

STATE OF MISSOURI



DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT BOOK

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: 122015 - 017 Project Number: 2015-10-006
Installation Number: 203-0020

Parent Company: Timber Charcoal Co. LLC
Parent Company Address: HC 62 Box 456, Salem, MO 65560
Installation Name: Timber Charcoal Co. LLC
Installation Address: HC 62 Box 512, Salem, MO 65560
Location Information: Shannon County, S19, T31N, R04W

Application for Authority to Construct was made for:
6 charcoal kilns and an afterburner. This review was conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

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

Chad Stephenson
Prepared by
Chad Stephenson
New Source Review Unit

Kyra L Moore
Director or Designee
Department of Natural Resources

Dec 29, 2015
Effective Date

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 start up 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 start up 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.

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."

Timber Charcoal Co. LLC
Shannon County, S19, T31N, R04W

1. Charcoal Kiln Processing Requirements
 - A. Timber Charcoal Co. LLC shall not simultaneously burn more than one (1) kiln in the bank of the six new kilns known as Kiln #13, #14, #15, #16, #17 and #18 to Afterburner #3
 - B. Timber Charcoal Co. LLC shall maintain a daily log for each charcoal kiln that includes start-up time, cool-down time, and re-light time to demonstrate compliance with Special Conditions 1. It is a violation of this permit to operate more than one charcoal kilns (one per control system), during a burn cycle, at a time.

2. Control Device Requirements-Afterburner #3
 - A. Timber Charcoal Co. LLC shall control emissions from the charcoal kilns #13, #14, #15, #16, #17, and #18 using Afterburner #3 as specified in the permit application. The afterburner shall be operated and maintained in accordance with the manufacturer's specifications.
 - B. Timber Charcoal Co. LLC shall continuously monitor and record the temperature of the Afterburner #3 any time the charcoal kilns #13, #14, #15, #16, #17, or #18 are in operation.
 - C. Timber Charcoal Co. LLC shall ensure that the temperature of the Afterburner #3 is maintained within the normal operating range established in the emissions test report. The normal operating range defined by a previous stack test at the facility on a similar afterburner, called for above 1,250 °F or above 900°F if no visible emissions are present during start-up.
 - D. Timber Charcoal Co. LLC has the option of submitting an afterburner temperature control analysis and proposing an alternate temperature control plan to the Director of the Air Pollution Control Program. Upon approval by the Director, an alternate temperature control plan can be implemented.
 - E. Timber Charcoal Co. LLC shall maintain an operating and maintenance log for Afterburner #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.

SPECIAL CONDITIONS:

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

3. Fuel Requirements
Afterburner #3 shall be fueled exclusively by propane.
4. Record Keeping and Reporting Requirements
 - A. Timber Charcoal Co. LLC shall maintain all records demonstrating the date and procedure of the transition between Phase I and Phase II. These records shall be maintained for not less than five years and shall make them available to any Missouri Department of Natural Resources' personnel upon request.

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

Project Number: 2015-10-006
Installation ID Number: 203-0020
Permit Number:

Installation Address:
Timber Charcoal Co. LLC
HC 62 Box 512
Salem, MO 65560

Parent Company:
Timber Charcoal Co. LLC
HC 62 Box 456
Salem, MO 65560

Shannon County, S19, T31N, R04W

REVIEW SUMMARY

- Timber Charcoal Co. LLC has applied for authority to construct six new kilns (Kiln #13 through #18) and a new Afterburner #3.
- The application was deemed complete on October 19, 2015.
- HAP emissions are expected from the proposed equipment. HAPs of concern from this process are Methanol and Polycyclic Organic Matter (POM). HAPs of concern from this process are below major source level and individual SMALS.
- None of the New Source Performance Standards (NSPS) apply to the installation.
- None of the NESHAPs apply to this installation. None of the currently promulgated MACT regulations apply to the proposed equipment.
- An afterburner #3 is being used to control the carbon monoxide, PM, PM₁₀, PM_{2.5}, CO, Polycyclic Organic Matter (POM), HAPs and VOC 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*. Potential emissions of all pollutants are below de minimis levels.
- This installation is located in Shannon 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.

- Ambient air quality modeling was not performed since potential emissions of the application are below de minimis levels.
- Emissions testing is not required for the Afterburner #3. Stack testing was performed on October 2 and 4, 2001 and October 31, 2003 for existing charcoal kilns with a similar design
- A Basic Operating Permit application is not required for this installation since the conditioned potential emissions of the facility is below de minimis.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

Timber Charcoal Company operates an existing charcoal production installation near Salem, Missouri (Shannon County). Charcoal is formed through the pyrolysis of carbon containing materials. The most commonly used materials are woods, such as beech, birch, hard maple, hickory, and oak. Other materials can be used, including nutshells, fruit pits, coal, vegetable wastes, and paper mill residues. During the manufacturing process, the wood is heated, driving off water and highly volatile organic compounds. Wood temperature rises to approximately 275°C (527°F), and the VOC distillate yield increases. At this point, external application of heat is no longer required because the carbonization reactions become exothermic. At 350°C (662°F), exothermic pyrolysis ends, and heat is again applied to remove the less volatile tarry materials from the product charcoal.

The production of charcoal results in emissions of NO_x, PM₁₀, VOCs, CO, and some organic and inorganic HAPs. Some amounts of SO_x, NO_x, CO, and VOC are expected from the combustion of propane used to initiate combustion in the kilns.

The existing installation consists of 12 currently operating batch-type charcoal kilns, four of which are considered grandfathered per 10 CSR 10-6.060(6)(E)3. These kilns however, must still meet the requirements of 10 CSR 10-6.330, *Restriction of Emissions from Batch-Type Charcoal Kilns*. The other eight charcoal kilns were added under construction permit 032004-04. Charcoal production installations are considered “named installations” under Missouri air pollution control regulations. Timber Charcoal Company is an existing de minimis source under the construction permits rule.

The following is a list of kilns currently at the site:

- Kilns #1-6 – Operational with afterburner #1
- Kilns #7-12 – Operational with afterburner #2
- Kilns #13-18 – Being added under the review of this project with afterburner #3

The following New Source Review permits have been issued to Timber Charcoal Co. LLC from the Air Pollution Control Program.

Table 1: Permit History

Permit Number	Description
032004-004	Eight new charcoal kilns and an afterburner. Six controlled by new afterburner and two controlled by existing afterburner. Limit of one kiln burning at a time per afterburner

PROJECT DESCRIPTION

Timber Charcoal CO. LLC, plans to construct six new charcoal kilns and a thermal oxidation control system (afterburner) at their facility in Shannon County, Missouri. The proposed kilns will be numbered 13 through 18. The thermal oxidizer and kilns will be built to the same specifications as the previous two kiln systems at this facility. The design has been successfully tested in 2003 and approved at their facility for the existing two systems on 01/09/2004. The maximum hourly design rate for each kiln system will be 0.375 tons of charcoal produced per hour.

Emission factors for this application are derived from the test results and production values obtained in the 2003 stack test.

The configuration of this design will be six kilns connected to one afterburner with only one kiln burning at any given time.

The thermal oxidizer will use propane to maintain the minimum temperature if the kilns do not provide adequate combustion gases. The stack test results include the contribution from any propane combustion.

As a result of this production capacity increase, particulate emissions from hauling, handling and storage at the site will also increase accordingly. The area of the charcoal storage pile will not increase from the current maximum stated size. Therefore, storage pile emissions due to wind erosion are not expected to increase. The emissions from all haul roads and vehicular activity were however included in this project.

When this project is completed, the operation of this facility will consist of the six new kilns (Kilns #13-18) with Afterburner #3, storage piles and haul roads.

EMISSIONS/CONTROLS EVALUATION

Emissions from the six charcoal kilns #13-18 will be controlled by propane-fired afterburner (AB-3). Emission factors for this project were determined by prior stack testing performed on units of similar design and capacity at the facility. Results of this testing were used to develop the emission factors and control efficiencies for PM, NO_x, VOCs, and CO. The test results have been reviewed and approved by the Air Pollution Control Program's Testing Oversight Unit. In a memo dated January 9, 2004, the Air Pollution Control Program's Testing Oversight Unit determined that no further testing was required for afterburner at this facility unless the afterburners should be reconfigured to control more than one (1) kiln simultaneously.

Therefore, a special condition of this permit requires that no more than one kiln, being controlled by the same afterburner, may operate in the burn phase simultaneously. The emission factors obtained from the stack test are listed in Table 2.

Table 2: Emission Rates from 10/31/03 Stack Test on Similar Kiln System

Pollutant	Average Emission Rate (lb/hr)
PM	0.180
CO	0.022
NOx	0.900
VOC	0.031

According to Missouri State Rule 10 CSR 10-6.330, *Restriction of Emissions from Batch-Type Charcoal Kilns*, new charcoal kilns may operate without initial performance testing if three (3) separate and similar systems have successfully demonstrated compliance with the emission limit requirements of the rule. Timber Charcoal submitted emissions test reports for testing that was performed on similar units equipped with afterburner controls of the same design as those proposed for this project. The testing was performed on October 31, 2003 at this facility and on October 2 and 4, 2001 at Streumph Charcoal Works facilities in Steelville and Belle, Missouri.

The potential emissions of methanol and POM were determined using emission factors from the Environmental Protection Agency (EPA) document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 10.7 *Charcoal* (September, 1995). Test reports confirm that the expected control efficiency for volatile HAPs is 99.98%, resulting in potential emissions of 0.20 tons per year for methane, 0.27 tons per year for methanol and an insignificant level of POM. Sulfur oxides (SO_x) emissions are expected to be negligible and were not determined.

CO₂ emissions were calculated using the retest from the previous stack data test report stating that CO₂ concentration was 13.72 % of the dry flow volume. Using the mass emission rate calculation, CO₂, GHG (mass) and GHG(CO₂e) emissions were determined.

Potential emissions associated with the emission increase associated with the haul roads and storage piles have been included with this project. The emission factors used in the analysis of the haul roads, and the charcoal load in/load out activity were obtained from the following Sections of AP-42: Section 13.2.2 *Unpaved Roads* (November 2006), Section 13.2.1 *Paved Haul Roads*, (January 2011), and Section 13.2.4 *Aggregate Handling and Storage Piles* (November 2006).

The following table provides an emissions summary for this project. Existing potential emissions were taken from Permit #032004-020. Existing actual emissions were taken from the installation's 2014 EIQ. Conditioned potential emissions of the application represent the potential of the new equipment after taking into account the special conditions of this permit, assuming continuous operation (8,760 hours per year

Table 3: Emissions Summary (tons per year)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions ¹	Existing Actual Emissions (2014 EIQ)	Potential Emissions of the Application	New Potential Installation Emissions
PM	25.0	N/D	N/D	8.82	N/D
PM ₁₀	15.0	2.85	0.47	3.10	5.95
PM _{2.5}	10.0	N/D	0.34	1.02	N/D
SOx	40.0	N/D	N/D	N/D	N/D
NOx	40.0	11.39	1.85	3.94	15.33
VOC	40.0	0.99	0.06	0.14	1.13
CO	100.0	0.74	0.07	0.10	0.84
Methanol ²	10.0	N/D	N/D	0.036	N/D
GHG (CO ₂ e) ³	75,000 / 100,000	N/D	N/D	2,208	N/D
GHG (mass) ⁴	0.0 / 100.0 / 250.0	N/D	N/D	2,207	N/D
HAPS ⁵	10.0/25.0	0.02	N/D	0.049	0.069

N/D = Not Determined

¹Taken from permit #032004-020

²Methonal's SMAL is 10 tons/yr

³GHGe=CO₂ + 25(methane)

⁴GHG mass= CO₂ + Methane

⁵Combined HAPS is Methanol and POM. The POM was not calculated in previous permits but would be insignificant. So, the Methanol amount was used to determine new installation PTE

PERMIT RULE APPLICABILITY

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

APPLICABLE REQUIREMENTS

Timber Charcoal Co. LLC 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
 - Per 10 CSR 10-6.110(4)(B)2.B(II) and (4)(B)2.C(II) a full EIQ is required for the first full calendar year the equipment (or modifications) approved by this permit are in operation.
- *Operating Permits*, 10 CSR 10-6.065 is not required since the conditioned potential emission of the facility is below de minimis.

- *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 From Batch-Type Charcoal Kilns*, 10 CSR 10-6.330

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*, it is recommended that this permit be granted with special conditions.

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated October 2, 2015, received October 5, 2015, designating Timber Charcoal Co. LLC as the owner and operator of the installation.
- Email from Todd Hamilton, company manager, dated October 19, 2015.
- Memo dated January 9, 2004, the Air Pollution Control Program's Testing Oversight Unit, describing the results of emissions testing of the facilities existing charcoal kilns
- Memo with source files 055-0002 and 125-0012, the Air Pollution Control Program's Testing Oversight Unit, describing the results of emissions testing of charcoal kilns at Streumph's Charcoal Works facilities in Steelville and Belle, Missouri

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	SDS	Safety Data Sheet
GHG	Greenhouse Gas	SIC	Standard Industrial Classification
gpm	gallons per minute	SIP	State Implementation Plan
gr	grains	SMAL	Screening Model Action Levels
GWP	Global Warming Potential	SO_x	sulfur oxides
HAP	Hazardous Air Pollutant	SO₂	sulfur dioxide
hr	hour	tph	tons per hour
hp	horsepower	tpy	tons per year
lb	pound	VMT	vehicle miles traveled
lbs/hr	pounds per hour	VOC	Volatile Organic Compound
MACT	Maximum Achievable Control Technology		
µg/m³	micrograms per cubic meter		

Mr. Todd Hamilton
Company Manager
Timber Charcoal Co. LLC
HC 62 Box 456
Salem, MO 65560

RE: New Source Review Permit - Project Number: 2015-10-006

Dear Mr. Hamilton:

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 and your new source review permit application 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 were adversely affected by this permit decision, you may be entitled to pursue an appeal before the administrative hearing commission pursuant to Sections 621.250 and 643.075.6 RSMo. To appeal, you must file a petition with the administrative hearing commission within thirty 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 Administrative Hearing Commission, Truman State Office Building www.ao.mo.gov/ahc. If you have questions regarding this permit, contact Chad Stephenson, at the Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 751-4817.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Susan Heckenkamp
New Source Review Unit Chief

SH:csl

Enclosures

c: Southeast Regional Office
PAMS File: 2015-10-006
Permit Number: