

**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: **05 2 0 1 2 - 0 1 3**

Project Number: 2011-09-060  
Installation Number: 217-0050

Parent Company: Palo Petroleum, Incorporated

Parent Company Address: 5944 Luther Lane, Suite 900, Dallas, TX 75225

Installation Name: Palo Petroleum, Incorporated

Installation Address: Highway 54 W, Deerfield, MO 64741

Location Information: Vernon County, S3 and S4, T35N, R33W

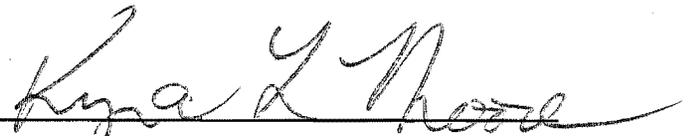
Application for Authority to Construct was made for:  
A steam assisted heavy oil extraction well. This review was conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

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

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

**MAY 2 2 2012**

EFFECTIVE DATE

  
\_\_\_\_\_  
DIRECTOR OR DESIGNEE  
DEPARTMENT OF NATURAL RESOURCES

## STANDARD CONDITIONS:

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

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

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

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

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

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

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

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Permit No.	
Project No.	2011-09-060

**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."*

Palo Petroleum, Incorporated  
Vernon County, S3 and S4, T35N, R33W

1. Nitrogen oxides (NO<sub>x</sub>) Emission Limitation
  - A. Palo Petroleum, Incorporated shall emit less than 40.0 tons of NO<sub>x</sub> in any consecutive 12-month period from the emission units listed below.
    - 1) Boiler (EU-01)
    - 2) Generator (EU-02)
  - 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 1.A.
2. Record Keeping and Reporting Requirements
  - A. Palo Petroleum, Incorporated 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.
  - B. Palo Petroleum, Incorporated shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than ten days after the end of the month during which any record required by this permit shows an exceedance of a limitation imposed by this permit.

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

Project Number: 2011-09-060  
Installation ID Number: 217-0050  
Permit Number:

Palo Petroleum, Incorporated  
Highway 54 W  
Deerfield, MO 64741

Complete: September 28, 2011

Parent Company:  
Palo Petroleum, Incorporated  
5944 Luther Lane, Suite 900  
Dallas, TX 75225

Vernon County, S3 and S4, T35N, R33W

REVIEW SUMMARY

- Palo Petroleum, Incorporated has applied for the authority to construct a steam assisted heavy oil extraction well.
- Hazardous Air Pollutant (HAP) emissions are expected from the proposed equipment. HAPs of concern from this process are due to the combustion of natural gas.
- 40 CFR 60 Subpart Dc, "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units" applies to the 95 million Btu per hour natural gas-fired boiler (EU-01).
- 40 CFR 60 Subpart JJJJ, "Standards of Performance for Stationary Spark Ignition Internal Combustion Engines" does not apply to the generator (EU-02) because the 470 horsepower (hp) Caterpillar Model G398 engine was manufactured prior to the July 1, 2008 applicability date.
- None of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) set forth in 40 CFR Part 61 apply to this installation.
- 40 CFR 63 Subpart JJJJJ, "National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources" does not apply to the 95 million Btu per hour natural gas-fired boiler (EU-01) because gas-fired boilers are not subject to the standard.
- 40 CFR 63 Subpart ZZZZ, "National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines" applies to the natural gas-fueled generator (EU-02).

- No air pollution control equipment is being used in association with the new equipment.
- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of nitrogen oxides (NO<sub>x</sub>) are conditioned to below de minimis levels.
- This installation is located in Vernon County, an attainment area for all criteria pollutants.
- This installation is not on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation's major source level is 250 tons per year and fugitive emissions are not 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 as a condition of this permit. However, Palo Petroleum, Incorporated shall comply with the emission testing requirements of 40 CFR Part 63 Subpart ZZZZ.
- A Basic Operating Permit application is required for this installation within 30 days of equipment startup because the boiler (EU-01) is subject to 40 CFR Part 60 Subpart Dc.
- Approval of this permit is recommended with special conditions.

#### INSTALLATION/PROJECT DESCRIPTION

Palo Petroleum, Incorporated (Palo Petroleum) has proposed to construct a horizontal well to extract “heavy oil” from Missouri’s tar sand petroleum deposits located in Vernon County. No permits have been issued to Palo Petroleum from the Air Pollution Control Program.

“Heavy oil,” also known as pitch or asphalt, is thick and does not flow easily. Production of tar sand is difficult and requires special techniques to “thin” the oil for extraction. Palo Petroleum has proposed to pump steam into the tar sand wells in order to heat the oil to a viscosity suitable for pumping. Emission units considered for this project include a 95 million Btu per hour natural gas-fired boiler (EU-01) and a 273.3 pounds natural gas per hour (470 horsepower) generator (EU-02).

#### EMISSIONS/CONTROLS EVALUATION

Emissions associated with this project are due to the combustion of natural gas from the boiler (EU-01) and generator (EU-02). Emission factors for NO<sub>x</sub>, volatile organic compounds (VOC), and carbon monoxide (CO) from the generator (EU-02) were obtained from manufacturer's emissions data provided by the applicant. All other generator emission factors were obtained from AP-42, Volume I, Fifth Edition, Section

3.2 *Natural Gas-fired Reciprocating Engines* for a 4-stroke, lean burn engine. Emission factors for the boiler (EU-01) were obtained from AP-42, Section 1.4 *Natural Gas Combustion* (July 1998). Emissions of VOC and HAPs from the pumping and storage of heavy oil are expected to be negligible due to the low vapor pressure of the oil. Although potential emissions of VOC and HAPs from the storage tanks and associated equipment were not calculated for this review they are assumed to be less than their respective de minimis levels and screening model action levels. Potential emissions of the application represent the potential of the boiler (EU-01) and generator (EU-02), assuming continuous operation (8760 hours per year.) The following table provides an emissions summary for this project.

Table 1: Emissions Summary (tons per year)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions	Potential Emissions of the Application	New Installation Conditioned Potential
PM	25.0	N/A	N/A	3.39	0.94
PM <sub>10</sub>	15.0	N/A	N/A	3.39	0.94
PM <sub>2.5</sub>	10.0	N/A	N/A	3.39	0.94
SO <sub>x</sub>	40.0	N/A	N/A	0.54	0.15
NO <sub>x</sub>	40.0	N/A	N/A	144.16	<40.0
VOC	40.0	N/A	N/A	8.81	2.45
CO	100.0	N/A	N/A	43.03	11.94
HAPs	10.0/25.0	N/A	N/A	0.88	0.25

N/A = Not Applicable

### PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of NO<sub>x</sub> are conditioned to below de minimis levels.

### APPLICABLE REQUIREMENTS

Palo Petroleum, Incorporated 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

- *New Source Performance Regulations*, 10 CSR 10-6.070 – *New Source Performance Standards (NSPS) for Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units*, 40 CFR Part 60, Subpart Dc
- *Maximum Achievable Control Technology (MACT) Regulations*, 10 CSR 10-6.075, *National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*, 40 CFR Part 63, Subpart ZZZZ
- *Restriction of Particulate Matter Emissions From Fuel Burning Equipment Used for Indirect Heating*, 10 CSR 10-6.405

#### 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.

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Kathi Jantz  
Environmental Engineer

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Date

#### PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated September 28, 2011, received September 28, 2011, designating Palo Petroleum, Incorporated as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- Southwest Regional Office Site Survey, dated October 5, 2011.



Mr. James Graham  
Vice President Acquisitions  
Palo Petroleum, Incorporated  
5944 Luther Lane, Suite 900  
Dallas, TX 75225

RE: New Source Review Permit - Project Number: 2011-09-060

Dear Mr. Graham:

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 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 Kathi Jantz, 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:kjl

Enclosures

c: Southwest Regional Office  
PAMS File: 2011-09-060

Permit Number: