



Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

## DEPARTMENT OF NATURAL RESOURCES

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DEC 24 2013

Mr. Jesse England  
 Regulatory/HR/Logistics Manager  
 Blue Sun St. Joe Refining, LLC  
 5701 Stockyard Expressway  
 St. Joseph, MO 64504

RE: New Source Review Temporary Permit Request - Project Number: 2013-10-005  
 Installation ID Number: 021-0120  
 Temporary Permit Number: **122013-008**  
 Expiration Date: December 31, 2014

Dear Mr. England:

The Missouri Department of Natural Resources' Air Pollution Control Program has completed a review of your request to construct a temporary jet fuel pilot plant at Blue Sun St. Joe Refining, LLC, located in St. Joseph, Missouri. The Air Pollution Control Program is hereby granting your request to conduct this temporary operation at this location in accordance with Missouri State Rule 10 CSR 10-6.060(3).

Blue Sun Advanced Fuels (BSAF) intends to build a small, renewable jet/diesel/naphtha intermediates certification plant that is planned for the Blue Sun St. Joe Refining facility. BSAF will create a small, 100 barrel per day (approximately 4,200 gallons/day) facility that will convert vegetable oil and animal fats into intermediate compounds that can then be refined into renewable jet fuel, renewable diesel fuel and renewable naphtha. The intermediates created on the Blue Sun site in St. Joseph, Missouri will be shipped to Houston, Texas for final processing/refining by a third-party, tolling vendor. The facility is intended to function for approximately three months, or more in service relative to creating certification-volume quantities of fuel – volume totaling 300,000 to 900,000 gallons. The facility will then be converted to a maintenance shop or a storage shed for continuing service to the existing biodiesel business (Blue Sun St. Joe Refining), operating on the same site. It is not known at what date the use of the facility will be terminated for purpose of creating renewable fuels for certification testing, but it is generally expected to terminate operations before the end of calendar year 2014.

The BSAF facility is privately funded by Blue Sun owners/investors. The intermediates and fuel that is created will be consumed by the US Navy, US Air Force, and US Army in aviation test flights, power generation equipment and other applications in an effort to assess acceptability versus military specifications and the American Society for Testing and Materials (ASTM) specifications. Similarly, the jet engine's original equipment manufacturer (OEM) (Pratt & Whitney, Rolls Royce, General Electric, etc.) will receive and test the fuel in various scenarios to

Mr. Jesse England  
Page Two

determine if the fuel is compatible with their engines. Finally, the ASTM and the United States Environmental Protection Agency will evaluate the fuel and the certification test results against their standards as part of the process of allowing the fuel to be accepted in the public/military domains with respect to toxicity and specific performance/safety/consumer liability expectations.

This project includes the process equipment and associated piping required to convert triglycerides, such as vegetable oil or animal fats, into petroleum crude through the patented Catalytic Hydrothermolysis (CH) process developed by Applied Research Associates, Inc. The CH process uses water at high temperature and pressure to convert biomass into crude oil intermediates, which can then be conventionally hydro-treated and fractionated to produce jet fuel, diesel fuel, and naphtha. The equipment to be installed as part of this process at the Blue Sun facility includes feedstock and product tanks, a heated tube reactor, separation equipment, including a gas/liquid separator vessel and an oil/water separator, and thermal oxidizer for control of process vent streams and product storage tanks. The intermediated crude products from this process will be loaded into containers and transported offsite for final refining into finished renewable fuels. The proposed temporary plant has a design capacity of 4,200 gallons per day and is expected to terminate operations at the end of 2014.

Based on information provided by Blue Sun, the operation of the BSAF will result in combustion emissions through the firing of natural gas in the reactor and Thermal Oxidizer, uncontrolled emission of volatile organic compounds (VOCs) that are not destroyed in the thermal oxidizer, and VOC emissions through fugitive component losses. The potential combustion emissions from the reactor furnace and the thermal oxidizer were calculated using emissions factors for natural gas combustion obtained from the *Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources*, Fifth Edition (AP-42), Section 1.4, *Natural Gas Combustion*. It was assumed that all particulate matter less than 10 microns in aerodynamic diameter (PM<sub>10</sub>) and all particulate matter less than 2.5 microns in aerodynamic diameter PM<sub>2.5</sub> would not be greater than the calculated particulate matter (PM). The expected VOC loading of 8.23 lb/hr and destruction efficiency of 99% for the thermal oxidizer were obtained from the manufacturer design specifications supplied by Blue Sun St. Joe Refining, LLC. The potential emissions of VOCs through fugitive component losses were calculated from emission factors obtained from Table 2-1 of the EPA document, *Protocol for Equipment Leak Emission Estimates*, November 1995. The equipment leak emission rates were combined with the total number and type of fugitive components (i.e., valve, pump, and connector), as provided by Blue Sun, to estimate the total fugitive losses for the new equipment. The potential emissions of this project are listed in Table 2.

Page No.	4
Permit No.	122013-008
Project No.	2013-10-005

## SPECIAL CONDITIONS:

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

### SPECIAL CONDITIONS

*The special conditions listed in this temporary 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."*

Blue Sun St. Joe Refining  
Buchanan County, S31, T57N, R35W

#### 1. Control Device Requirements

- A. Blue Sun St. Joe Refining, LLC shall control emissions from the closed vent system connected to various tanks and the gas/liquid and oil/water separators using a Thermal Oxidizer (TO Burner) as specified in the temporary permit application. The afterburner shall be operated and maintained in accordance with the manufacturer's specifications.
- B. Blue Sun St. Joe Refining, LLC shall continuously monitor and record the temperature of the Thermal Oxidizer (TO Burner) any time the Reactor Furnace (HTR-200) is in operation.
- C. Blue Sun St. Joe Refining, LLC shall ensure that the temperature of the Thermal Oxidizer (TO Burner) is maintained within the normal operating range established in the emissions test reports that were provided with the application. Process data supplied by Blue Sun St. Joe Refining, LLC indicate that a minimum temperature of 1400°F must be maintained to ensure continued compliance.
- D. Blue Sun St. Joe Refining, LLC may submit a thermal oxidizer 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.
- E. Blue Sun St. Joe Refining, LLC shall maintain an operating and maintenance log for Thermal Oxidizer (TO Burner) 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.

Table 2: Emissions Summary (tons per year)

Pollutant	De Minimis Level (tpy)	Potential to Emit (tpy)	PTE with Thermal Oxidizer (tpy)
PM	25	0.05	0.05
PM <sub>10</sub>	15	0.05	0.05
PM <sub>2.5</sub>	10	0.05	0.05
CO	100	0.60	0.60
NO <sub>x</sub>	40	0.71	0.71
SO <sub>2</sub>	40	0.0044	0.0044
VOC	40	45.44	9.83
HAPs	10/25	0.07	0.07
GHG CO <sub>2</sub> (mass)	0.0 / 100.0 / 250.0	773.8	773.8
GHG CO <sub>2</sub> e	75,000/100,000	774.5	774.5

The potential VOC emission at the Blue Sun St. Joe Refining biodiesel facility was calculated to be above *de minimis* source limit. Blue Sun St. Joe Refining will be required to operate the Thermal Oxidizer to control the VOC emission to below the *de minimis* threshold. The destruction efficiency of the Thermal Oxidizer is expected to be 99%. Therefore, the attached special conditions will be required in this temporary permit.

You are still obligated to meet all applicable air pollution control rules, Department of Natural Resources' rules, or any other applicable federal, state, or local agency regulations. Specifically, you should avoid violating 10 CSR 10-6.045 *Open Burning Requirements*, 10 CSR 10-6.220, *Restriction of Emission of Visible Air Contaminants*, 10 CSR 10-6.165 *Restriction of Emission of Odors*, and 10 CSR 10-6.170 *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*.

A copy of this letter should be kept with the unit and be made available to Department of Natural Resources' personnel upon verbal request. If you have any questions regarding this determination, please do not hesitate to contact Kathy Kolb at the Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or by telephone at (573) 751-4817. Thank you for your time.

Sincerely,

AIR POLLUTION CONTROL PROGRAM



Kyra L. Moore  
Director

KLM:kk1

c: PAMS File: 2013-10-005  
Kansas City Regional Office

Page No.	5
Permit No.	122013-008
Project No.	2013-10-005

**SPECIAL CONDITIONS:**

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

**2. Record Keeping and Reporting Requirements**

- A. Blue Sun St. Joe Refining, LLC 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 Material Safety Data Sheet (MSDS) for all materials used.
  
- B. Blue Sun St. Joe Refining, LLC 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.