

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: 122009-012 Project Number: 2009-07-012

Parent Company: Royal Oak Enterprises, LLC - Salem Briquet Plant

Parent Company Address: P.O. Box 549, Salem, MO 65560

Installation Name: Royal Oak Enterprises, LLC - Salem Briquet Plant

Installation Address: Hwy. JJ, 3/4 mile north of Hwy. 19, Salem, MO 65560

Location Information: Dent County, S30, R35N, R5W

Application for Authority to Construct was made for:

Installation of a sawdust dryer system and ancillary equipment. 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.

DEC 18 2009

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 departments' Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant source(s). The information must be made available not more than 60 days but at least 30 days in advance of this date. 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 this (these) air contaminant source(s).

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 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 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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Project No.	2009-07-012

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, LLC - Salem Briquet Plant
Dent County, S30, R35N, R5W

1. **Superseding Condition**
The conditions of this permit supersede all special conditions found in the previously issued construction permit (Permit Number 012002-010) from the Air Pollution Control Program.
2. **Emission Limitation**
 - A. Royal Oak Enterprises, LLC - Salem Briquet Plant shall emit less than 15.0 tons of particulate matter less than ten (10) microns in diameter (PM₁₀) in any consecutive 12 month period from the equipment listed in Table 1.

Table 1: Project Emission Points

Emission Point	Description
EP-38	Belt Conveyor
EP-39	Hammermill
EP-40	Pneumatic Transfer to Silo
EP-43	Cyclone Separator
EP-44	Conveyor
EP-45	Fuel Storage Bin
EP-46	Webb Burner Sawdust Combustion

- B. Royal Oak Enterprises, LLC - Salem Briquet Plant shall maintain an accurate record of PM₁₀ emitted into the atmosphere from the equipment listed in Table 1. Attachment A or an equivalent form shall be used for this purpose. Royal Oak Enterprises, LLC - Salem Briquet Plant shall maintain all records required by this permit for not less than five (5) years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request.
 - C. Royal Oak Enterprises, LLC - Salem Briquet Plant shall report to the Air Pollution Control Program's Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than ten (10) days after the end of the month during which the records from Special Condition Number 2.B indicate that the source exceeds the limitation of Special Condition Number 2.A.

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SPECIAL CONDITIONS:

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

3. Control Device – Cyclone
 - A. The associated cyclone must be in use at all times when the sawdust dryer with cyclone separator (EP-43), fuel storage bin (EP-45) or WebbTM Burner (EP-46) are in operation. The cyclone shall be operated and maintained in accordance with the manufacturer's specifications. The cyclone shall be equipped with a gauge or meter, which indicates the pressure drop across the control device.
 - B. Royal Oak Enterprises, LLC - Salem Briquet Plant shall maintain an operating and maintenance log for each cyclone 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. Control Device - Fabric Filter
 - A. Royal Oak Enterprises, LLC - Salem Briquet Plant shall control emissions from belt conveyor (EP-38), hammermill (EP-39) or pneumatic transfer to silo (EP-40) using fabric filters as specified in the permit application. The fabric filters shall be operated and maintained in accordance with the manufacturer's specifications. The fabric filter 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 Resource employees may easily observe them. Replacement filters for the fabric filters 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).
 - B. Royal Oak Enterprises, LLC - Salem Briquet Plant shall monitor and record the operating pressure drop across the fabric filters at least once every 24 hours. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty.
 - C. Royal Oak Enterprises, LLC - Salem Briquet Plant shall maintain an operating and maintenance log for the fabric filters 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.

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

Project Number: 2009-07-012
Installation ID Number: 065-0038
Permit Number:

Royal Oak Enterprises, LLC - Salem Briquet Plant Complete: July 6, 2009
Highway JJ, 3/4 mile north of Highway 19
Salem, MO 65560

Parent Company:
Royal Oak Enterprises, LLC - Salem Briquet Plant
P.O. Box 549
Salem, MO 65560

Dent County, S30, R35N, R5W

REVIEW SUMMARY

- Royal Oak Enterprises, LLC - Salem Briquet Plant has applied for authority to construct a sawdust dryer system and ancillary equipment.
- Small amounts of Hazardous Air Pollutant (HAP) emissions are expected from the combustion of wood in the Webb burner.
- None of the New Source Performance Standards (NSPS) apply to the proposed equipment.
- None of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) or currently promulgated Maximum Achievable Control Technology (MACT) regulations apply to the proposed equipment.
- Fabric filters and cyclones are being used to control the PM₁₀ 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*. Project potential emissions of PM₁₀ are conditioned to below de minimis levels and all other pollutants' emissions for this project are below de minimis levels.
- This installation is located in Dent County, an attainment area for all criteria air pollutants.
- This installation is not on the List of Named Installations [10 CSR 10-6.020(3)(B), Table 2]. This installation is not considered as a charcoal production facility since they do not operate any charcoal kilns.

- Ambient air quality modeling was not performed since potential emissions of the application are below de minimis levels.
- Emissions testing is required for the new equipment.
- Potential emissions of the facility exceed 100 tons per year for PM₁₀. Either an Intermediate Operating Permit is required for this installation within 90 days of equipment startup or a Part 70 Operating Permit application is required for this installation within 1 year of equipment startup.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

Royal Oak Enterprises, LLC - Salem Briquet Plant operates a charcoal briquette production facility in Dent county. Their Intermediate Operating Permit was renewed in February of 2009 (OP2009-005). PM₁₀ has been conditioned to less than 100 tons per year in their current Operating Permit. All other pollutants have emissions less than PM₁₀.

The following permits have been issued to Royal Oak Enterprises, LLC - Salem Briquet Plant from the Air Pollution Control Program.

Table 2: Previously Issued Construction Permits

Permit Number	Description
082001-026	Replacement of existing 20.8 MMBtu/hr burner/boiler and two (2) sawdust feed conveyors with 5.0, 12.0 and 3.0 MMBtu/hr direct-fired sawdust burners and a pneumatic transfer system with storage silo.
012002-010	Addition of a hopper, two (2) belt conveyors and a hammermill crusher to the sawdust handling system for the sawdust-fired dryer.

PROJECT DESCRIPTION

Royal Oaks Enterprises, LLC is seeking permission for the installation of a sawdust dryer system and ancillary equipment and modification to some of the existing equipment in the sawdust handling system. The purpose of the dryer is to heat green sawdust until the moisture content is reduced such that the dry sawdust can be used as fuel for drying briquet. The heat for the sawdust dryer will come from a 12 million British thermal unit (MMBtu) per hour Webb BurnerTM that will combust a portion of the dried sawdust.

The process starts with green sawdust (approximately 40 percent moisture content) which is stored inside the existing material storage building. Haul roads are used to transport the green sawdust to the facility. Each truck is estimated to deliver approximately 25 tons per load. Emissions are based on the bottlenecked rate of 2.05 tons per hour which is the total amount consumed by all burners. From the storage building, the sawdust will be loaded onto a drag chain conveyor and travel to a shaker screen that will remove oversized material and foreign objects. A screw conveyor will

meter the dust through an airlock into the dryer where the moisture is reduced to approximately 10 percent. At the end of the dryer, the sawdust is blown to a 19,000 cubic feet per minute cyclone separator (EP-43). The sawdust will exit the cyclone onto a reversible conveyor (EP-44). The sawdust travels to an existing belt conveyor (EP-38). The existing conveyor loads material into an existing hammermill (EP-39). Below the hammermill will be a valve that, when opened, will divert the sawdust pneumatically through a 1,500 cfm cyclone to the fuel storage bin (EP-45). The sawdust will then be fed from the bin into the new Webb burner. Sawdust not diverted to the fuel storage bin will be pneumatically transferred (EP-40) from the hammermill to a silo in the existing sawdust handling system. This sawdust will eventually be fed to the burners that dry the briquets.

Sawdust transfer between the storage bin and the new Webb Burner will be completely enclosed. Hot gases from combustion will exhaust into the hot gas transfer duct at the top of the biomass burner, and will then be drawn through the duct into the sawdust dryer by an induced draft fan. Combustion emissions from the burner will eventually exhaust to the atmosphere through the cyclone separator. PM₁₀ emissions from the belt conveyor, hammermill and the pneumatic transfer to the silo are being controlled by fabric filters and PM₁₀ emissions from the cyclone separator and fuel storage bin are being controlled by a cyclone.

Existing equipment (EP-38, 39 & 40) were permitted at a maximum hourly design rating of 2.5 tons per hour in Permit No. 0122002-010 and with this permit increase to 4.2 tons per hour. However, these emission units as well as the new equipment (EP-43, EP-44, EP-45) are bottlenecked by either the silo loadout (EP-41) which has an MHDR of 1.25 tons per hour or the new Webb burner (EP-46) which has the capability of burning a maximum of 0.8 tons of sawdust per hour. Please note that the maximum hourly design rate (MHDR) represents the rated capacity of the equipment. A piece of equipment may be able to operate at its MHDR for a short period of time; however, on a long-term (annual) basis, its emissions will be limited due to bottlenecks in the process. Since a project's potential emissions are based on annual emission rates for permit applicability purposes, the effective bottlenecked rate will be used in determining the potential to emit (PTE) for the project.

Table 3: Emission Points

Emission Point	Description	MHDR (tons/hour)	Effective Bottlenecked Rate (ton/hr)
EP-38	Belt Conveyor	4.2	2.05
EP-39	Hammermill	4.2	1.25
EP-40	Pneumatic Transfer to Silo	4.2	1.25
EP-41	Silo Loadout	1.25	1.25
EP-42	Screw Conveyor	1.25	1.25
EP-43	Cyclone Separator	4.2	2.05
EP-44	Conveyor	4.2	2.05
EP45	Fuel Storage Bin	4.2	0.8
EP-46	Webb Burner Sawdust Combustion	0.8 (12MMBtu/hr)	0.8

In Permit 0122002-010, the potential emissions of the project were based on the MHDR of the equipment and not the bottlenecked rates. By using the MHDR, the PTE of the project was equal to 18.0 tpy of PM₁₀ and a 15 tpy PM₁₀ limitation was given in the permit. However, by taking into account the bottleneck created by the silo loadout, the PTE of Permit No. 012002-010 considering bottlenecks is equal to 10.97 tpy of PM₁₀. Since emissions of the project cannot exceed 15 tpy, the PM₁₀ limitation has been superseded. Table 3 above states the MHDR and effective bottlenecked rate of equipment associated with this project and Permit No. 0120020-010.

EMISSIONS/CONTROLS EVALUATION

PM₁₀ is the main pollutant of concern in this project although other pollutants are emitted while combusting sawdust in the burner. The PM₁₀ emissions can be attributed to the transfer of sawdust and the combustion of sawdust in the Webb burner. Following is a brief summary of the emission factors and control efficiencies used in this analysis.

- Cyclones and fabric filters are being used to control PM₁₀ emissions. The cyclones and fabric filters were given 2.5 percent and 99 percent PM₁₀ control efficiency, respectively.
- The emission factors for transfer and handling of the sawdust were obtained from Factor Information Retrieval (FIRE) V6.23, *Source Classification Codes and Emission Factors Listings for Criteria Air Pollutants* (SCC: 3-07-008-02 & 3-07-009-03).
- The emission factors used for the Webb burner were obtained from the Environmental Protection Agency (EPA) document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 1.6, *Wood Residue Combustion in Boilers* (September 2003).
- The emission factors used for the paved and unpaved haul roads were taken from the EPA document AP-42, Fifth Edition, Section 13.2.1, *Paved Roads* (November 2006) and Section 13.2.2, *Unpaved Roads* (November 2006), respectively.

The following table provides an emissions summary for this project. Existing potential emissions represent the facility's emission prior to this project. They were taken from Permit Number 012002-010 and adjusted to take into account the bottlenecked rates of the project (10.97 tpy of PM₁₀). Existing actual emissions were taken from the installation's 2008 Emission Inventory Questionnaire (EIQ). Potential emissions of the application represent the potential of the new and modified equipment based on bottlenecked rates, assuming continuous operation (8,760 hours per year).

Table 4: Emissions Summary (tons per year)

Pollutant	Regulatory De Minimis Levels	Existing Potential Emissions	Existing Actual Emissions (2008 EIQ)	Potential Emissions of the Application	New Installation Conditioned Potential
PM ₁₀	15.0	98.12	42.0	27.0	<15.0
SO _x	40.0	2.72	1.59	1.31	N/D
NO _x	40.0	67.5	32.2	25.8	N/D
VOC	40.0	20.9	5.00	0.89	N/D
CO	100.0	60.3	38.3	31.5	N/D
HAPs	10.0/25.0	4.7	1.54	1.82	N/D

N/D = Not Determined

Emissions of other pollutants are indirectly limited by the PM₁₀ limitation. However, since these emissions are not proportional to the PM₁₀ emission limitation, the conditioned potential were not calculated for the other pollutants.

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 PM₁₀ for this project are conditioned to below de minimis levels and all other pollutants' emissions associated with this project are below de minimis levels.

APPLICABLE REQUIREMENTS

Royal Oak Enterprises, LLC - Salem Briquet Plant 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
The emission fee is the amount established by the Missouri Air Conservation Commission annually under Missouri Air Law 643.079(1). Submission of an Emissions Inventory Questionnaire (EIQ) is required June 1 for the previous year's emissions.
- *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 10-3.090*

SPECIFIC REQUIREMENTS

- *Restriction of Emission of Particulate Matter From Industrial Processes, 10 CSR 10-6.400*
- *Restriction of Emission of Sulfur Compounds, 10 CSR 10-6.260*
- *Maximum Allowable Emissions of Particulate Matter From Fuel Burning Equipment Used for Indirect Heating, 10 CSR 10-3.060*

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.

Susan Heckenkamp
Environmental Engineer

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated July 6, 2009, received July 6, 2009, designating Royal Oak Enterprises, LLC - Salem Briquet Plant as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- Southeast Regional Office Site Survey, dated July 16, 2009.

Mr. Jim Hayes
Vice President
Royal Oak Enterprises, LLC - Salem Briquet Plant
Highway JJ, 3/4 mile north of Highway 19
Salem, MO 65560

RE: New Source Review Permit - Project Number: 2009-07-012

Dear Mr. Hayes:

Enclosed with this letter is your permit to construct. Please study it carefully. Also, note the special conditions, if any, 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 Susan Heckenkamp, at the Departments' 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

Kendall B. Hale
New Source Review Unit Chief

KBH:shl

Enclosures

c: Southeast Regional Office
PAMS File: 2009-07-012

Permit Number: