

STATE OF MISSOURI



DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: 082013-012 Project Number: 2012-04-077
Installation Number: 221-0042

Parent Company: Biomass Energy and Technology, Inc.

Parent Company Address: P.O. Box 399, Potosi, MO 63664

Installation Name: Biomass Energy and Technology, Inc.

Installation Address: 10155 Energy Circle, Cadet, MO 63630

Location Information: Washington County, S12, T37N, R2E

Application for Authority to Construct was made for:

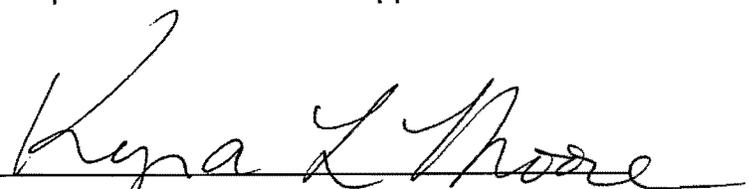
Clean biomass processing facility to manufacture charcoal, lime, calcium carbide, calcium hydroxide, acetylene, and liquid biofuels. This review was conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

Standard Conditions (on reverse) are applicable to this permit.

Standard Conditions (on reverse) and Special Conditions are applicable to this permit.

AUG 23 2013

EFFECTIVE DATE


DIRECTOR OR DESIGNEE
DEPARTMENT OF NATURAL RESOURCES

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. Permittee should notify the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit and the project review. In the event that there is a discrepancy between the permit application and this permit, the conditions of this permit shall take precedence. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the Department's Air Pollution Control Program of the anticipated date of startup of these air contaminant sources. The information must be made available within 30 days of actual startup. Also, you must notify the Department of Natural Resources Regional office responsible for the area within which you are located within 15 days after the actual startup of these air contaminant sources.

A copy of this permit and permit review shall be kept at the installation address and shall be made available to Department of Natural Resources' personnel upon request.

You may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, MO 65102, as provided in RSMo 643.075.6 and 621.250.3. If you choose to appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

If you choose not to appeal, this certificate, the project review and your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant sources(s), but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources and other applicable federal, state and local laws and ordinances.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit at (573) 751-4817. If you prefer to write, please address your correspondence to the Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, attention: Construction Permit Unit.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (12)(A)10. "Conditions required by permitting authority."

Biomass Energy and Technology, Inc.
Washington County, S12, T37N, R2E

1. Operational Requirement - Chamber 1 (EU-28)
 - A. The preheater shall be fueled exclusively by propane. The preheater shall only be operated during startup as determined by performance testing under Special Condition 8.F.
 - B. Clean biomass shall be the only feedstock. Clean biomass is plant or plant-based material free of primer, paint, sealant, protectant, preservative, insecticide, fungicide, treatment or other coatings. Railroad ties and utility poles are not clean biomass.
 - C. The oxygen content, temperature, and pressure shall be continuously monitored and recorded.
 - D. Chamber 1 shall be operated and maintained in accordance with the operational ranges established in the latest performance test. All specifications and operating ranges shall be kept on site.
2. Control Device Requirement - Thermal Oxidation
 - A. Biomass Energy and Technology, Inc. shall control emissions from the emission units in Table 1 using chamber 2 (EU-29) or chamber 3 (EU-38).

Table 1: Emission Units Controlled by Thermal Oxidation

Emission Unit	Description
28	Chamber 1
N/A	Chamber 2 material conversion with indirect heat
N/A	Chamber 3 material conversion with indirect heat
32	Pyrolysis oil condenser
33	Pyrolysis oil distiller
34	Biogases
35	Gas cleaning
36	Gas bottling
46	Acetylene bottling
EU-42	Reciprocating internal combustion engine

N/A = Not Applicable

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- B. Biomass Energy and Technology, Inc. shall control emissions from chamber 2 using chamber 3.
 - C. Biogas created in chamber 1 shall be the only fuel in chamber 2.
 - D. Biogas created in chamber 1 or chamber 2 shall be the only fuel in chamber 3.
 - E. Biomass Energy and Technology, Inc. shall continuously monitor and record the temperature and pressure of chamber 2 and chamber 3.
 - F. Biomass Energy and Technology, Inc. shall operate and maintain chamber 2 and chamber 3 in accordance with the operational ranges established in the latest performance test report. All specifications and operating ranges shall be kept on site.
 - G. Biomass Energy and Technology, Inc. shall maintain an operating and maintenance log for each chamber 2 and chamber 3 which shall include the following:
 - 1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
 - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
3. Capture Device Requirement - Building Enclosure
- A. Biomass Energy and Technology, Inc. shall capture emissions from the emission units in Table 2 using complete enclosure or completely enclosed buildings. All windows and doors shall be closed.

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

Table 2: Enclosed Emission Units

Emission Unit	Description
2a	Clean biomass pile - load-in
2b	Clean biomass pile - load-out
2c	Clean biomass pile - wind erosion
2d	Clean biomass pile – vehicular activity
3	Clean biomass grinder
4	Clean biomass conveyor
22	Limestone receiving
23	Limestone conveyor
24	Limestone storage bin
25	Clean biomass storage bin
26	Clean biomass conveyor
27	Clean biomass conveyor
30	Charcoal conveyor
31	Charcoal bagging
32	Pyrolysis oil condenser
33	Pyrolysis oil distiller
34	Biogases
35	Gas cleaning process
36	Gas bottling process
37	Lime/char mixer
46	Acetylene bottling
43	Lime conveyor
44	Lime bagging
45	Calcium hydroxide packaging
39	Calcium carbide handling
40	Calcium carbide crushing
41	Calcium carbide packaging
28	Gasifier 1 st chamber
29	Gasifier 2 nd chamber
38	Gasifier 3 rd chamber

4. Control Device Requirement - Baghouse
 - A. Biomass Energy and Technology, Inc. shall control emissions from the emission units in Table 3 using baghouses.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

Table 3: Emission Units with Baghouse Control

Emission Unit	Description	Baghouse ID
2a	Clean biomass pile - load-in	4
2b	Clean biomass pile - load-out	
2c	Clean biomass pile - wind erosion	
2d	Clean biomass pile – vehicular activity	
3	Clean biomass grinder	
4	Clean biomass conveyor	
22	Limestone receiving	5
23	Limestone conveyor	
24	Limestone storage bin	
25	Clean biomass storage bin	6
26	Clean biomass conveyor	
27	Clean biomass conveyor	
30	Charcoal conveyor	8
31	Charcoal bagging	
37	Lime/char mixer	10
43	Lime conveyor	7
44	Lime bagging	
45	Calcium hydroxide packaging	12
39	Calcium carbide handling	11
40	Calcium carbide crushing	
41	Calcium carbide packaging	

- B. The baghouses shall be operated and maintained in accordance with the manufacturer's specifications. Each baghouse shall be equipped with a gauge or meter, which indicates the pressure drop across the control device. These gauges or meters shall be located such that the Department of Natural Resources' employees may easily observe them.
- C. Replacement filters for the baghouses shall be kept on hand at all times. The bags shall be made of fibers appropriate for operating conditions expected to occur (i.e. temperature limits, acidic and alkali resistance, and abrasion resistance).
- D. Biomass Energy and Technology, Inc. shall monitor and record the operating pressure drop across each baghouse at least once every 24 hours. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty.
- E. Biomass Energy and Technology, Inc. shall maintain a copy of the baghouse manufacturer's performance warranty on site.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- F. Biomass Energy and Technology, Inc. shall maintain an operating and maintenance log for the baghouses which shall include the following:
 - 1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
 - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.

- 5. Haul Roads and Storage Pile Areas
 - A. Biomass Energy and Technology, Inc. shall pave all haul roads and storage pile areas with asphalt, concrete, or other materials subject to approval by the Air Pollution Control Program.

 - B. Maintenance and repair of the surfaces shall be conducted as necessary to ensure that the physical integrity of the pavement is adequate to achieve control of fugitive emissions from these areas while the installation is in operation.

- 6. Record Keeping and Reporting Requirements
 - A. Biomass Energy and Technology, Inc. shall maintain all records required by this permit for not less than five years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request. These records shall include MSDS for all materials used.

 - B. Biomass Energy and Technology, Inc. shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than ten days after the end of the month during which any record required by this permit shows an exceedance of a limitation imposed by this permit.

- 7. Performance Testing
 - A. Biomass Energy and Technology, Inc. shall conduct initial performance testing on chamber 3 according to methods preapproved by the Air Pollution Control Program Compliance/Enforcement Section.
 - 1) The emission units in Table 1 shall be in operation during the performance test, each operating at or within 10% below the respective MHDR as provided in Table 7. Chamber 2 and chamber 3 material conversion with indirect heat shall be in operation. If tested operation rates are above or below this range then Biomass Energy and Technology, Inc. shall submit a revised construction permit application per Special Condition 7.G.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- 2) Testing shall demonstrate emission rates not exceeding those in Table 4.

Table 4: Performance Testing Emission Rates (lb/hr)

Pollutant	Emission Rate
PM	1.24
PM ₁₀	1.24
PM _{2.5}	1.24
SO _x	0.11
NO _x	8.04
VOC	5.18
CO	7.25
CO ₂	371.00
CH ₄	0.02
N ₂ O	0.25
Acetaldehyde	0.02
Acrolein	0.009
Benzene	0.02
Carbon Disulfide	0.02
Chlorine	0.02
Dichloromethane	0.02
Formaldehyde	0.02
Hydrogen Chloride	0.1
Manganese	0.02
Methanol	0.02
Phenol	0.02
Polycyclic Organic Matter	0.002

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- B. The parameters in Table 5 shall be monitored and recorded during the performance test.

Table 5: Test Parameters

Emission Unit	Parameter	Units
Chamber 1	Clean biomass feedstock type	N/A
	Clean biomass feedstock input rate	tph
	¹ Clean biomass feedstock input rate	MMBtu/hr
	Clean biomass feedstock moisture	% wt
	¹ Preheater fuel	MMBtu/hr
	Preheater fuel usage duration	minutes
	Process duration	minutes
	Process oxygen content (high, low, average)	ppmv
	Process temperature	°F
	Process pressure	Inches water
	Process flowrate	DSCFM
	Processed material output rate	tph
	Processed material moisture content	% wt
Chamber 2	¹ Biogas input rate	MMBtu/hr
	Raw material input types	N/A
	Raw material input rates	tph
	Process temperature	°F
	Process pressure	Inches water
	Process flowrate	DSCFM
	Processed material output type	N/A
	Processed material output rate	tph
Process duration	minutes	
Chamber 3	¹ Biogas input rate	MMBtu/hr
	Raw material input types	N/A
	Raw material input rates	tph
	Process temperature	°F
	Process pressure	Inches water
	Process flowrate	DSCFM
	Processed material output type	N/A
	Processed material output rate	tph
Process duration	minutes	

N/A = Not Applicable

¹ Can be established by calculation.

- C. The initial test shall be performed within 60 days after achieving the maximum production rate of the installation, but not later than 180 days after initial start-up of chamber 1.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- D. A completed Proposed Test Plan Form (enclosed) must be submitted to the Air Pollution Control Program 30 days prior to the proposed test date so that the Air Pollution Control Program may arrange a pretest meeting, if necessary, and assure that the test date is acceptable for an observer to be present. The Proposed Test Plan may serve the purpose of notification and must be approved by the Director prior to conducting the required performance testing.
- E. Two copies of a written report of the Performance Test Results shall be submitted to the Director within 30 days of completion of any required testing. The report must include legible copies of the raw data sheets, analytical instrument laboratory data, and complete sample calculations from the required EPA Method for at least one sample run.
- F. The Performance Test Results report is to fully account for all operational and emission parameters addressed both in the permit conditions as well as in any other applicable state or federal rules or regulations (NSPS and MACT). The Performance Test Results report shall establish the operational ranges and parameters for Table 6.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

Table 6: Performance Test Results Report Operational Ranges

Emission Unit	Parameter	Units
Chamber 1	Duration, temperature, pressure, oxygen content, flowrate or other parameters needed to define each startup and normal process operation	N/A
	Clean biomass feedstock MHDR	tph
	Process oxygen content (high, low, average)	ppmv
	Process temperature range	°F
	Process pressure range	Inches water
	Process flowrate range	DSCFM
	Processed material MHDR	tph
	Processed material moisture content	% wt
Chamber 2	Raw material MHDR	tph
	Process temperature range	°F
	Process pressure range	Inches water
	Process flowrate range	DSCFM
	Processed material MHDR	tph
Chamber 3	Raw material MHDR	tph
	Process temperature range	°F
	Process pressure range	Inches water
	Process flowrate range	DSCFM
	Processed material MHDR	tph
N/A	MHDR and chamber of origin of all products (processed materials) including but not limited to calcium carbide, lime, acetylene, calcium hydroxide, liquid and gaseous biofuels	N/A

- G. If the results of the performance testing show that the emission rates exceed those in Table 4, then Biomass Energy and Technology, Inc. shall evaluate what effects these higher emission rates would have had on the permit applicability of this project. Biomass Energy and Technology, Inc. shall submit the results of any such evaluation in a construction permit application within 30 days of submitting the Performance Test Results report required in Special Condition 8.E. of this permit.
- H. Biomass Energy and Technology, Inc. shall conduct testing of a previously untested clean biomass feedstock category, previously untested blends of clean biomass feedstock categories, or previously untested raw materials for indirect heat processing in chamber 2 or chamber 3 within 90 days of processing such biomass fuel category or raw material. Test results shall be submitted to the Air Pollution Control Program's New Source Review

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

Unit for review and approval. Approval shall specify the maximum percentage of each biomass feedstock category that may be used in any blend. Approval shall specify the type and maximum input rate of the raw material for processing by indirect heat in chamber 2 and chamber 3. Thereafter, the approved biomass feedstock category shall be in a blend at a percentage not exceeding the approved percentage, and the approved raw material shall be used at a rate not exceeding its approved rate.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (5) REVIEW

Project Number: 2012-04-077
Installation ID Number: 221-0042
Permit Number:

Biomass Energy and Technology, Inc.
10155 Energy Circle
Cadet, MO 63630

Complete: April 25, 2012

Parent Company:
Biomass Energy and Technology, Inc.
P.O. Box 399
Potosi, MO 63664

Washington County, S12, T37N, R2E

REVIEW SUMMARY

- Biomass Energy and Technology, Inc. has applied for authority to construct a clean biomass processing facility to manufacture charcoal, lime, calcium carbide, calcium hydroxide, acetylene, and liquid biofuels.
- HAP emissions may result from the proposed emission units. HAP emission rates will be confirmed by performance testing.
- 40 CFR 60 Subpart CCCC, *Standards of Performance for Commercial and Industrial Solid Waste Incineration Units for Which Construction is Commenced After November 30, 1999 or for Which Modification or Reconstruction is Commenced After June 1, 2001*, does not apply to the installation as the only permitted feedstock is clean biomass. No other incineration NSPS apply.
- 40 CFR 60 Subpart NNN, *Standards of Performance for Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations*, may apply to the installation. Applicability will be determined by the Air Pollution Control Program following submittal of the initial Performance Test Results report, based upon the chemicals produced by the installation (§60.667).
- 40 CFR 60 Subpart JJJJ, *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*, applies to the engine (EU-42). Engine emissions are controlled by thermal oxidation.
- None of the NESHAPs under 40 CFR Subpart 61 apply to this installation.

- 40 CFR 63 Subpart VVVVVV, *National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources*, may apply to the installation. Applicability will be determined by the Air Pollution Control Program following submittal of the initial Performance Test Results report, based upon the HAP emissions.
- 40 CFR 63 Subpart AAAAA, *National Emission Standard for Hazardous Air Pollutants for Lime Manufacturing Plants*, likely does not apply to the installation as it is not projected to be a major HAP source. Applicability will be determined by the Air Pollution Control Program following submittal of the initial Performance Test Results report, based upon the HAP emissions.
- 40 CFR 63 Subpart ZZZZ, *National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*, applies to the engine, however it meets all requirements of this subpart by meeting NSPS JJJJ.
- 40 CFR 63 Subpart MMMMMM, *National Emission Standards for Hazardous Air Pollutants for Carbon Black Production Area Sources*, does not apply to the installation as it does not contain a carbon black production process unit.
- Process enclosure, building enclosure, baghouses, and thermal oxidation are being used to control emissions from the equipment in this permit.
- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Controlled potential emissions of all pollutants are below respective de minimis levels.
- This installation is located in Washington County, an attainment area for all criteria pollutants.
- This installation is on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation is classified as item number 25. Charcoal production facilities. The installation's major source level is 100 tons per year and fugitive emissions are counted toward major source applicability. The installation may manufacture other products such that the primary business activity may change from charcoal production. It is the installation's responsibility to determine primary business activity and notify the Air Pollution Control Program of any change.
- Ambient air quality modeling was not performed since potential emissions of the application are below respective de minimis levels.
- Performance testing is required.
- Operating permit applicability will be determined by the Air Pollution Control Program following submittal of the initial Performance Test Results report, based upon revised potential emissions and NSPS/MACT applicability.

- Approval of this permit is recommended with special conditions.

INSTALLATION/PROJECT DESCRIPTION

Biomass Energy and Technology, Inc. proposes to construct a clean biomass processing facility to manufacture charcoal, lime, calcium carbide, calcium hydroxide, acetylene, and liquid biofuels. Clean biomass will be received, stored, ground, and processed through three continuous chambers. In the first chamber the biomass will be preheated with direct propane combustion until pyrolysis begins. Biogas will be sent to the second and third chambers. Biogas may be condensed and distilled to bioliquids such as liquid fuel. Biosolids may exit the first chamber and be processed as charcoal. Biogas from the first chamber will be combusted in the second chamber up to 1,800 °F. In the second chamber, indirect heat will be applied to limestone to produce lime. Biogas supplied to the third chamber will be combusted up to 3,600 °F. In the third chamber lime and char from the other chambers will be indirectly heated to produce calcium carbide. Lime will also be processed into calcium hydroxide. Beyond the chambers calcium carbide will be refined into acetylene gas and bottled. Acetylene will also be used as a fuel for an onsite RICE generator set. Technical specifications for the RICE were not available at the time of permit issuance. Permitted emission units are provided in Table 7. The bottleneck is the 1st chamber biomass processing rate.

The storage piles and milling equipment are controlled by building enclosure and baghouses. All haul roads and storage pile areas will be paved. The second and third chambers are control devices for the first chamber, RICE exhaust, and indirect heating of limestone, lime and char. No permits have been issued to Biomass Energy and Technology, Inc. from the Air Pollution Control Program.

Table 7: Installation Emission Units

Emission Unit	Emission Point	Description	Bottlenecked MHDR (tph)	MHDR (MMBtu/hr) input / output
1	1	Clean biomass receiving haul road	10.0	N/A
2a	BH4	Clean biomass pile - load-in	10.0	
2b	BH4	Clean biomass pile - load-out	10.0	
2c	BH4	Clean biomass pile - wind erosion	10.0	
2d	BH4	Clean biomass pile – vehicular activity	10.0	
3	BH4	Clean biomass grinder	10.0	
4	BH4	Clean biomass conveyor	10.0	
21	21	Limestone receiving haul road	20.0	
22	BH5	Limestone receiving	20.0	
23	BH5	Limestone conveyor	20.0	
24	BH5	Limestone storage bin	20.0	
25	BH6	Clean biomass storage bin	10.0	
26	BH6	Clean biomass conveyor	10.0	
27	BH6	Clean biomass conveyor	10.0	
30	BH8	Charcoal conveyor	2.5	
31	BH8	Charcoal bagging	2.5	
32	TO1	Pyrolysis oil condenser	3.5	
33	TO1	Pyrolysis oil distiller	2.5	
34	TO1	Biogases	1.0	

35	TO1	Gas cleaning process	1.0	
36	TO1	Gas bottling process	1.0	
37	BH10	Lime/char mixer	6.5	N/A
46	TO1	Acetylene bottling	0.5	
47d	47d	Charcoal shipping haul road	2.5	
43	BH7	Lime conveyor	5.0	
44	BH7	Lime bagging	5.0	
47e	47e	Lime shipping haul road	5.0	
47f	47f	Biogas shipping haul road	1.0	
45	BH12	Calcium hydroxide packaging	1.5	
47h	47h	Calcium hydroxide shipping haul road	1.5	
39	BH11	Calcium carbide handling	4.5	
40	BH11	Calcium carbide crushing	4.5	
41	BH11	Calcium carbide packaging	4.5	
47i	47i	Calcium carbide shipping haul road	4.5	
47g	47g	Acetylene shipping haul road	0.5	
28	TO1	Gasifier 1 st chamber	10.0	
29	TO1	Gasifier 2 nd chamber	20.0	0.35 / 2.5
38	TO1	Gasifier 3 rd chamber	6.5	0.85 / 5.0
42	TO1	RICE	N/A	N/D

N/A = Not Applicable; N/D = Not Determined

BH = Baghouse

TO = Thermal oxidizer = 3rd chamber

EMISSIONS/CONTROLS EVALUATION

Clean biomass and limestone receiving and conveying, charcoal, lime and calcium carbide handling potential emissions were calculated using the emission factors obtained from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 13.2.4 *Aggregate Handling and Storage Piles*, November 2006. Biomass moisture was assumed 4.8% which is the upper limit of the range in the section. Actual moisture may be higher, but will not significantly reduce the potential emissions compared to 4.8%. Limestone moisture was assumed 0.7%, cited from 13.2.4-1. Char moisture was assumed 0.1%. Average wind speed of 9.6 miles per hour was selected from St. Louis City data available from the National Climatic Data Center, updated 2008. Building and process enclosure without requirement for demonstration of negative pressure were assigned 95% capture efficiency. Baghouses were assigned 99.5% control efficiency for each PM, PM₁₀, and PM_{2.5}. Therefore, overall removal efficiency is 94.525%.

Potential emissions from the biomass grinder were calculated using the log debarking emission factors, SIC 3-07-008-01 obtained from EPA WebFIRE.

Potential emissions from the chambers were calculated based upon performance testing from batch style charcoal kilns and other information provided by the applicant. Potential emissions from the chambers will be verified through performance testing.

Potential emissions from the RICE, oil condensing, distilling, and processing were provided by the applicant, were assumed part of the emissions from chamber 3, and will be performance tested.

Potential emissions from the haul roads were calculated using AP-42 Section 13.2.1 *Paved Roads*, January 2011. Silt loading of 7.4 grams per square meter was selected citing municipal solid waste landfills. Testing of silt loading is not required for this permit.

The following table provides an emissions summary for this project. Potential emissions of the application represent the potential of the new emission units, assuming continuous operation (8,760 hours per year). Potential emissions will be revised following performance testing.

Table 8: Emissions Summary (tpy)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions	Controlled Potential Emissions of the Application	Conditioned Potential Emissions of the Installation
PM	25.0	N/A	N/A	17.01	N/A
PM ₁₀	15.0	N/A	N/A	8.46	N/A
PM _{2.5}	10.0	N/A	N/A	6.09	N/A
SO _x	40.0	N/A	N/A	0.50	N/A
NO _x	40.0	N/A	N/A	35.23	N/A
VOC	40.0	N/A	N/A	22.69	N/A
CO	100.0	N/A	N/A	31.75	N/A
GHG (CO ₂ e)	75,000 / 100,000	N/A	N/A	1966.27	N/A
GHG (mass)	0.0 / 100.0 / 250.0	N/A	N/A	1626.16	N/A
HAPs	10.0 / 25.0	N/A	N/A	1.29	N/A

N/A = Not Applicable

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Controlled potential emissions of all pollutants are below respective de minimis levels.

APPLICABLE REQUIREMENTS

Biomass Energy and Technology, Inc. shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved.

GENERAL REQUIREMENTS

- *Submission of Emission Data, Emission Fees and Process Information*, 10 CSR 10-6.110
- *Operating Permits*, 10 CSR 10-6.065

- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*, 10 CSR 10-6.170
- *Restriction of Emission of Visible Air Contaminants*, 10 CSR 10-6.220
- *Restriction of Emission of Odors*, 10 CSR 10-6.165

SPECIFIC REQUIREMENTS

- *Restriction of Emission of Particulate Matter From Industrial Processes*, 10 CSR 10-6.400, does not apply as all emission units are either fugitive, burn fuel for indirect heating, have the potential to emit less than 0.5 lb/hr PM, or are subject to a federally enforceable requirement to install, operate, and maintain a PM control device system that controls at least 90% of PM emissions.
- *Restriction of Emissions from Batch-Type Charcoal Kilns*, 10 CSR 10-6.330, does not apply as the process is continuous, not batch-type.
- *Restriction of Particulate Matter Emissions From Fuel Burning Equipment Used for Indirect Heating*, 10 CSR 10-6.405, applies to chamber 2 and chamber 3. Compliance is assumed according to 10 CSR 10-6.405(3)(C). Compliance will be determined through performance testing.
- *Restriction of Emission of Sulfur Compounds*, 10 CSR 10-6.260 applies. Compliance will be determined through performance testing.

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, I recommend this permit be granted with special conditions.

David Little
New Source Review Unit

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated April 24, 2012, received April 25, 2012, designating Biomass Energy and Technology, Inc. as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- EPA WebFIRE <http://www.epa.gov/ttn/chief/webfire/index.html>

APPENDIX A

Abbreviations and Acronyms

%	percent	m/s	meters per second
°F	degrees Fahrenheit	Mgal	1,000 gallons
acfm	actual cubic feet per minute	MW	megawatt
BACT	Best Available Control Technology	MHDR	maximum hourly design rate
BMPs	Best Management Practices	MMBtu	Million British thermal units
Btu	British thermal unit	MMCF	million cubic feet
CAM	Compliance Assurance Monitoring	MSDS	Material Safety Data Sheet
CAS	Chemical Abstracts Service	NAAQS ...	National Ambient Air Quality Standards
CEMS	Continuous Emission Monitor System	NESHAPs National Emissions Standards for Hazardous Air Pollutants
CFR	Code of Federal Regulations	NO_x	nitrogen oxides
CO	carbon monoxide	NSPS	New Source Performance Standards
CO₂	carbon dioxide	NSR	New Source Review
CO_{2e}	carbon dioxide equivalent	PM	particulate matter
COMS	Continuous Opacity Monitoring System	PM_{2.5}	particulate matter less than 2.5 microns in aerodynamic diameter
CSR	Code of State Regulations	PM₁₀	particulate matter less than 10 microns in aerodynamic diameter
dscf	dry standard cubic feet	ppm	parts per million
EQ	Emission Inventory Questionnaire	PSD	Prevention of Significant Deterioration
EP	Emission Point	PTE	potential to emit
EPA	Environmental Protection Agency	RACT	Reasonable Available Control Technology
EU	Emission Unit	RAL	Risk Assessment Level
fps	feet per second	SCC	Source Classification Code
ft	feet	scfm	standard cubic feet per minute
GACT	Generally Available Control Technology	SIC	Standard Industrial Classification
GHG	Greenhouse Gas	SIP	State Implementation Plan
gpm	gallons per minute	SMAL	Screening Model Action Levels
gr	grains	SO_x	sulfur oxides
GWP	Global Warming Potential	SO₂	sulfur dioxide
HAP	Hazardous Air Pollutant	tph	tons per hour
hr	hour	tpy	tons per year
hp	horsepower	VMT	vehicle miles traveled
lb	pound	VOC	Volatile Organic Compound
lbs/hr	pounds per hour		
MACT	Maximum Achievable Control Technology		
µg/m³	micrograms per cubic meter		

Mr. Kelley Silvey
Vice President
Biomass Energy and Technology, Inc.
P.O. Box 399
Potosi, MO 63664

RE: New Source Review Permit - Project Number: 2012-04-077

Dear Mr. Silvey:

Enclosed with this letter is your permit to construct. Please study it carefully and refer to Appendix A for a list of common abbreviations and acronyms used in the permit. Also, note the special conditions on the accompanying pages. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files. Operation in accordance with these conditions, your new source review permit application and with your operating permit is necessary for continued compliance. The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

If you have any questions regarding this permit, please do not hesitate to contact David Little, at the Department of Natural Resources' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102, or by telephone at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Susan Heckenkamp
New Source Review Unit Chief

SH:dlk

Enclosures

c: Southeast Regional Office
PAMS File: 2012-04-077

Permit Number: