>10.14</b>	<b>0.18</b>	<b>3.40</b>	<b>3.43</b>	

<sup>1</sup> PM = PM<sub>10</sub> = PM<sub>2.5</sub>

Process/Facility	Potential Emissions (tpy)						
	NOx	CO	VOC	SO <sub>2</sub>	PM <sup>1</sup>	HAPs	
Waukesha P939OGSI Compressor Engines (6) (Existing)	22.98	29.94	13.74	0.24	7.86	5.52	
CAT 3616 Compressor Engines (2) (Existing)	45.72	12.58	23.04	0.18	3.1	7.68	
Regeneration Heater H-741 (8.12 MMBtu/hr) (Existing)	1.88	1.46	0.04	0.00	0.05	0.01	
Hot Medium Oil Heater H-781 (26.0 MMBtu/hr) (Existing)	10.13	8.51	0.56	0.06	0.77	0.19	
Regeneration Heater H-1741 (6.84 MMBtu/hr) (Existing)	1.59	1.23	0.15	0.02	0.20	0.05	
Hot Medium Oil Heater H-1781 (18.05 MMBtu/hr) (Existing)	7.03	5.91	0.39	0.04	0.53	0.13	
Regeneration Heaters H-3741 and H-4741 (7.69 MMBtu/hr) (Existing)	3.57	2.76	0.36	0.04	0.50	0.12	
Hot Medium Oil Heater H-3781 (16.07 MMBtu/hr) (Existing)	6.90	5.80	0.38	0.04	0.52	0.13	
Regeneration Heaters H-5741 (7.69 MMBtu/hr) (New)	1.79	1.38	0.18	0.02	0.25	0.06	
Regeneration Heater H-5781 (26.2 MMBtu/hr) (New)	11.25	9.45	0.62	0.07	0.86	0.21	
Emergency Flare (Existing)	0.48	0.39	0.04	0.04	0.04	0.35	
Fugitives (Modified)	--	--	4.86	--	--	0.47	
<b>Future Site-Wide Emissions (lb/hr)</b>	<b>113.33</b>	<b>79.41</b>	<b>44.36</b>	<b>0.76</b>	<b>14.70</b>	<b>14.94</b>	

<sup>1</sup> PM = PM<sub>10</sub> = PM<sub>2.5</sub>

**Hazardous Air Pollutant Potential Emissions**

Process/Facility	HAPs - Potential Emissions (lb/hr)									
	Acetaldehyde	Acrolein	Benzene	Ethylbenzene	Formaldehyde	Methanol	n-Hexane	Toluene	Xylenes	
Waukesha P939OGSI Compressor Engines (6) (Existing)	0.24	0.24	0.12	0.06	0.24	0.30	--	0.06	0.06	0.06
CAT 3616 Compressor Engines (2) (Existing)	0.6	0.36	0.01	0.02	0.54	0.18	--	0.02	0.02	0.02
Regeneration Heater H-741 (8.12 MMBtu/hr) (Existing)	--	--	0.00	--	0.00	--	0.01	0.00	0.00	--
Hot Medium Oil Heater H-781 (26.0 MMBtu/hr) (Existing)	--	--	0.00	--	0.00	--	0.04	0.00	0.00	--
Regeneration Heater H-1741 (6.84 MMBtu/hr) (Existing)	--	--	0.00	--	0.00	--	0.01	0.00	0.00	--
Hot Medium Oil Heater H-1781 (18.05 MMBtu/hr) (Existing)	--	--	0.00	--	0.00	--	0.03	0.00	0.00	--
Regeneration Heaters H-3741 and H-4741 (7.69 MMBtu/hr) (Existing)	--	--	0.00	--	0.00	--	0.03	0.00	0.00	--
Hot Medium Oil Heater H-3781 (16.07 MMBtu/hr) (Existing)	--	--	0.00	--	0.00	--	0.03	0.00	0.00	--
Regeneration Heaters H-5741 (7.69 MMBtu/hr) (New)	--	--	0.00	--	0.00	--	0.01	0.00	0.00	--
Regeneration Heater H-5781 (26.2 MMBtu/hr) (New)	--	--	0.00	--	0.00	--	0.05	0.00	0.00	--
Emergency Flare (Existing)	--	--	--	--	0.00	--	--	--	--	--
Fugitives (Modified)	--	--	--	--	--	--	--	--	--	--
<b>Future Site-Wide Emissions (lb/hr)</b>	<b>0.84</b>	<b>0.60</b>	<b>0.13</b>	<b>0.08</b>	<b>0.79</b>	<b>0.48</b>	<b>0.21</b>	<b>0.08</b>	<b>0.08</b>	<b>0.08</b>

Process/Facility	HAPs - Potential Emissions (tpy)									
	Acetaldehyde	Acrolein	Benzene	Ethylbenzene	Formaldehyde	Methanol	n-Hexane	Toluene	Xylenes	
Waukesha P939OGSI Compressor Engines (6) (Existing)	1.14	1.08	0.66	0.06	1.14	1.26	--	0.24	0.06	0.06
CAT 3616 Compressor Engines (2) (Existing)	2.6	1.6	0.14	0.02	2.38	0.78	--	0.12	0.06	0.06
Regeneration Heater H-741 (8.12 MMBtu/hr) (Existing)	--	--	0.00	--	0.00	--	0.06	0.00	--	--
Hot Medium Oil Heater H-781 (26.0 MMBtu/hr) (Existing)	--	--	0.00	--	0.01	--	0.18	0.00	--	--
Regeneration Heater H-1741 (6.84 MMBtu/hr) (Existing)	--	--	0.00	--	0.00	--	0.05	0.00	--	--
Hot Medium Oil Heater H-1781 (18.05 MMBtu/hr) (Existing)	--	--	0.00	--	0.01	--	0.13	0.00	--	--
Regeneration Heaters H-3741 and H-4741 (7.69 MMBtu/hr) (Existing)	--	--	0.00	--	0.00	--	0.12	0.00	--	--
Hot Medium Oil Heater H-3781 (16.07 MMBtu/hr) (Existing)	--	--	0.00	--	0.01	--	0.12	0.00	--	--
Regeneration Heaters H-5741 (7.69 MMBtu/hr) (New)	--	--	0.00	--	0.00	--	0.06	0.00	--	--
Regeneration Heater H-5781 (26.2 MMBtu/hr) (New)	--	--	0.00	--	0.01	--	0.20	0.00	--	--
Emergency Flare (Existing)	--	--	--	--	--	--	--	--	--	--
Fugitives (Modified)	--	--	--	--	--	--	--	--	--	--
<b>Future Site-Wide Emissions (tpy)</b>	<b>3.74</b>	<b>2.68</b>	<b>0.80</b>	<b>0.08</b>	<b>3.56</b>	<b>2.04</b>	<b>0.92</b>	<b>0.36</b>	<b>0.12</b>	<b>0.12</b>

**Greenhouse Gas Potential Emissions**

Process/Facility	GHG
	CO <sub>2</sub> e (tpy)
Waukesha P939OGSI Compressor Engines (6) (Existing)	52184.88
CAT 3616 Compressor Engines (2) (Existing)	39569.86
Regeneration Heater H-741 (8.12 MMBtu/hr) (Existing)	4577.03
Hot Medium Oil Heater H-781 (26.0 MMBtu/hr) (Existing)	14824.60
Regeneration Heater H-1741 (6.84 MMBtu/hr) (Existing)	3855.52
Hot Medium Oil Heater H-1781 (18.05 MMBtu/hr) (Existing)	10174.30
Regeneration Heaters H-3741 and H-4741 (7.69 MMBtu/hr) (Existing)	9553.98
Hot Medium Oil Heater H-3781 (16.07 MMBtu/hr) (Existing)	9982.61
Regeneration Heaters H-5741 (7.69 MMBtu/hr) (New)	4338.56
Regeneration Heater H-5781 (26.2 MMBtu/hr) (New)	14781.55
Emergency Flare	746.08
Fugitives (Modified)	500.47
<b>Future Site-Wide Emissions (lb/hr)</b>	<b>165089.45</b>

**MarkWest Liberty Midstream & Resources L.L.C.  
Mobley Gas Plant - Difference Between Phase IV and Phase V**

**Summary of Potential Emissions**

Criteria Pollutant	Potential Emissions (lb/hr)						
	NOx	CO	VOC	SO <sub>2</sub>	PM <sup>1</sup>	HAPs	HAPs
Previous Permit	22.87	15.67	11.39	0.16	3.14	3.50	3.50
Current Permit Application	25.85	18.14	10.14	0.18	3.40	3.43	3.43
<b>Difference in Site-Wide Emissions (lb/hr)</b>	<b>2.98</b>	<b>2.47</b>	<b>-1.25</b>	<b>0.02</b>	<b>0.25</b>	<b>-0.08</b>	<b>-0.08</b>

<sup>1</sup> PM = PM<sub>10</sub> = PM<sub>2.5</sub>

Process/Facility	Potential Emissions (tpy)						
	NOx	CO	VOC	SO <sub>2</sub>	PM <sup>1</sup>	HAPs	HAPs
Previous Permit	100.29	68.58	49.84	0.67	13.59	15.27	15.27
Current Permit Application	113.33	79.41	44.36	0.76	14.70	14.94	14.94
<b>Difference in Site-Wide Emissions (lb/hr)</b>	<b>13.04</b>	<b>10.83</b>	<b>-5.48</b>	<b>0.09</b>	<b>1.11</b>	<b>-0.33</b>	<b>-0.33</b>

<sup>1</sup> PM = PM<sub>10</sub> = PM<sub>2.5</sub>

**Hazardous Air Pollutant Potential Emissions**

Process/Facility	HAPs - Potential Emissions (lb/hr)									
	Acetaldehyde	Acrolein	Benzene	Ethylbenzene	Formaldehyde	Methanol	n-Hexane	Toluene	Xylenes	Xylenes
Previous Permit	0.84	0.60	0.13	0.08	0.79	0.48	0.15	0.08	0.08	0.08
Current Permit Application	0.84	0.60	0.13	0.08	0.79	0.48	0.21	0.08	0.08	0.08
<b>Difference in Site-Wide Emissions (lb/hr)</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.06</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

Process/Facility	HAPs - Potential Emissions (tpy)									
	Acetaldehyde	Acrolein	Benzene	Ethylbenzene	Formaldehyde	Methanol	n-Hexane	Toluene	Xylenes	Xylenes
Previous Permit	3.74	2.68	0.80	0.08	3.55	2.04	0.66	0.36	0.12	0.12
Current Permit Application	3.74	2.68	0.80	0.08	3.56	2.04	0.92	0.36	0.00	0.00
<b>Difference in Site-Wide Emissions (lb/hr)</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.01</b>	<b>0.00</b>	<b>0.26</b>	<b>0.00</b>	<b>-0.12</b>	<b>-0.12</b>

**Greenhouse Gas Potential Emissions**

Process/Facility	GHG
	CO <sub>2</sub> e (tpy)
Previous Permit	146485.90
Current Permit Application	165089.45
<b>Difference in Site-Wide Emissions (lb/hr)</b>	<b>18603.55</b>

**Regeneration Heaters  
 (H-5741)**

**Source Designation:**

Manufacturer:	Heatec
Year Installed	TBD
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,124
Heat Input (MMBtu/hr)	7.69
Fuel Consumption (mmscf/hr):	6.84E-03
Potential Annual Hours of Operation (hr/yr):	8,760

**Criteria and Manufacturer Specific Pollutant Emission Rates**

Pollutant	Emission Factor (lb/MMscf) <sup>a,b</sup>	Potential Emissions	
		(lb/hr) <sup>c</sup>	(tons/yr) <sup>d</sup>
NO <sub>x</sub>	59.6	0.408	1.785
CO	46.1	0.315	1.381
SO <sub>2</sub>	0.7	0.0045	0.0198
PM Total	8.4	0.0573	0.2510
PM Condensable	6.3	0.043	0.188
PM <sub>10</sub> (Filterable)	2.1	0.014	0.063
PM <sub>2.5</sub> (Filterable)	2.1	0.014	0.063
VOC	6.1	0.041	0.182
CO <sub>2</sub>	58.4 kg/mmbtu	991	4,338
CH <sub>4</sub>	0.001 kg/mmbtu	0.019	0.082
N <sub>2</sub> O	0.0001 kg/mmbtu	0.002	0.008

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

Pollutant	Emission Factor (lb/MMscf) <sup>a</sup>	Potential Emissions	
		(lb/hr) <sup>c</sup>	(tons/yr) <sup>d</sup>
<b>HAPs:</b>			
3-Methylchloranthrene	1.98E-06	1.36E-08	5.94E-08
7,12-Dimethylbenz(a)anthracene	1.76E-05	1.21E-07	5.28E-07
Acenaphthene	1.98E-06	1.36E-08	5.94E-08
Acenaphthylene	1.98E-06	1.36E-08	5.94E-08
Anthracene	2.64E-06	1.81E-08	7.93E-08
Benz(a)anthracene	1.98E-06	1.36E-08	5.94E-08
Benzene	2.31E-03	1.58E-05	6.93E-05
Benzo(a)pyrene	1.32E-06	9.05E-09	3.96E-08
Benzo(b)fluoranthene	1.98E-06	1.36E-08	5.94E-08
Benzo(g,h,i)perylene	1.32E-06	9.05E-09	3.96E-08
Benzo(k)fluoranthene	1.98E-06	1.36E-08	5.94E-08
Chrysene	1.98E-06	1.36E-08	5.94E-08
Dibenzo(a,h) anthracene	1.32E-06	9.05E-09	3.96E-08
Dichlorobenzene	1.32E-03	9.05E-06	3.96E-05
Fluoranthene	3.31E-06	2.26E-08	9.91E-08
Fluorene	3.09E-06	2.11E-08	9.25E-08
Formaldehyde	8.26E-02	5.65E-04	2.48E-03
Hexane	1.98E+00	1.36E-02	5.94E-02
Indo(1,2,3-cd)pyrene	1.98E-06	1.36E-08	5.94E-08
Phenanthrene	1.87E-05	1.28E-07	5.61E-07
Pyrene	5.51E-06	3.77E-08	1.65E-07
Toluene	3.75E-03	2.56E-05	1.12E-04
Arsenic	2.20E-04	1.51E-06	6.60E-06
Beryllium	1.32E-05	9.05E-08	3.96E-07
Cadmium	1.21E-03	8.29E-06	3.63E-05
Chromium	1.54E-03	1.06E-05	4.62E-05
Cobalt	9.26E-05	6.33E-07	2.77E-06
Lead	5.51E-04	3.77E-06	1.65E-05
Manganese	4.19E-04	2.86E-06	1.25E-05
Mercury	2.87E-04	1.96E-06	8.59E-06
Nickel	2.31E-03	1.58E-05	6.93E-05
Selenium	2.64E-05	1.81E-07	7.93E-07
<b>Polycyclic Organic Matter:</b>			
Methylnaphthalene (2-)	2.64E-05	1.81E-07	7.93E-07
Naphthalene	6.72E-04	4.60E-06	2.01E-05
<b>Total HAP</b>		<b>1.42E-02</b>	<b>6.24E-02</b>

<sup>a</sup> Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 (07/98) for all criteria and HAP pollutants, corrected to site-specific gas heat content.

<sup>b</sup> Emission factors for GHG pollutants from 40 CFR Part 98, Subpart C and corrected to site-specific gas heat content.

<sup>c</sup> Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf).

<sup>d</sup> Annual Emissions (tons/yr)<sub>Potential</sub> = (lb/hr)<sub>Emissions</sub> × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

**HMO Heater  
(H-5781)**

<b>Source Designation:</b>	
Manufacturer:	Heatec
Year Installed	TBD
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,124
Heat Input (MMBtu/hr)	26.20
Fuel Consumption (mmscf/hr):	2.33E-02
Potential Annual Hours of Operation (hr/yr):	8,760

**Criteria and Manufacturer Specific Pollutant Emission Rates**

Pollutant	Emission Factor (lb/MMscf) <sup>a,b</sup>	Potential Emissions	
		(lb/hr) <sup>c</sup>	(tons/yr) <sup>d</sup>
NO <sub>x</sub>	110.2	2.569	11.251
CO	92.6	2.158	9.450
SO <sub>2</sub>	0.7	0.0154	0.0675
PM Total	8.4	0.1952	0.8550
PM Condensable	6.3	0.146	0.641
PM <sub>10</sub> (Filterable)	2.1	0.049	0.214
PM <sub>2.5</sub> (Filterable)	2.1	0.049	0.214
VOC	6.1	0.141	0.619
CO <sub>2</sub>	58.4 kg/mmbtu	3,375	14,781
CH <sub>4</sub>	0.001 kg/mmbtu	0.064	0.279
N <sub>2</sub> O	0.0001 kg/mmbtu	0.006	0.028

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

Pollutant	Emission Factor (lb/MMscf) <sup>a</sup>	Potential Emissions	
		(lb/hr) <sup>c</sup>	(tons/yr) <sup>d</sup>
<b>HAPs:</b>			
3-Methylchloranthrene	1.98E-06	4.62E-08	2.03E-07
7,12-Dimethylbenz(a)anthracene	1.76E-05	4.11E-07	1.80E-06
Acenaphthene	1.98E-06	4.62E-08	2.03E-07
Acenaphthylene	1.98E-06	4.62E-08	2.03E-07
Anthracene	2.64E-06	6.16E-08	2.70E-07
Benz(a)anthracene	1.98E-06	4.62E-08	2.03E-07
Benzene	2.31E-03	5.39E-05	2.36E-04
Benzo(a)pyrene	1.32E-06	3.08E-08	1.35E-07
Benzo(b)fluoranthene	1.98E-06	4.62E-08	2.03E-07
Benzo(g,h,i)perylene	1.32E-06	3.08E-08	1.35E-07
Benzo(k)fluoranthene	1.98E-06	4.62E-08	2.03E-07
Chrysene	1.98E-06	4.62E-08	2.03E-07
Dibenzo(a,h)anthracene	1.32E-06	3.08E-08	1.35E-07
Dichlorobenzene	1.32E-03	3.08E-05	1.35E-04
Fluoranthene	3.31E-06	7.71E-08	3.38E-07
Fluorene	3.09E-06	7.19E-08	3.15E-07
Formaldehyde	8.26E-02	1.93E-03	8.44E-03
Hexane	1.98E+00	4.62E-02	2.03E-01
Indo(1,2,3-cd)pyrene	1.98E-06	4.62E-08	2.03E-07
Phenanthrene	1.87E-05	4.37E-07	1.91E-06
Pyrene	5.51E-06	1.28E-07	5.63E-07
Toluene	3.75E-03	8.73E-05	3.83E-04
Arsenic	2.20E-04	5.14E-06	2.25E-05
Beryllium	1.32E-05	3.08E-07	1.35E-06
Cadmium	1.21E-03	2.83E-05	1.24E-04
Chromium	1.54E-03	3.60E-05	1.58E-04
Cobalt	9.26E-05	2.16E-06	9.45E-06
Lead	5.51E-04	1.28E-05	5.63E-05
Manganese	4.19E-04	9.76E-06	4.28E-05
Mercury	2.87E-04	6.68E-06	2.93E-05
Nickel	2.31E-03	5.39E-05	2.36E-04
Selenium	2.64E-05	6.16E-07	2.70E-06
<b>Polycyclic Organic Matter:</b>			
Methylnaphthalene (2-)	2.64E-05	6.16E-07	2.70E-06
Naphthalene	6.72E-04	1.57E-05	6.86E-05
<b>Total HAP</b>		<b>4.85E-02</b>	<b>2.12E-01</b>

<sup>a</sup> Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 (07/98) for all criteria and HAP pollutants, corrected to site-specific gas heat content.

<sup>b</sup> Emission factors for GHG pollutants from 40 CFR Part 98, Subpart C and corrected to site-specific gas heat content.

<sup>c</sup> Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf).

<sup>d</sup> Annual Emissions (tons/yr)<sub>Potential</sub> = (lb/hr)<sub>Emissions</sub> × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

Mark West Liberty Midstream & Resources L.L.C.  
Mobley Gas Plant

Final Emissions from Equipment Leaks

Component	Service Type	Component Count <sup>2</sup>	TOC Emission Factor <sup>3</sup> (g/hr/component)	Average NG Leak Rate (lb/hr)	Max NG Leak Rate (gpy)	VOC Wt.% <sup>4</sup>	HAP Wt. %	CH <sub>4</sub> Wt.%	CO <sub>2</sub> Wt.%	Potential VOC Emissions (tpy)	Potential HAP Emissions (tpy)	Potential CH <sub>4</sub> Emissions (tpy)	Potential CO <sub>2</sub> Emissions (tpy)
Compressor	Gas	1,250	1.84E-04	0.5071	2.22	15.58%	1.51%	64.18%	0.24%	0.55	0.03	1.43E+00	5.33E-03
Flanges	Gas	500	3.90E-04	0.4239	1.88	15.58%	1.51%	64.18%	0.24%	0.29	0.03	1.21E+00	4.52E-03
Open-Ended Lines	Gas	0	2.00E-03	0.0000	0.00	15.58%	1.51%	64.18%	0.24%	0.00	0.00	0.00E+00	0.00E+00
Pump Seals	Gas	0	2.40E-03	0.0000	0.00	15.58%	1.51%	64.18%	0.24%	0.00	0.00	0.00E+00	0.00E+00
Valves	Gas	1,000	7.09E-04	1.5631	6.83	15.58%	1.51%	64.18%	0.24%	1.07	0.10	4.39E+00	1.64E-02
Other <sup>1</sup>	Gas	30	8.80E-03	0.5620	2.55	15.58%	1.51%	64.18%	0.24%	0.40	0.04	1.60E+00	6.12E-03
Connections	Light Oil	1,250	1.84E-04	0.5071	2.22	15.58%	1.51%	64.18%	0.24%	0.35	0.03	1.43E+00	5.33E-03
Flanges	Light Oil	500	1.10E-04	0.1213	0.53	15.58%	1.51%	64.18%	0.24%	0.08	0.01	3.41E-01	1.27E-03
Open-Ended Lines	Light Oil	0	1.40E-03	0.0000	0.00	15.58%	1.51%	64.18%	0.24%	0.00	0.00	0.00E+00	0.00E+00
Pump Seals	Light Oil	10	4.93E-03	0.1087	0.48	15.58%	1.51%	64.18%	0.24%	0.07	0.01	3.06E-01	1.14E-03
Valves	Light Oil	2,500	5.99E-04	3.3014	14.46	15.58%	1.51%	64.18%	0.24%	2.25	0.22	9.28E+00	3.47E-02
Other <sup>1</sup>	Light Oil	0	7.50E-03	0.0000	0.00	15.58%	1.51%	64.18%	0.24%	0.00	0.00	0.00E+00	0.00E+00
<b>Total</b>										<b>4.859</b>	<b>0.670</b>	<b>20.016</b>	<b>0.075</b>

1. "Other" equipment types include compressor seals, relief valves, diaphragms, drains, etc.

2. The component count is a preliminary estimate based on the permitted design of the Mobley I Plant.

3. Table 2-4-101 & Gas Production Operations Average Emission Factors, Revised for Equipment Leak Emission Estimates, EPA 453/R-95-017, November 1995. Emission factors based on average measured TOC from component types indicated in gas service at OCG Production Operations.

4. VOC, HAP, CH<sub>4</sub>, and CO<sub>2</sub> weight percent based on representative gas analysis dated 9-9-09. All CO<sub>2</sub> components assumed to be hazardous air pollutants for a conservative emissions estimate.

EPA Protocol for Equipment Leak Emissions

Valves in Gas Service (Gas, Oil and Gas Prod Operations [includes gas processing])

LDAR 500 ppm and quarterly monitoring  
(consistent with Subpart OOOO)

Table 2-4, Oil and Gas Production Operations Average Emission Factors  
0.0045 Average Leak Rate (kg/hr/source)

Table 5-7, Eqns Relating ALR to LKFRAC at O&G Production Operations  
 $ALR = (0.070 * LKFRAC) + 0.0000091$   
 $LKFRAC = (ALR - 0.0000091) / 0.070$

Table G-3, Refineries values (none available for oil or gas production)

1 FR Fix Rate Fraction  
 0 R Recurrence Rate Fraction  
 0.02 Oc Occurrence Rate Fraction

0.24 Z1 Initial Leak Fraction (From LKFRAC Eqtn in Table 5.7)

Immediate Post LDAR Leak Fraction % = Y1

Subsequent Iterations

$$Y_i = Z_i - (FR * Z_i) + (FR * Z_i * R)$$

$$Z_{(i+1)} = Oc * (1 - Y_i) + Y_i$$

Leak Fraction

	1	2	3	4	5	6	7
Z	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Y	0.00	0	0	0	0	0	0
Average	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Average Leak Rate

	1	2	3	4	5	6	7
Leak Rate	0.000709	0.000709	0.000709	0.000709	0.000709	0.000709	0.000709

0.000709 LDAR Final Average Leak Rate (kg/hr/source)

0.001536 lb/hr/source

84.24222 LDAR Control Effectiveness

EPA Protocol for Equipment Leak Emissions

Valves in Light Liquid Service (Gas, Oil and Gas Prod Operations [includes gas processing])

LDAR 500 ppm and quarterly monitoring  
(consistent with Subpart OOOO)

Table 2-4, Oil and Gas Production Operations Average Emission Factors  
0.0025 Average Leak Rate (kg/hr/source)

Table 5-7, Eqns Relating ALR to LKFRAC at O&G Production Operations  
 $ALR = (0.059 * LKFRAC) + 0.0000094$   
 $LKFRAC = (ALR - 0.0000094) / 0.059$

Table G-3, Refineries values (none available for oil or gas production)  
 1 FR Fix Rate Fraction  
 0 R Recurrence Rate Fraction  
 0.02 Oc Occurrence Rate Fraction

0.285 Z1 Initial Leak Fraction (From LKFRAC Eqtn in Table 5.7)

Immediate Post LDAR Leak Fraction % = Y1

Subsequent Iterations

$$Y_i = Z_i - (FR * Z_i) + (FR * Z_i * R)$$

$$Z_{(i+1)} = Oc * (1 - Y_i) + Y_i$$

Leak Fraction

	1	2	3	4	5	6	7
Z	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Y	0	0	0	0	0	0	0
Average	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Average Leak Rate

	1	2	3	4	5	6	7
Leak Rate	0.000599	0.000599	0.000599	0.000599	0.000599	0.000599	0.000599

0.000599 LDAR Final Average Leak Rate (kg/hr/source)

0.001321 lb/hr/source

76.024 LDAR Control Effectiveness

EPA Protocol for Equipment Leak Emissions

Connectors in Gas and Light Liquid Service (Gas, Oil and Gas Prod Operations [includes gas processing])

LDAR 500 ppm and quarterly monitoring  
(consistent with Subpart OOOO)

Table 2-4, Oil and Gas Production Operations Average Emission Factors  
0.0002 Average Leak Rate (kg/hr/source)

Table 5-7, Eqns Relating ALR to LKFRAC at O&G Production Operations  
 $ALR = (0.070 * LKFRAC) + 0.0000091$   
 $LKFRAC = (ALR - 0.0000091) / 0.070$

Table G-3, Refineries values (none available for oil or gas production)

1 FR Fix Rate Fraction  
 0 R Recurrence Rate Fraction  
 0.005 Oc Occurrence Rate Fraction

0.017 Z1 Initial Leak Fraction (From LKFRAC Eqtn in Table 5.7)

Immediate Post LDAR Leak Fraction % = Y1

Subsequent Iterations

$$Y_i = Z_i - (FR * Z_i) + (FR * Z_i * R)$$

$$Z_{(i+1)} = Oc * (1 - Y_i) + Y_i$$

Leak Fraction

	1	2	3	4	5	6	7
Z	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Y	0.00	0	0	0	0	0	0
Average	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025

Average Leak Rate

	1	2	3	4	5	6	7
Leak Rate	0.000184	0.000184	0.000184	0.000184	0.000184	0.000184	0.000184

0.000184 LDAR Final Average Leak Rate (kg/hr/source)  
 0.000428 lb/hr/source

7.95 LDAR Control Effectiveness

EPA Protocol for Equipment Leak Emissions

Pumps in Light Oil Service (Gas, Oil and Gas Prod Operations [includes gas processing])

LDAR 10,000 ppm and quarterly monitoring

Table 2-4, Oil and Gas Production Operations Average Emission Factors  
0.013 Average Leak Rate (kg/hr/source)

Table 5-7, Eqns Relating ALR to LKFRAC at Oil and Gas Production Operations  
 $ALR = (0.1 * LKFRAC) + 0.00051$   
 $LKFRAC = (ALR - 0.00051) / 0.1$

Table G-3, Refineries values (none available for oil or gas production)

1 FR Fix Rate Fraction  
 0 R Recurrence Rate Fraction  
 0.1 Oc Occurrence Rate Fraction

24 Z1 Initial Leak Fraction (From LKFRAC Eqtn in Table 5.7)

Immediate Post LDAR Leak Fraction % = Y1

Subsequent Iterations

$$Y_i = Z_i - (FR * Z_i) + (FR * Z_i * R)$$

$$Z_{(i+1)} = Oc * (1 - Y_i) + Y_i$$

Leak Fraction

	1	2	3	4	5	6	7
Z	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Y	0	0	0	0	0	0	0
Average	0.05	0.05	0.05	0.05	0.05	0.05	0.05

Average Leak Rate

	1	2	3	4	5	6	7
Leak Rate	0.004925	0.004925	0.004925	0.004925	0.004925	0.004925	0.004925

0.004925 LDAR Final Average Leak Rate (kg/hr/source)

0.010353 lb/hr/source

62.11538 LDAR Control Effectiveness

## ATTACHMENT P: PUBLIC NOTICE

MarkWest Liberty Midstream & Resources L.L.C. has published a public notice in *The Wetzel Chronicle* newspaper, headquartered in Wetzel County, WV. This paper serves the geographical area surrounding the proposed facility.

The affidavit issued by the paper showing the date of publication and the actual text is attached following the proposed text:

### AIR QUALITY PERMIT NOTICE

#### Notice of Application

Notice is given that MarkWest Liberty Midstream & Resources L.L.C. has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, to modify a New Source Review (45 CSR 13) construction permit for a natural gas processing plant (Mobley Gas Plant) located in Wetzel County, West Virginia (Permit R13-2878B). The site is located at Latitude N 39° 33' 08" and Longitude W 80° 32' 26". From Mannington, West Virginia go due west on Buffalo St/Market St (5.9 mi), turn left onto Brink Rd (1.3 mi), stay left on Brink Rd (3.2 mi), continue straight onto N Fork Rd (4.0 mi), the plant entrance is on the left.

The modification will result in changes to the potential to emit of the following Regulated Air Pollutants as follows:

Nitrogen Oxides (NOx)	13.04 tons/yr
Carbon Monoxide (CO)	10.83 tons/yr
Volatile Organic Compounds (VOC)	-5.48 tons/yr
Particulate Matter (PM)	0.09 tons/yr
Sulfur Dioxide (SO <sub>2</sub> )	1.11 tons/yr
Total HAPs	-0.33 tons/yr

Startup of operation is planned to begin during October 2015. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57<sup>th</sup> Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice. Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1227, during normal business hours.

Dated the 1<sup>st</sup> of May, 2015

By: MarkWest Liberty Midstream & Resources L.L.C.  
Leanne Meyer  
VP of EH&S  
1515 Arapahoe Street  
Tower 1, Suite 1600  
Denver, CO 80202-2137

MarkWest Liberty Midstream & Resources L.L.C.  
Mobley Gas Plant – Modification  
May 2015

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### **APPLICATION FEE**

Per 45CSR13 and 45CSR22, Title 45, Series 22, Section 3.4.a, a fee of \$1,000 must be submitted for a Modification Permit. In addition, per Section 3.4b, a Category Fee of \$1,000 must be paid for NSPS requirements.

MarkWest Liberty Midstream & Resources L.L.C. hereby submits a check for the total \$2,000.00 payable to: WVDEP/DAQ

## **APPENDIX A: SUPPORT DOCUMENTS**

Heater Specification Sheets



# DESIGN X 1.10

H-5781

HCI	IP UNITS	SI UNITS	
Heater Capacity (Btu/hr) (MW)	19,139,997	5.61	
Heater Circulation Rate (Lb/hr) (kg/hr)	366,456	166,178	
Heater Circulation Rate (Gal/min) (m <sup>3</sup> /hr)	712	162	
Heater Inlet Temperature (°F) (°C)	195	91	
Heater Outlet Temperature (°F) (°C)	255	124	
Minimum Allowable Circulation Rate (Gal/min) (m <sup>3</sup> /hr)	570	129	
Input (HHV) (Btu/hr) (MW)	26,147,362	7.66	
Stack Temperature (°F) (°C)	730	388	
Calculated Heater Efficiency % LHV	81	81	
Heater Calculated ΔP (psid) (kPa) (Clean)	18	125	
Heater Volume (Gallons) (m <sup>3</sup> )	816	3	
Tank Capacity (Gallons) (m <sup>3</sup> )	500	3	
Total Surface Area (ft <sup>2</sup> ) (m <sup>2</sup> )	1,453	135	
Overall Flux Rate (Btu/hr-ft <sup>2</sup> ) (kW/m <sup>2</sup> )	13,173	42	
Radiant Surface Area (ft <sup>2</sup> ) (m <sup>2</sup> )	727	68	
Average Radiant Flux Rate (Btu/hr-ft <sup>2</sup> ) (kW/m <sup>2</sup> ) AICHE	16,467	52	
Maximum Radiant Flux Rate (Btu/hr-ft <sup>2</sup> ) (kW/m <sup>2</sup> ) AICHE	22,231	70	
Maximum Metal Temperature (°F) (°C) AICHE	296	147	
Maximum Film Temperature (°F) (°C) AICHE	278	137	
Combustion Loading (Btu/hr-ft <sup>3</sup> ) (kW/m <sup>3</sup> )	31,956	331	
Average Flue Gas Velocity Across Insulation (ft/s) (m/s)	76	23	
Average TEG/Water Velocity (ft/s) (m/s)	9	3	
% Output	Duty (Btu/Hr)	% Eff (LHV)	Stack Temp (F)
25.00	4,784,999	87	430
50.00	9,569,998	85	530
75.00	14,354,998	83	630
100.00	19,139,997	81	730

H-5741

### SYSTEM PARAMETERS

The recommendations in this proposal are based on the following parameters:

Heater location	Unknown
Plant elevation	Maximum 2,000 ft
Heater location	Outdoor
Heat load (normal)	5,794,562 Btu/hr x 1.3
Heater burner input (normal)	7,689,564 Btu/hr
Flow rate	20,840 Lbs/Hr x 1.10
Heater pressure loss (normal)	5 P.S.I.D.
Average heat flux (normal)	7,820 Btu/hr/ft <sup>2</sup>
Combustion loading (normal)	26,038 Btu/hr/cu. ft
Electrical	480/3/60
Controls	NEHA 4
Primary fuel <u>Standard Natural Gas only</u>	Fuel gas
Gas pressure required	10 PSIG
Insurance requirements	IRI
ASME Code	650 °F. @ 1395 PSIG
Heater turndown	3:1
Heat Medium	Regeneration Gas
Supply temperature	550°F
Return temperature	135°F
Expected NOx	40 ppm

5

## **EQUIPMENT RECOMMENDATIONS:**

### **HEATER PACKAGE:**

In the majority of all process heaters, 70% or more of all heat transferred occurs in the radiant section of a heater. Proper design of this section is the single most important factor to consider when selecting a heater. For your application we recommend one (1) Horizontal Helical Coil Heater, Model HCI-5010-40-G designed for an output of 5,794,562 x 1.3 Btu's/hr. The heater will raise the regeneration gas temperature from 135°F to 550°F at a flow rate of 20,840#/hr x 1.10 while the heat transfer coil pressure drop is 5.0 PSI. The average radiant flux rate for the helical coil heater is much lower than that observed in serpentine coil or three pass design heaters. The result will be significant increase in heater life. This model heater is a helical coil, two pass design utilizing a radiant and convection section for heat transfer. The heater is designed, manufactured, wired, and tested at our facility in Chattanooga, Tennessee USA. It is completely packaged and will include:

- High media velocity Single Circuit 4" SA 106 Gr. B seamless, Schedule 80 helical coil with an ASME section VIII stamp for 1095 PSIG @ 650 °F with a CA = .0625" with 4" 900 # RTI flanges on inlet and outlet.
- Coil is hydrostatically tested per ASME code and will receive National Board for pressure vessels registration
- 3/8" thick A36 carbon steel shell & end covers
- The end covers, which are bolted to the heater to allow easy coil removal, should the heater ever need to be repaired. Covers are equipped with lifting eyes for servicing.
- 3-5" thick high temperature ceramic fiber blanket insulation with seams overlapped on interior of heater shell and end covers to provide an average skin temperature of 140-160 °F with an ambient temperature of 70 °F and 5 MPH wind.
- Rear cover contains a 18" bolted manway in rear cover for access to heater internals and blast gate type peep sight allows one to inspect flame conditions and assure there is no flame impingement.
- Inert gas smothering connection in front cover (Gas and controls by others).
- Structural steel skid with fabricated saddles and 4 skid lifting lugs welded to A36 channels to form a complete skid mounted frame.
- 304 stainless steel coil supports located in the convection zone where they remain cooler
- Stack rain cap and bird screen

(Spreader bars, by customer, need to be used for positioning unit at the installation site).

### **Burner:**

An Eclipse WiNOx forced draft burner is provided for natural gas only combustion for maximum 2,000 ft elevation. Burner, fuel train(s) and controls are completely packaged and tested to arrive at customer's site requiring no additional assembly. The pilot will be natural gas with the standard ignition procedures. Estimated emissions (Corrected to 3% O2) are as follows:

NOx - 40 PPMVD  
CO - 50 PPMVD

#### **Burner includes:**

- Direct spark ignited natural gas pilot (Interrupted type)
- UV Flame detection scanner for proving main and pilot flames
- Ignition transformer
- Nameplate on burner stating the burner rated maximum input (HHV)
- A 20 hp Combustion air blower with TEFC motor for 480V/3PH/60HZ
- Combustion air duct with damper and modulation motor containing low / high fire proof switches
- Locally mounted low combustion air pressure switch

#### **Pilot Gas Fuel Train**

Pilot gas train supplied to **NEMA 4** requirements. Fuel train will consist of all NPT connections and typical NFPA requirements. The fuel train includes:

- Pressure regulator
- Safety shutdown valve
- Solenoid vent valve
- Manual ball valve (UL listed)
- Pressure gauge with isolation valve
- Pilot gas train will be painted yellow

#### **Main Gas Fuel Train**

Main gas train supplied to **NEMA 4** requirements. Fuel train will consist of **NPT** connections and typical NFPA requirements. The fuel train includes:

- Pressure regulator
- Dual automatic safety shutdown valves with a proof of closure switches
- Solenoid vent valve
- Locally mounted high and low pressure switches
- Two (2) manual ball valves (UL listed)
- Butterfly valve
- Fuel modulation valve
- Sampling ports
- Pressure gauge with isolation valve
- Strainer
- Drip leg
- Pressure relief valve
- Main gas train will be painted yellow

## **Electrical Controls Enclosure:**

### **Control Panel**

A NEMA 4X 316 SS (UL Listed) enclosure, wired to meet NEMA 4 and NEC requirements, is mounted on the front face of the heater frame. The enclosure utilizes digital controllers, touch safe design, solid state components and is wired to meet NEC requirements. It is designed, manufactured and tested at our facility. The enclosure design separates low and high voltages to eliminate electromotive force interference and includes the following.

- Honeywell burner management system (U.L. listed as a burner management system as required by NFPA)
- Fireye E-300 First Out Annunciator
- Control relays
- Numbered terminal strips with enclosed wiring raceways
- Yokogawa series temperature controller (indicating)
- Yokogawa series high media temperature limit switch (indicating) with manual reset
- Yokogawa series high stack temperature limit switch (indicating) with manual reset
- Indicating lights for: power on, ignition, main fuel, pump on, blower on, burner on and alarm silenced
- Switches for: burner off/on, alarm silence, low fire hold.
- Flame safety reset button
- Manual emergency trip switch
- Alarm horn, to indicate flame failure (mounted adjacent to panel)

### **Locally mounted instruments included are:**

- Low or no flow media (Regen Gas) Contacts and devices by customer for shutdown of heater.
- Inlet & Outlet pressure gauge with shut off cock
- Inlet & Outlet thermometer with thermowell and equal length stem
- Duplex process thermocouple
- Stack thermocouple
- Pressure relief valve connection on the outlet of heater process piping (1" NPT) (Valve by customer)
- Graphite paste will be used on all threaded process connections

**NOTE: NO ANALYZERS OR FLOW METERS/RECORDERS OF ANY KIND OFFERED IN THIS PROPOSAL.**

### **Electrical Test:**

An electrical continuity test is performed on every heater. The burner firing is simulated prior to shipment.

### **Stack:**

The flanged stack will bolt on to the flue gas outlet of the heater.

Stack will extend a minimum of 8 feet above top of heater. The stack with bird screen, rain cap and flanged bottom connection will ship loose with the heater. Field reattachment is required by customer.

**Note: Platform and ladders not included nor required.**

**Approximate Physical Data (Horizontal Helical Coil Heater Only):**

25.5' L. x 7.2'W x 7.9'H (Less Stack)	
Dry 15,800 Lbs.	

**Painting:**

All external metal surfaces will be white metal sandblasted per SSPC-SP10.

After sandblasting a primer coat of 2 to 3 mil thick will be applied followed by one topcoat.

On all fabricated metal surfaces above 450°F, a top coat of High Heat Paint, 1 ½ to 2 mil thick will be applied.

All purchased accessory items will remain as coated by the original manufacturers.

**Shipping:**

The major components of shipment are as follows:

- A) Heater shell assembly
- B) Stack assembly
- C) (1) Lot of bolts, nuts and gasket materials

**INVESTMENT:**

ITEM DESCRIPTION	PRICE
HCI 5010-40-G Heater, Burner, Burner Management, Controls & Stack	

**\*These prices are valid for 90 days.**

**Taxes:**

All taxes which Heatec may be required to pay to any government (foreign, federal, state or municipal) upon sale or transportation of the equipment involved will require reimbursement.

**Special Note:**

Because of increased enforcement of a Tennessee State Law, Heatec must add Tennessee State Sales Tax to the purchase price of equipment if the transfer of ownership occurs in the State of Tennessee. Transfer of ownership, by definition, occurs when a Freight Company hired by the Customer or Customer owned transport(s) pickup the equipment. Please make special note that Tennessee State Tax is 6% of the purchase price, plus \$36.00 and this amount will be added when ownership transfer in the State of Tennessee is applicable. To eliminate this additional cost, Heatec will arrange shipping, using Customer guidance if requested. Actual freight costs will or can be prepaid and invoiced to the Customer.

**Terms of payment:**

Purchaser shall pay the purchase price in progress payments as follows:

30% at thirty (30) days ARO, after receipt of order. This corresponds to the typical issue of approval drawings (if applicable).\*

40% at sixty (60) days ARO after receipt of order. This corresponds to the typical completion of the coil or purchase of major components.\*

Balance on shipment.

All invoices due on receipt.

\*Receipt of these progress payments is required before the equipment will be released for shipment.