



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: 092013-007 Project Number: 2013-04-063 Installation Number: 091-0012

Parent Company: Royal Oak Enterprises, LLC

Parent Company Address: 1 Royal Oak Avenue, Roswell, GA 30076

Installation Name: Royal Oak Enterprises-Mountain View Kiln Facility

Installation Address: 9916 County Road 2780, West Plains, MO 65775

Location Information: Howell County, S12, T26N, R7W

Application for Authority to Construct was made for: Installation of eight new charcoal kilns and a new thermal oxidizer. 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.

SEP 11 2013
EFFECTIVE DATE

Kyra L Moore
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."

Royal Oak Enterprises-Mountain View Kiln Facility
Howell County, S12, T26N, R7W

1. Charcoal Kiln Processing Requirements

- A. Royal Oak Enterprises, LLC-Mountain View Kiln Facility shall not simultaneously burn more than four (4) kilns in the bank of eight kilns known as kiln 17 - kiln 24 (EU17-EU24).
- B. Royal Oak Enterprises, LLC-Mountain View Kiln Facility 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.A. and 1.B.

2. Control Device Requirements

- A. Royal Oak Enterprises, LLC-Mountain View Kiln Facility shall control emissions from the charcoal kilns (EU17-EU24) using afterburner (CD3) as specified in the permit application. The afterburner shall be operated and maintained in accordance with the manufacturer's specifications.
- B. Royal Oak Enterprises, LLC-Mountain View Kiln Facility shall continuously monitor and record the temperature of the afterburner (CD3) any time the charcoal kilns (EU17-EU24) are in operation.
- C. Royal Oak Enterprises, LLC-Mountain View Kiln Facility shall ensure that the temperature of the afterburner (CD3) is maintained within the normal operating range established in the emissions test reports that were provided with the application. Emission test reports indicate that a minimum temperature of 1430°F must be maintained to ensure continued compliance.
- D. Royal Oak Enterprises, LLC-Mountain View Kiln Facility may submit an afterburner temperature control analysis and may propose an alternate temperature control plan to the Director of the Air Pollution Control Program. Upon approval by the Director, an alternate temperature control plan may be implemented.

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SPECIAL CONDITIONS:

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

- E. Royal Oak Enterprises, LLC-Mountain View Kiln Facility shall maintain an operating and maintenance log for the afterburners (CD3) 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. Record Keeping and Reporting Requirements
 - A. Royal Oak Enterprises, LLC-Mountain View Kiln Facility 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. Royal Oak Enterprises, LLC-Mountain View Kiln Facility 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 show an exceedance of a limitation imposed by this permit.
- 4. Construction Prohibition

If at any time, Royal Oak Enterprises, LLC-Mountain View Kiln Facility decides to construct the screening project under permit 082012-011, a new Application for Authority to Construct for the screening project shall be submitted to the Air Pollution Control Program.

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

Project Number: 2013-04-063
Installation ID Number: 091-0012
Permit Number:

Royal Oak Enterprises-Mountain View Kiln Facility Complete: April 25, 2013
9916 County Road 2780
West Plains, MO 65775

Parent Company:
Royal Oak Enterprises, LLC
1 Royal Oak Avenue
Roswell, GA 30076

Howell County, S12, T26N, R7W

REVIEW SUMMARY

- Royal Oak Enterprises-Mountain View Kiln Facility has applied for authority to construct eight new charcoal kilns and a new thermal oxidizer.
- HAPs of concern from this process are methanol and Polycyclic Organic Matter (POM).
- None of the New Source Performance Standards (NSPS) apply to the installation.
- None of the NESHAPs apply to this installation. None of the MACT regulations apply to the proposed equipment.
- A thermal oxidizer is used to control the condensable PM₁₀, CO, VOC, POM and HAP 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*.
- This installation is located in Howell 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. There are no modeling standards for PM.

- Emissions testing is not required for the equipment.
- An amended Basic Operating Permit application is required for this installation within 30 days of equipment startup.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

Royal Oak Enterprises, LLC - Mountain View Kiln Facility is an existing charcoal production facility located in Mountain View, Missouri, which is in Howell County. This facility operates 14 kilns (EU1-EU6 and EU9-EU16). Two kilns, EU7 and EU8, were permitted in 072009-011, but were never built. The existing kilns are all controlled by an afterburner/thermal oxidizer. Royal Oak Enterprises, LLC - Mountain View Kiln Facility was issued a Basic Operating Permit from the Air Pollution Control Program which expires March 3, 2017.

Royal Oak has determined that it will not construct the screening project permitted in 082012-011. The emissions from that project were removed from the facility's potential emissions.

The following construction permits have been issued to Mountain View Kiln from the Air Pollution Control Program.

Table 1: Previously Issued Construction Permits

Permit Number	Description
0499-016	This permit was issued for the installation of 12 new batch-type charcoal kilns with 2 afterburner controls. After receipt of the permit, only 6 batch-type charcoal kilns with 1 afterburner control were installed.
072009-011	This permit was issued for the installation of ten new batch-type charcoal kilns and two propane-fired afterburners. (Only eight kilns were built and Phase II was not constructed.)
082012-011	This permit was for a screening equipment that was never built, and its potential emissions were deducted from the facility's PTE per request by Royal Oak Enterprises, LLC-Mountain View Kiln Facility

PROJECT DESCRIPTION

The proposed kilns, number EU17 through EU24, will be concrete, Missouri-type kilns built to the same specifications as kilns EU9-EU16 permitted in permit 072009-011. Mountain View Kiln receives wood waste slabs as the raw material for the manufacture of charcoal. Wood slabs are staged in outdoor storage piles before being transferred to the concrete batch-type charcoal kilns for processing. The concrete kilns are approximately 24 feet wide by 40 feet long and are loaded with up to 120 tons of wood per batch. The 120 tons of wood are converted to 25 tons of charcoal through pyrolysis. Pyrolysis is the heating of wood in the absence of oxygen to drive off volatiles. Each batch has a burn phase followed by cooling, unloading, and then re-loading. Each batch is completed in about 192 hours, resulting in a maximum hourly design rate for

each kiln of 0.13 tons charcoal per hour. (8 kilns x 0.13 tons = 1.04 tons of charcoal produced per hour.) Typically finished charcoal is immediately loaded onto trucks for shipment offsite or stored temporarily in the new char storage shed that will be built adjacent to the new kilns; however, some charcoal may be transferred to an existing 2.5 acre storage pile (EU17) before being loaded onto trucks for shipment offsite. As most of the finished charcoal bypasses the storage pile (EU17), the size of the storage pile (EU17) is not expected to increase as a result of this project.

The thermal oxidizer (EP-07) will be the same design as constructed for permit 072009-001. That design has been tested in the following Missouri Royal Oak locations: Mountain View on 9/15/99, Salem on 7/26/01, and Ellsinore on 6/23/05. Emission factors for this application (and 2010 EIQ) are derived from the test results and production values obtained in the 2005 Ellsinore stack test. (Note: In the original stack test report; there was an error in the calculation of the average condensable emission rate. The error migrated to the 2010 EIQ. Table 2-4 of the test report gives the average condensable PM emission rate as 0.179 lb/hr. The actual average of the reported results for each run yields a corrected rate of 0.198 lb/hr.) 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.

The emission units considered for this application are summarized in the table below:

Table 2: Emission Unit Summary

Emission Unit ID	Description	MHDR	MHDR units
EU16 – EU24	New Kilns 16-24 (EP-07)	1.04	Tons charcoal per hour
EP-02	Charcoal Load-in/Load-out	1.04	Tons charcoal per hour
EP-03	Haul Roads (increased traffic) – Wood Slabs	0.3125	Miles (1650 feet)
EP-03	Haul Roads (increased traffic) - Charcoal	0.5	Miles (2640 feet)

EMISSIONS/CONTROLS EVALUATION

Emissions from the eight charcoal kilns (EU17-EU24) will be controlled by propane-fired afterburners (CD-3). Emission factors for this project were determined by prior stack testing performed on units of similar design and capacity. 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. Mountain View Kiln submitted an emissions test report for testing that was performed on similar units having four (4) operating charcoal kilns equipped with afterburner controls of the same design and capacities as those proposed for this project. The testing was performed on three (3) afterburners: located in Mountain View, Missouri on September 15, 1999, located in Salem, Missouri, on July 26, 2001, and located in Ellsinore, Missouri, on June 23, 2005. Results of this testing were used to develop the emission factors and control efficiencies for PM₁₀, 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 September 1, 2005, the Air Pollution Control Program's Testing Oversight Unit determined that no further testing was required unless the afterburner should be reconfigured to control

more than four (4) kilns simultaneously. Therefore, a special condition of this permit requires that no more than four kilns, being controlled by the same afterburner, may operate in the burn phase simultaneously.

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). Uncontrolled emissions of methane are estimated to be 501.07 tons per year; uncontrolled emissions of methanol are estimated to be 683.28 tons per year; and uncontrolled emissions of POM are estimated to be 0.043 tons per year. Test reports confirm that the expected control efficiency for volatile HAPs is 99.98%, resulting in potential emissions of 0.10 tons per year for methane, 0.14 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 stack data test report stating that CO₂ concentration was 14.27 % of the dry flow volume. Using the mass emission rate calculation, CO₂, GHG (mass) and GHG(CO₂e) emissions were determined.

The emission factors used in the analysis of the haul roads (EU18), and the charcoal load in/load out activity (EU19) were obtained from the following Sections of AP-42: Section 13.2.2 *Unpaved Roads* (November 2006), Section 13.2.4 *Aggregate Handling and Storage Piles* (November 2006), and Section 13.2.5 *Industrial Wind Erosion* (November 2006). Although most finished charcoal will bypass the storage pile (EU17), the potential emissions calculations for haul roads were based on the worst case assumption that all charcoal is first transferred to the storage pile (EU17) before being loaded onto trucks for shipment offsite. The following table provides an emissions summary for this project.

The following table provides an emissions summary for this project. Royal Oak Enterprises, LLC-Mountain View Kiln Facility has determined that the screening project in Permit 082012-011 will not be constructed. Therefore, the emissions from that project are removed from the facility's potential emissions. Existing potential emissions were taken from Permit 082012-011, less the emissions from that project. Existing actual emissions were taken from the installation's 2012 EIQ. Potential emissions of the application represent the potential of the new equipment, 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 (2012 EIQ)	Potential Emissions of the Application	New Installation Potential
PM	25.0	N/D	N/D	19.34	N/D
PM ₁₀	15.0	9.98	4.01	8.28	20.11
PM _{2.5}	10.0	N/D	0.22	3.68	N/D
SO _x	40.0	N/D	2.9	0.0	N/D
NO _x	40.0	43.59	44.64	24.87	68.46
VOC	40.0	0.17	0.16	0.10	1.13
CO	100.0	0.6	0.47	0.08	1.56
CO ₂	N/A	N/D	N/D	6116.75	N/D
Methanol ²	10	0.24	0.00	0.14	0.38
GHG (CO ₂ e)	75,000 / 100,000	N/D	N/D	27,865	N/D
GHG (mass)	0.0 / 100.0 / 250.0	N/D	N/D	27,863	N/D
POM	³ 10/0.01	N/D	N/D	8.6549E ⁻⁴	N/D
HAPs ⁴	10.0/25.0	N/D	0.0	0.14	0.38

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

¹Taken from Permit 082012-011 (Existing Potential Emission prior to this permit. 082012-011 was never constructed and those emissions are not counted in the facility's PTE.

²Methanol's SMAL is 10 tons/yr.

³Major source level is 10 tons per year; SMAL for POM is 0.01 tons per year.

⁴Combined 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 for HAPs.

10 CSR 10-6.330, *Restriction of Emissions from Batch-Type Charcoal Kilns*, has a minimum temperature requirement of 1520°F; however, new charcoal kilns may operate at a lower temperature if compliance testing has shown that the destruction efficiencies exceed 99%. In the memo dated September 1, 2005, the Air Pollution Control Program's Testing Oversight Unit determined that a minimum temperature of 1430°F is sufficient to achieve destruction efficiencies exceeding 99% for this after burner design.

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

APPLICABLE REQUIREMENTS

Royal Oak Enterprises-Mountain View Kiln Facility 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. For a complete list of applicable requirements for your installation, please consult your operating permit.

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 Emissions 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*, I recommend this permit be granted with special conditions.

Kathy Kolb
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 10, 2013, received April 16, 2013, designating Royal Oak Enterprises, LLC as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- *Royal Oak Enterprises, Inc. Charcoal Kiln Afterburners Emission Testing Report*, July 30, 2005 performed June 21-24, 2005 at Ellsinore, 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	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. Randy Beech
Vice President
Royal Oak Enterprises-Mountain View Kiln Facility
1 Royal Oak Avenue
Roswell, GA 30076

RE: New Source Review Permit - Project Number: 2013-04-063

Dear Mr. Beech:

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 amended 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 Kathy Kolb, 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 time and attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Susan Heckenkamp
New Source Review Unit Chief

SH:kkk

Enclosures

c: Southeast Regional Office
PAMS File: 2013-04-063

Permit Number: