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:	062020-007	Project Number: 2020-02-009 Installation Number: 035-0004
Parent Company:	Royal Oak Enterprises, LLC	
Parent Company Address:	1 Royal Oak Ave., Roswell, GA 33067	
Installation Name:	Royal Oak Enterprises, LLC - Ellsinore	
Installation Address:	Highway FF, Ellsinore, MO 63937	
Location Information:	Carter County, S35, T27N, R2E	

Application for Authority to Construct was made for:
Twenty new charcoal kilns. 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.

Kendall B. Hall

Director or Designee
Department of Natural Resources

June 4, 2020

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 Enforcement and Compliance Section of 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 Enforcement and Compliance Section of the Department's Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant source(s). The information must be made available within 30 days of actual startup. Also, you must notify the Department's regional office responsible for the area within which you are located within 15 days after the actual start up of this (these) air contaminant source(s).

A copy of the permit application and this permit and permit review shall be kept at the installation address and shall be made available to Department's 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 source(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 using the contact information below.

Contact Information:
Missouri Department of Natural Resources
Air Pollution Control Program
P.O. Box 176
Jefferson City, MO 65102-0176
(573) 751-4817

The regional office information can be found at the following website:
http://dnr.mo.gov/regions/

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 to 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 (3)(E). "Conditions required by permitting authority."

Royal Oak Enterprises, LLC - Ellsinore
Carter County, S35, T27N, R2E

1. Charcoal Kiln Processing Requirements
   A. Royal Oak Enterprises, LLC-Ellsinore Facility shall not simultaneously operate more than four (4) kilns during the burn cycle in each bank of ten kilns known as Kilns #41-50 (EU-41 through 50 routed to EP-05/Thermal Oxidizer) and Kilns #51-60 (EU-51 through 60 routed to EP-06/Thermal Oxidizer).

   B. Royal Oak Enterprises, LLC-Ellsinore 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.

2. NOx Emission Limitation
   A. Royal Oak Enterprises, LLC-Ellsinore Facility shall emit less than 40.0 tons of NOx in any consecutive 12-month period from Kilns #41-50 (EU-41 through 50 routed to EP-05/Thermal Oxidizer) and Kilns #51-60 (EU-51 through 60 routed to EP-06/Thermal Oxidizer). The SSM emissions as reported to the Air Pollution Control Program's Compliance/Enforcement Section in accordance with the requirements of 10 CSR 10-6.050 *Start-Up, Shutdown, and Malfunction Conditions* shall be included in the limit.

   B. Attachment A or equivalent forms, such as electronic forms, approved by the Air Pollution Control Program shall be used to demonstrate compliance with Special Conditions 2.A/2.B.

3. Control Device Requirements
   A. Royal Oak Enterprises, LLC-Ellsinore Facility shall control emissions from each bank of 10 kilns with a thermal oxidizer as specified in the permit application:
      - Kilns #41-50 (EU-41 through 50 routed to EP-05/Thermal Oxidizer),
      - Kilns #51-60 (EU-51 through 60 routed to EP-06/Thermal Oxidizer)

   B. The afterburners/thermal oxidizers shall be operated and maintained in accordance with the manufacturer's specifications.

   C. Royal Oak Enterprises, LLC-Ellsinore Facility shall continuously monitor and record the temperature of the Thermal Oxidizers EP-05 and EP-06

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

any time any charcoal kilns in the associated kiln bank are in operation.

D. Royal Oak Enterprises, LLC-Ellsinore Facility shall ensure that the temperature of the Thermal Oxidizers EP-05 and EP-06 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.

E. Royal Oak Enterprises, LLC-Ellsinore Facility may propose to use a lower minimum temperature than the one stated in Special Condition 3.C by submitting subsequent testing to the Director of the Air Pollution Control Program as allowed by 10 CSR 10-6.330(3)(F). Upon approval by the Director, an alternate temperature control plan may be implemented.

F. Royal Oak Enterprises, LLC-Ellsinore Facility shall maintain an operating and maintenance log for Thermal Oxidizer EP-05 and EP-06, 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.

4. Record Keeping and Reporting Requirements

A. Royal Oak Enterprises, LLC-Ellsinore 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 SDS for all materials used.

B. Royal Oak Enterprises, LLC-Ellsinore 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.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (5) REVIEW
Project Number: 2020-02-009
Installation ID Number: 035-0004
Permit Number: 062020-007

Installation Address:	Parent Company:
Royal Oak Enterprises, LLC - Ellsinore	Royal Oak Enterprises, LLC
Highway FF	1 Royal Oak Ave.
Ellsinore, MO 63937	Roswell, GA 33067

Carter County, S35, T27N, R2E

REVIEW SUMMARY

- Royal Oak Enterprises, LLC - Ellsinore has applied for authority to construct two sets of ten kilns each equipped with an associated triple-pass afterburner (thermal oxidizer) for control.

- The application was deemed complete on February 6, 2020.

- 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.

- Thermal Oxidizers EP-05 and EP-06 are being used to control the PM, PM_{10}, $PM_{2.5}$, VOC, CO and HAPs 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 NOx are conditioned below de minimis levels.

- This installation is located in Carter County, an attainment/unclassifiable 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 equipment as a part of this permit.

- A Part 70 Operating Permit application is required for this installation within 1 year of commencement of operations.

- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

Royal Oak Enterprises, LLC (Royal Oak) operates a charcoal production facility in Carter County near Ellsinore, Missouri. Charcoal is currently produced in 40 kilns ducted to four separate afterburners to control kiln emissions. In addition to the kilns' exhaust, there are fugitive particulate matter emissions from material handling, storage and hauling. Charcoal bagging and briquet manufacturing is also done at this installation. A temporary permit that expires May 15, 2020 for a Green Power kiln was issued but is no longer being tested/operated.

The following New Source Review permits have been issued to Royal Oak Enterprises, LLC - Ellsinore from the Air Pollution Control Program.

Table 1: Previous Construction Permits Issued to the Installation

Permit Number	Description
0782-008	Sawdust fired boiler and charcoal operation (Under ID 035-0004)
1297-014	Brix plant (Under ID 035-0021)
062003-004	Sixteen (16) charcoal kilns (Under ID 035-0004)
102003-009	Sixteen controlled kilns (Under ID 035-0004)
102008-003	New lump processing plant
082017-004	Forty new kilns (4 banks of 10 kilns)
052019-007	Temporary permit for Green Power kiln
052019-009	Briquet Plant (Revitalize old plant)
052019-007A	Preheater change for Green Power kiln

PROJECT DESCRIPTION

Royal Oak is constructing two sets of ten (10) new charcoal kilns with a triple-pass afterburner to control each set of 10 kilns. Each set of 10 kilns will be the same design as the construction that took place in 2003 in Ellsinore. The only difference will be the addition of two extra kilns and these kilns will be constructed in-line, as opposed to U-shape design. At any given time only four kilns will be in the burn phase while the other six kilns will be in the cool down/loading/unloading phase.

A stack test of the Royal Oak triple-pass afterburner design (with four kilns in the burn phase) was performed at Royal Oak's Mountain View Facility in September 1999, Salem facility in July 2001 and Ellsinore facility in June 2005. The afterburner will use propane to maintain the minimum allowable temperature if the kilns do not provide adequate combustion heat. All previous stack test results include the contribution from propane combustion. With the new configuration of ten kilns system, a more even flow of heat is expected from the kilns to the afterburner thus reducing the amount of propane needed to sustain the minimum allowable temperature.

There will be no change to emission points EP-24 through EP-39 (bagging equipment controlled by baghouses in Permit 102008-003) which has a 15 tons per year de minimis limit.

There will be PM, PM_{10}, and $PM_{2.5}$ emissions from haul roads when wood slabs are delivered to the storage area and hauled to the kilns. There will also particulate matter emissions when unloading the kilns.

Table 2: Emission Unit/ Points of this Project

Emission Unit/Point	Description	MHDR
EP-02K	Unload Kilns/load Truck	1.74 for two banks of kilns (0.87 tph per bank of 10 kilns)
EP-05K	Haul Road (Segment 1 Delivery of wood slabs to the property)	0.202 VMT/hr
EP-05K	Haul Road (Segment 2 Transfer slabs from storage to kilns)	0.2581 VMT/hr
EU-41 through 50/EP-05	Kilns 41 through 50 controlled by afterburner EP-05	0.87 tph
EU-51 through 60/EP-06	Kilns 51 through 60 controlled by afterburner EP-06	0.87 tph

EMISSIONS/CONTROLS EVALUATION

Emissions from the twenty charcoal kilns (Kilns #41-50, EU-41 through EU-50) will be controlled by a propane-fired afterburner EP-05 and (Kilns #51-60, EU-51 through EU-60) will be controlled by a propane fired afterburner EP-06. 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. Royal Oak 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 rates and control efficiencies

for PM_{10}, 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 419.17 tons per year for one set of kilns and 838.34 tons per year for two sets of kilns; uncontrolled emissions of methanol are estimated to be 571.59 tons per year for one set of kilns and 1,143.18 for two set of kilns; and uncontrolled emissions of POM are estimated to be 0.036 tons per year for one set of kilns and 0.072 tons per year for two sets of kilns. Test reports confirm that the expected control efficiency for volatile HAPs is 99.98%, resulting in potential emissions of 0.08 tons per afterburner per year for methane, 0.11 tons per afterburner per year for methanol and an insignificant level of POM. Sulfur oxides (SO_X) emissions are expected to be negligible due to low sulfur content in the fuel and were not determined.

CO_2 emissions were calculated using the stack data test report stating that CO_2 concentration was 14.27% of the dry flow volume. Using the mass emission rate calculation, CO_2, GHG (mass) and GHG (CO_2e) emissions were determined.

Particulate matter emission calculations for haul road segments are presented in Appendix B. The emissions factors are determined from equations found in AP-42, Fifth Edition, *Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and area Sources.* Emission calculations are based on the rate of charcoal production and the quantity of wood required for that production. In general, 4.7 tons of wood are required to produce one ton of raw charcoal. To produce 0.87 tons per hour of charcoal, 4.09 tons per hour of wood slabs are required. Flat-bed trucks will deliver wood slabs an average of 3,000 feet on an unpaved road (EP-05K) to a slab storage yard for seasoning. Wood slabs are transferred by truck from their storage location to staging areas near the kilns to be loaded. Emission calculations are based on the wood usage rate of 4.09 tons per hour. The distance of travel averages 2,500 feet on unpaved surfaces. Emission point EP-02K, Unload Kilns/Load Trucks, captures the particulate matter emissions from a single drop point. The drop point occurs when a loader removes charcoal from the kilns to the concrete pad in front of the kilns to allow for cooling. (Trucks are no longer loaded at the kilns to ship charcoal from the site.) The charcoal is transferred to the bagging facility on site. The emissions from the haul road for this is counted for in Construction Permit #102008-003, EP-22.

Table 3 provides an emissions summary for this installation. Existing potential emissions were taken from Permits 082017-004, 102008-003 and 052019-009.

The following table provides an emissions summary for this project. Existing actual

emissions were taken from the installation's 2018 EIQ. Potential emissions of the application represent the potential of the new equipment, assuming continuous operation (8760 hours per year).

Table 3: Existing emissions at Ellsinore installation

Pollutant	102008-003 Lump charcoal packaging	[5]082017-004 40 kilns	052019-009 Briquet	[6]052019-007 Temporary Green Power kiln (Expiration May 15, 2020)	[1]Existing Installation Potential
PM	N/D	10.6	31.03	N/A	N/D
PM_{10}	<15.0	10.6	<15.0	N/A	<40.6
$PM_{2.5}$	N/D	<10.0	4.58	N/A	N/D
SOx	N/A	N/D	0.01	N/A	N/D
NOx	N/A	83.2	6.98	N/A	90.18
VOC	N/A	0.32	0.11	N/A	0.43
CO	N/A	1.17	1.18	N/A	2.35
Methane	N/A	0.34	N/D	N/A	0.34
GHG (CO_2e)	N/A	46,619.04	N/D	N/A	N/D
GHG (mass)	N/A	46,617.03	N/D	N/A	N/D
HAPs[2]	N/A	0.45	0.06	N/A	0.51
POM[3]	N/A	2.89E-05	N/D	N/A	2.89E-05
Methanol[4]	N/A	0.45	N/D	N/A	0.45

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

[1]Summary of the past permits as indicated in each column.

[2]Combined 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. An error was found in Construction Permit 082017-004 in reporting the HAPs incorrectly and has be updated in this table to reflect the correct value.

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

[4]Methanol's SMAL is 10 tons/yr.

[5]Test results were conducted on PM using Method 5/202. Half of the PM_{10} emissions are condensable (which would be $PM_{2.5}$) according to the stack test. It is assumed that not all filterable PM_{10} emissions equal $PM_{2.5}$ emissions. Based on this assumption, $PM_{2.5}$ emissions are expected to be less than 10 tons per year.

[6]Royal Oak Enterprises is no longer pursuing the Green Power kiln project per email dated March 20, 2020

In Table 4, existing actual emissions were taken from the installation's 2018 EIQ (last full EIQ submitted). Potential emissions of the application represent the potential of the twenty kilns with associated afterburners, assuming continuous operation (8760 hours per year). Conditioned potential emissions account for a voluntary annual NOx emission limit of 40.0 tons per year to avoid dispersion modelling.

Table 4: Emissions Summary (tpy)

Pollutant	Regulatory *De Minimis* Levels	[1]Existing Potential Emissions	Existing Actual Emissions (2018 EIQ)	Potential Emissions of the Project	New Conditioned Potential of the Project
PM	25.0	N/D	N/D	17.14	16.47
PM_{10}	15.0	<40.6	11.5	9.50	9.13
$PM_{2.5}$	10.0	N/D	7.9	5.72	5.49
SOx	40.0	N/D	0.0	0.0	0.0
NOx	40.0	90.18	49.84	41.62	<40.0
VOC	40.0	0.43	1.59	0.16	0.15
CO	100.0	2.35	10.8	0.58	0.56
Methane	N/A	0.34	N/D	0.17	0.16
GHG (CO_2e)	N/A	N/D	N/D	46,619.04	44,801.32
GHG (mass)	N/A	N/D	N/D	46,617.03	44,799.33
HAPs/POM[2]	10.0/25.0	N/D	N/D	0.23	0.22
POM[3]	0.01	2.89E-05	N/D	1.45E-05	1.34E-05
Methanol[4]	10 (SMAL)	0.45	N/D	0.23	0.22

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

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

[1]According to the last Construction Permit 052019-009, the existing potential emissions of the installation reflected the emissions stated in Table 2.

[2]Combined 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.

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

[4]Methanol's SMAL is 10 tons/yr.

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 NOx are conditioned below de minimis levels.

APPLICABLE REQUIREMENTS

Royal Oak Enterprises, LLC - Ellsinore 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

- *Operating Permits*, 10 CSR 10-6.065. A Part 70 application is required since NOx emissions exceed 100 tons for the installation.

- *Start-Up, Shutdown, and Malfunction Conditions,* 10 CSR 10-6.050

- *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.

- *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*, 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 none, received February 6, 2020, designating Royal Oak Enterprises, LLC as the owner and operator of the installation.

Attachment A - NOx Compliance Worksheet

From Kilns 41 through 60

EU-41 through 50/EP-05 and EU-51 through 60/EP-06

Royal Oak Enterprises, LLC - Ellsinore
Site County: Carter County, S35, T27N, R2E
Project Number: 2020-02-009
Installation ID Number: 035-0004
Permit Number: 062020-007
This sheet covers the period from ____________________ to ____________________ (Copy as needed)
(Month, Day Year) (Month, Day Year)

Month	Production (tons)	NOx Composite Emission Factor[1] (lb/ton)	Monthly NOx Emissions[2] (lbs)	Startup, Shutdown and Malfunction NOx Emissions[3] (lbs)	Monthly NOx Emissions[4] (tons)	12-Month Rolling Total Emissions[5] (tons)
Example	*1,500*	*5.461*	*8,191.5*	*0.0*	*4.1*	*4.1+ 11 previous months*
		5.461				
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[1]Multiply the monthly production by the NOx composite emission factor.
[2]As reported to the Air Pollution Control Program's Compliance/Enforcement Section according to the provisions of 10 CSR 10-6.050 for the month.
[3]Add the monthly NOx emissions plus the SSM emissions from the same time period and divide by 2000 and
[4]Add the monthly emissions (tons) to the sum of the monthly emissions from the previous eleven months. A total of less than 40.0 tons of NOx per consecutive 12 months is necessary for compliance.

APPENDIX A

Abbreviations and Acronyms

%.....percent
ºF.....degrees Fahrenheit
acfm.....actual cubic feet per minute
BACT.....Best Available Control Technology
BMPs.....Best Management Practices
Btu.....British thermal unit
CAM.....Compliance Assurance Monitoring
CAS.....Chemical Abstracts Service
CEMS.....Continuous Emission Monitor System
CFR.....Code of Federal Regulations
CO.....carbon monoxide
CO_2.....carbon dioxide
CO_2e.....carbon dioxide equivalent
COMS.....Continuous Opacity Monitoring System
CSR.....Code of State Regulations
dscf.....dry standard cubic feet
EIQ.....Emission Inventory Questionnaire
EP.....Emission Point
EPA.....Environmental Protection Agency
EU.....Emission Unit
fps.....feet per second
ft.....feet
GACT.....Generally Available Control Technology
GHG.....Greenhouse Gas
gpm.....gallons per minute
gr.....grains
GWP.....Global Warming Potential
HAP.....Hazardous Air Pollutant
hr.....hour
hp.....horsepower
lb.....pound
lbs/hr.....pounds per hour
MACT.....Maximum Achievable Control Technology
$\mu g/m^3$.....micrograms per cubic meter
m/s.....meters per second
Mgal.....1,000 gallons
MW.....megawatt
MHDR.....maximum hourly design rate
MMBtu....Million British thermal units
MMCF.....million cubic feet
MSDS.....Material Safety Data Sheet
NAAQS....National Ambient Air Quality Standards
NESHAPs National Emissions Standards for Hazardous Air Pollutants
NO_x.....nitrogen oxides
NSPS.....New Source Performance Standards
NSR.....New Source Review
PM.....particulate matter
$PM_{2.5}$.....particulate matter less than 2.5 microns in aerodynamic diameter
PM_{10}.....particulate matter less than 10 microns in aerodynamic diameter
ppm.....parts per million
PSD.....Prevention of Significant Deterioration
PTE.....potential to emit
RACT.....Reasonable Available Control Technology
RAL.....Risk Assessment Level
SCC.....Source Classification Code
scfm.....standard cubic feet per minute
SDS.....Safety Data Sheet
SIC.....Standard Industrial Classification
SIP.....State Implementation Plan
SMAL.....Screening Model Action Levels
SO_x.....sulfur oxides
SO_2.....sulfur dioxide
SSM.....Startup, Shutdown & Malfunction
tph.....tons per hour
tpy.....tons per year
VMT.....vehicle miles traveled
VOC.....Volatile Organic Compound

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Air Pollution Control Program
Table of Hazardous Air Pollutants and Screening Model Action Levels

Chemical	CAS #	SMAL tons/yr	Group ID	VOC	PM	Chemical	CAS #	SMAL tons/yr	Group ID	VOC	PM
ACETALDEHYDE	75-07-0	9		Y	N	CHLOROMETHYL METHYL ETHER	107-30-2	0.1		Y	N
ACETAMIDE	60-35-5	1		Y	N	CHLOROPRENE	126-99-8	1		Y	N
ACETONITRILE	75-05-8	4		Y	N	CHROMIUM (VI) COMPOUNDS		0.002	L	N	Y
ACETOPHENONE	98-86-2	1		Y	N	CHROMIUM COMPOUNDS		5	L	N	Y
ACETYLAMINOFLUORINE, [2-]	53-96-3	0.005	V	Y	Y	CHRYSENE	218-01-9	0.01	V	Y	N
ACROLEIN	107-02-8	0.04		Y	N	COBALT COMPOUNDS		0.1	M	N	Y
ACRYLAMIDE	79-06-1	0.02		Y	N	COKE OVEN EMMISIONS	8007-45-2	0.03	N	Y	N
ACRYLIC ACID	79-10-7	0.6		Y	N	CRESOL, [META-]	108-39-4	1	B	Y	N
ACRYLONITRILE	107-13-1	0.3		Y	N	CRESOL, [ORTHO-]	95-48-7	1	B	Y	N
ALLYL CHLORIDE	107-05-1	1		Y	N	CRESOL, [PARA-]	106-44-5	1	B	Y	N
AMINOBIPHENYL, [4-]	92-67-1	1	V	Y	N	CRESOLS (MIXED ISOMERS)	1319-77-3	1	B	Y	N
ANILINE	62-53-3	1		Y	N	CUMENE	98-82-8	10		Y	N
ANISIDINE, [ORTHO-]	90-04-0	1		Y	N	CYANIDE COMPOUNDS		0.1	O	Y	N
ANTHRACENE	120-12-7	0.01	V	Y	N	DDE	72-55-9	0.01	V	Y	Y
ANTIMONY COMPOUNDS		5	H	N	Y	DI(2-ETHYLHEXYL) PHTHALATE, (DEHP)	117-81-7	5		Y	N
ANTIMONY PENTAFLUORIDE	7783-70-2	0.1	H	N	Y	DIAMINOTOLUENE, [2,4-]	95-80-7	0.02		Y	N
ANTIMONY POTASSIUM TARTRATE	28300-74-5	1	H	N	Y	DIAZOMETHANE	334-88-3	1		Y	N
ANTIMONY TRIOXIDE	1309-64-4	1	H	N	Y	DIBENZ(A,H)ANTHRACENE	53-70-3	0.01	V	Y	N
ANTIMONY TRISULFIDE	1345-04-6	0.1	H	N	Y	DIOXINS/FURANS		6E-07	D,V	Y	N
ARSENIC COMPOUNDS		0.005	I	N	Y	DIBENZOFURAN	132-64-9	5	V	Y	N
ASBESTOS	1332-21-4	0	A	N	Y	DIBROMO-3-CHLOROPROPANE, [1,2-]	96-12-8	0.01		Y	N
BENZ(A)ANTHRACENE	56-55-3	0.01	V	Y	N	DIBROMOETHANE, [1,2-]	106-93-4	0.1		Y	N
BENZENE	71-43-2	2		Y	N	DIBUTYL PHTHALATE	84-74-2	10		Y	Y
BENZIDINE	92-87-5	0.0003	V	Y	N	DICHLOROBENZENE, [1,4-]	106-46-7	3		Y	N
BENZO(A)PYRENE	50-32-8	0.01	V	Y	N	DICHLOROBENZIDENE, [3,3-]	91-94-1	0.2	V	Y	Y
BENZO(B)FLUORANTHENE	205-99-2	0.01	V	Y	N	DICHLOROETHANE, [1,1-]	75-34-3	1		Y	N
BENZO(K)FLUORANTHENE	207-08-9	0.01	V	Y	N	DICHLOROETHANE, [1,2-]	107-06-2	0.8		Y	N
BENZOTRICHLORIDE	98-07-7	0.006		Y	N	DICHLOROETHYLENE, [1,1-]	75-35-4	0.4		Y	N
BENZYL CHLORIDE	100-44-7	0.1		Y	N	DICHLOROMETHANE	75-09-2	10		N	N
BERYLLIUM COMPOUNDS		0.008	J	N	Y	DICHLOROPHENOXY ACETIC ACID, [2,4-]	94-75-7	10	C	Y	Y
BERYLLIUM SALTS		2E-05	J	N	Y	DICHLOROPROPANE, [1,2-]	78-87-5	1		Y	N
BIPHENYL, [1,1-]	92-52-4	10	V	Y	N	DICHLOROPROPENE, [1,3-]	542-75-6	1		Y	N
BIS(CHLOROETHYL)ETHER	111-44-4	0.06		Y	N	DICHLORVOS	62-73-7	0.2		Y	N
BIS(CHLOROMETHYL)ETHER	542-88-1	0.0003		Y	N	DIETHANOLAMINE	111-42-2	5		Y	N
BROMOFORM	75-25-2	10		Y	N	DIETHYL SULFATE	64-67-5	1		Y	N
BROMOMETHANE	74-83-9	10		Y	N	DIETHYLENE GLYCOL MONOBUTYL ETHER	112-34-5	5	P	Y	N
BUTADIENE, [1,3-]	106-99-0	0.07		Y	N	DIMETHOXYBENZIDINE, [3,3-]	119-90-4	0.1	V	Y	Y
BUTOXYETHANOL ACETATE, [2-]	112-07-2	5	P	Y	N	DIMETHYL BENZIDINE, [3,3-]	119-93-7	0.008	V	Y	Y
BUTYLENE OXIDE, [1,2-]	106-88-7	1		Y	N	DIMETHYL CARBAMOYL CHLORIDE	79-44-7	0.02		Y	N
CADMIUM COMPOUNDS		0.01	K	N	Y	DIMETHYL FORMAMIDE	68-12-2	1		Y	N
CALCIUM CYANAMIDE	156-62-7	10		Y	Y	DIMETHYL HYDRAZINE, [1,1-]	57-14-7	0.008		Y	N
CAPROLACTAM (Delisted)	105-60-2					DIMETHYL PHTHALATE	131-11-3	10		Y	N
CAPTAN	133-06-2	10		Y	Y	DIMETHYL SULFATE	77-78-1	0.1		Y	N
CARBARYL	63-25-2	10	V	Y	Y	DIMETHYLAMINOAZOBENZENE, [4-]	60-11-7	1		Y	N
CARBON DISULFIDE	75-15-0	1		Y	N	DIMETHYLANILINE, [N-N-]	121-69-7	1		Y	N
CARBON TETRACHLORIDE	56-23-5	1		Y	N	DINITRO-O-CRESOL, [4,6-] (Note 6)	534-52-1	0.1	E	Y	Y
CARBONYL SULFIDE	463-58-1	5		Y	N	DINITROPHENOL, [2,4-]	51-28-5	1		Y	N
CATECHOL	120-80-9	5		Y	N	DINITROTOLUENE, [2,4-]	121-14-2	0.02		Y	N
CHLORAMBEN	133-90-4	1		Y	Y	DIOXANE, [1,4-]	123-91-1	6		Y	N
CHLORDANE	57-74-9	0.01		Y	Y	DIPHENYLHYDRAZINE, [1,2-]	122-66-7	0.09	V	Y	Y
CHLORINE	7782-50-5	0.1		N	N	DIPHENYLMETHANE DIISOCYANATE, [4,4-]	101-68-8	0.1	V	Y	N
CHLOROACETIC ACID	79-11-8	0.1		Y	N	EPICHLOROHYDRIN	106-89-8	2		Y	N
CHLOROACETOPHENONE, [2-]	532-27-4	0.06		Y	N	ETHOXYETHANOL, [2-]	110-80-5	10	P	Y	N
CHLOROBENZENE	108-90-7	10		Y	N	ETHOXYETHYL ACETATE, [2-]	111-15-9	5	P	Y	N
CHLOROBENZILATE	510-15-6	0.4	V	Y	Y	ETHYL ACRYLATE	140-88-5	1		Y	N
CHLOROFORM	67-66-3	0.9		Y	N	ETHYL BENZENE	100-41-4	10		Y	N

ETHYL CHLORIDE	75-00-3	10		Y	N	NITROBENZENE	98-95-3	1		Y	N
ETHYLENE GLYCOL	107-21-1	10		Y	N	NITROBIPHENYL, [4-]	92-93-3	1	V	Y	N
ETHYLENE GLYCOL MONOBUTYL ETHER (Delisted)	111-76-2					NITROPHENOL, [4-]	100-02-7	5		Y	N
ETHYLENE GLYCOL MONOHEXYL ETHER	112-25-4	5	P	Y	N	NITROPROPANE, [2-]	79-46-9	1		Y	N
ETHYLENE IMINE [AZIRIDINE]	151-56-4	0.003		Y	N	NITROSODIMETHYLAMINE, [N-]	62-75-9	0.001		Y	N
ETHYLENE OXIDE	75-21-8	0.1		Y	N	NITROSOMORPHOLINE, [N-]	59-89-2	1		Y	N
ETHYLENE THIOUREA	96-45-7	0.6		Y	Y	NITROSO-N-METHYLUREA, [N-]	684-93-5	0.0002		Y	N
FORMALDEHYDE	50-00-0	2		Y	N	OCTACHLORONAPTHALENE	2234-13-1	0.01	V	Y	N
GLYCOL ETHER (ETHYLENE GLYCOL ETHERS)		5	P	Y	N	PARATHION	56-38-2	0.1		Y	Y
GLYCOL ETHER (DIETHYLENE GLYCOL ETHERS)		5	P	Y	N	PCB [POLYCHLORINATED BIPHENYLS]	1336-36-3	0.009	X	Y	Y
HEPTACHLOR	76-44-8	0.02		Y	N	PENTACHLORONITROBENZENE	82-68-8	0.3		Y	N
HEXACHLOROBENZENE	118-74-1	0.01		Y	N	PENTACHLOROPHENOL	87-86-5	0.7		Y	N
HEXACHLOROBUTADIENE	87-68-3	0.9		Y	N	PHENOL	108-95-2	0.1		Y	N
HEXACHLOROCYCLOHEXANE, [ALPHA-]	319-84-6	0.01	F	Y	N	PHENYLENEDIAMINE, [PARA-]	106-50-3	10		Y	N
HEXACHLOROCYCLOHEXANE, [BETA-]	319-85-7	0.01	F	Y	N	PHOSGENE	75-44-5	0.1		Y	N
HEXACHLOROCYCLOHEXANE, [DELTA-]	319-86-8	0.01	F	Y	N	PHOSPHINE	7803-51-2	5		N	N
HEXACHLOROCYCLOHEXANE, [TECHNICAL]	608-73-1	0.01	F	Y	N	PHOSPHOROUS (YELLOW OR WHITE)	7723-14-0	0.1		N	N
HEXACHLOROCYCLOPENTADIENE	77-47-4	0.1		Y	N	PHTHALIC ANHYDRIDE	85-44-9	5		Y	N
HEXACHLOROETHANE	67-72-1	5		Y	N	POLYCYLIC ORGANIC MATTER		0.01	V	Y	N
HEXAMETHYLENE,-1,6-DIISOCYANATE	822-06-0	0.02		Y	N	PROPANE SULTONE, [1,3-]	1120-71-4	0.03		Y	Y
HEXAMETHYLPHOSPHORAMIDE	680-31-9	0.01		Y	N	PROPIOLACTONE, [BETA-]	57-57-8	0.1		Y	N
HEXANE, [N-]	110-54-3	10		Y	N	PROPIONALDEHYDE	123-38-6	5		Y	N
HYDRAZINE	302-01-2	0.004		N	N	PROPOXUR [BAYGON]	114-26-1	10		Y	Y
HYDROGEN CHLORIDE	7647-01-0	10		N	N	PROPYLENE OXIDE	75-56-9	5		Y	N
HYDROGEN FLUORIDE	7664-39-3	0.1		N	N	PROPYLENEIMINE, [1,2-]	75-55-8	0.003		Y	N
HYDROQUINONE	123-31-9	1		Y	N	QUINOLINE	91-22-5	0.006		Y	N
INDENO(1,2,3CD)PYRENE	193-39-5	0.01	V	Y	N	QUINONE	106-51-4	5		Y	N
ISOPHORONE	78-59-1	10		Y	N	RADIONUCLIDES		Note 1	Y	N	Y
LEAD COMPOUNDS		0.01	Q	N	Y	SELENIUM COMPOUNDS		0.1	W	N	Y
LINDANE [GAMMA-HEXACHLOROCYCLOHEXANE]	58-89-9	0.01	F	Y	N	STYRENE	100-42-5	1		Y	N
MALEIC ANHYDRIDE	108-31-6	1		Y	N	STYRENE OXIDE	96-09-3	1		Y	N
MANGANESE COMPOUNDS		0.8	R	N	Y	TETRACHLORODIBENZO-P-DIOXIN,[2,3,7,8]	1746-01-6	6E-07	D,V	Y	Y
MERCURY COMPOUNDS		0.01	S	N	N	TETRACHLOROETHANE, [1,1,2,2-]	79-34-5	0.3		Y	N
METHANOL	67-56-1	10		Y	N	TETRACHLOROETHYLENE	127-18-4	10		N	N
METHOXYCHLOR	72-43-5	10	V	Y	Y	TITANIUM TETRACHLORIDE	7550-45-0	0.1		N	N
METHOXYETHANOL, [2-]	109-86-4	10	P	Y	N	TOLUENE	108-88-3	10		Y	N
METHYL CHLORIDE	74-87-3	10		Y	N	TOLUENE DIISOCYANATE, [2,4-]	584-84-9	0.1		Y	N
METHYL ETHYL KETONE (Delisted)	78-93-3					TOLUIDINE, [ORTHO-]	95-53-4	4		Y	N
METHYL HYDRAZINE	60-34-4	0.06		Y	N	TOXAPHENE	8001-35-2	0.01		Y	N
METHYL IODIDE	74-88-4	1		Y	N	TRICHLOROBENZENE, [1,2,4-]	120-82-1	10		Y	N
METHYL ISOBUTYL KETONE	108-10-1	10		Y	N	TRICHLOROETHANE, [1,1,1-]	71-55-6	10		N	N
METHYL ISOCYANATE	624-83-9	0.1		Y	N	TRICHLOROETHANE, [1,1,2-]	79-00-5	1		Y	N
METHYL METHACRYLATE	80-62-6	10		Y	N	TRICHLOROETHYLENE	79-01-6	10		Y	N
METHYL TERT-BUTYL ETHER	1634-04-4	10		Y	N	TRICHLOROPHENOL, [2,4,5-]	95-95-4	1		Y	N
METHYLCYCLCOPENTADIENYL MANGANESE	12108-13-3	0.1	R	N	Y	TRICHLOROPHENOL, [2,4,6-]	88-06-2	6		Y	N
METHYLENE BIS(2-CHLOROANILINE), [4,4-]	101-14-4	0.2	V	Y	Y	TRIETHYLAMINE	121-44-8	10		Y	N
METHYLENEDIANILINE, [4,4-]	101-77-9	1	V	Y	N	TRIFLURALIN	1582-09-8	9		Y	Y
METHYLNAPHTHALENE, [2-]	91-57-6	0.01	V	Y	N	TRIMETHYLPENTANE, [2,2,4-]	540-84-1	5		Y	N
MINERAL FIBERS		0	T	N	Y	URETHANE [ETHYL CARBAMATE]	51-79-6	0.8		Y	N
NAPHTHALENE	91-20-3	10	V	Y	N	VINYL ACETATE	108-05-4	1		Y	N
NAPHTHYLAMINE, [ALPHA-]	134-32-7	0.01	V	Y	N	VINYL BROMIDE	593-60-2	0.6		Y	N
NAPHTHYLAMINE, [BETA-]	91-59-8	0.01	V	Y	N	VINYL CHLORIDE	75-01-4	0.2		Y	N
NICKEL CARBONYL	13463-39-3	0.1	U	N	Y	XYLENE, [META-]	108-38-3	10	G	Y	N
NICKEL COMPOUNDS		1	U	N	Y	XYLENES (MIXED ISOMERS)	1330-20-7	10	G	Y	N
NICKEL REFINERY DUST		0.08	U	N	Y						
NICKEL SUBSULFIDE	12035-72-2	0.04	U	N	Y						

Air Pollution Control Program
Table of Hazardous Air Pollutants and Screening Model Action Levels

Legend	
Group ID	
A	Asbestos
B	Cresols/Cresylic Acid (isomers and mixtures)
C	2,4 - D, Salts and Esters
D	Dibenzofurans, Dibenzodioxins
E	4, 6 Dinitro-o-cresol, and Salts
F	Lindane (all isomers)
G	Xylenes (all isomers and mixtures)
H	Antimony Compounds
I	Arsenic Compounds
J	Beryllium Compounds
K	Cadmium Compounds
L	Chromium Compounds
M	Cobalt Compounds
N	Coke Oven Emissions
O	Cyanide Compounds
P	Glycol Ethers
Q	Lead Compounds (except elemental Lead)
R	Manganese Compounds
S	Mercury Compounds
T	Fine Mineral Fibers
U	Nickel Compounds
V	Polycyclic Organic Matter
W	Selenium Compounds
X	Polychlorinated Biphenyls (Aroclors)
Y	Radionuclides
Notes	The SMAL for radionuclides is defined as the effective dose equivalent to 0.3 millirems per year for 7 years exposure associated with a cancer risk of 1 in 1 million

Missouri Department of NATURAL RESOURCES
dnr.mo.gov
Michael L. Parson, Governor
Carol S. Comer, Director

June 4, 2020

Evan Bryant
Area Director
Royal Oak Enterprises, LLC - Ellsinore
PO Box 850
West Plains, MO 65775

RE: New Source Review Permit - Project Number: 2020-02-009

Dear Evan Bryant:

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 your application for a Part 70 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.

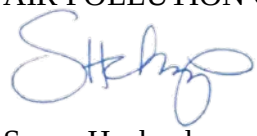
This permit may include requirements with which you may not be familiar. If you would like the department to meet with you to discuss how to understand and satisfy the requirements contained in this permit, an appointment referred to as a Compliance Assistance Visit (CAV) can be set up with you. To request a CAV, please contact your local regional office or fill out an online request. The regional office contact information can be found at the following website: http://dnr.mo.gov/regions/. The online CAV request can be found at http://dnr.mo.gov/cav/compliance.htm.

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, whose contact information is: Administrative Hearing Commission, United States Post Office Building, 131 West High Street, Third Floor, P.O. Box 1557, Jefferson City, Missouri 65102, phone: 573-751-2422, fax: 573-751-5018, website: www.oa.mo.gov/ahc.

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 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:kka

Enclosures

c: Southeast Regional Office
PAMS File: 2020-02-009

Permit Number: 062020-007