



# INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

*We Protect Hoosiers and Our Environment.*

*Mitchell E. Daniels Jr.*  
Governor

*Thomas W. Easterly*  
Commissioner

100 North Senate Avenue  
Indianapolis, Indiana 46204  
(317) 232-8603  
Toll Free (800) 451-6027  
[www.idem.IN.gov](http://www.idem.IN.gov)

TO: Interested Parties / Applicant

DATE: July 28, 2011

RE: Knoll Brothers Petroleum / 091 - 30683 - 00143

FROM: Matthew Stuckey, Branch Chief  
Permits Branch  
Office of Air Quality

## Notice of Decision: Approval - Registration

Please be advised that on behalf of the Commissioner of the Department of Environmental Management, I have issued a decision regarding the enclosed matter. Pursuant to IC 4-21.5-3-4(d) this order is effective when it is served. When served by U.S. mail, the order is effective three (3) calendar days from the mailing of this notice pursuant to IC 4-21.5-3-2(e).

If you wish to challenge this decision, IC 4-21.5-3-7 requires that you file a petition for administrative review. This petition may include a request for stay of effectiveness and must be submitted to the Office of Environmental Adjudication, 100 North Senate Avenue, Government Center North, Suite N 501E, Indianapolis, IN 46204, **within eighteen (18) calendar days of the mailing of this notice**. The filing of a petition for administrative review is complete on the earliest of the following dates that apply to the filing:

- (1) the date the document is delivered to the Office of Environmental Adjudication (OEA);
- (2) the date of the postmark on the envelope containing the document, if the document is mailed to OEA by U.S. mail; or
- (3) The date on which the document is deposited with a private carrier, as shown by receipt issued by the carrier, if the document is sent to the OEA by private carrier.

The petition must include facts demonstrating that you are either the applicant, a person aggrieved or adversely affected by the decision or otherwise entitled to review by law. Please identify the permit, decision, or other order for which you seek review by permit number, name of the applicant, location, date of this notice and all of the following:

- (1) the name and address of the person making the request;
- (2) the interest of the person making the request;
- (3) identification of any persons represented by the person making the request;
- (4) the reasons, with particularity, for the request;
- (5) the issues, with particularity, proposed for considerations at any hearing; and
- (6) identification of the terms and conditions which, in the judgment of the person making the request, would be appropriate in the case in question to satisfy the requirements of the law governing documents of the type issued by the Commissioner.

If you have technical questions regarding the enclosed documents, please contact the Office of Air Quality, Permits Branch at (317) 233-0178. Callers from within Indiana may call toll-free at 1-800-451-6027, ext. 3-0178.

Enclosures  
FN-REGIS.dot 1/2/08



# INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

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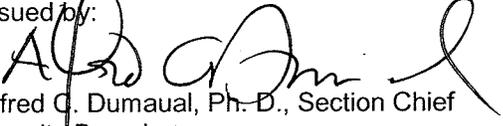
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## REGISTRATION OFFICE OF AIR QUALITY

**Knoll Brothers Petroleum  
1575 E US Highway 12  
Michigan City, Indiana 46360**

Pursuant to 326 IAC 2-5.1 (Construction of New Sources: Registrations) and 326 IAC 2-5.5 (Registrations), (herein known as the Registrant) is hereby authorized to construct and operate subject to the conditions contained herein, the source described in Section A (Source Summary) of this registration.

Registration No. R091-30683-00143	
Issued by:  Alfred C. Dumaul, Ph. D., Section Chief Permits Branch Office of Air Quality	Issuance Date: July 28, 2011

## SECTION A

## SOURCE SUMMARY

This registration is based on information requested by the Indiana Department of Environmental Management (IDEM), Office of Air Quality (OAQ). The information describing the source contained in conditions A.1 and A.2 is descriptive information and does not constitute enforceable conditions. However, the Registrant should be aware that a physical change or a change in the method of operation that may render this descriptive information obsolete or inaccurate may trigger requirements for the Registrant to obtain additional permits pursuant to 326 IAC 2.

### A.1 General Information

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The Registrant owns and operates a stationary air sparging/soil vapor extraction system for the remediation of soil and groundwater contaminated with petroleum hydrocarbons.

Source Address:	1575 E US Highway 12, Michigan City, Indiana 46360
General Source Phone Number:	219-874-7310
SIC Code:	4959 and 5171
County Location:	LaPorte County
Source Location Status:	Attainment for all criteria pollutants
Source Status:	Registration

### A.2 Emission Units and Pollution Control Equipment Summary

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This stationary source consists of the following emission units and pollution control devices:

- (a) One (1) air sparging and soil vapor extraction (AS/SVE) remediation system, identified as AS/SVE-1, approved for construction in 2011, for the remediation of soil and groundwater contaminated with petroleum hydrocarbons at a maximum air flow rate of 87.30 standard cubic feet per minute (scfm).
- (b) Fugitive emissions from paved roads.

## SECTION B

## GENERAL CONDITIONS

### B.1 Definitions [326 IAC 2-1.1-1]

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Terms in this registration shall have the definition assigned to such terms in the referenced regulation. In the absence of definitions in the referenced regulation, the applicable definitions found in the statutes or regulations (IC 13-11, 326 IAC 1-2 and 326 IAC 2-1.1-1) shall prevail.

### B.2 Effective Date of Registration [IC 13-15-5-3]

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Pursuant to IC 13-15-5-3, this registration is effective immediately, unless a petition for stay of effectiveness is filed and granted according to IC 13-15-6-3, and may be revoked or modified in accordance with the provisions of IC 13-15-7-1.

### B.3 Registration Revocation [326 IAC 2-1.1-9]

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Pursuant to 326 IAC 2-1.1-9 (Revocation), this registration to operate may be revoked for any of the following causes:

- (a) Violation of any conditions of this registration.
- (b) Failure to disclose all the relevant facts, or misrepresentation in obtaining this registration.
- (c) Changes in regulatory requirements that mandate either a temporary or permanent reduction of discharge of contaminants. However, the amendment of appropriate sections of this registration shall not require revocation of this registration.
- (d) For any cause which establishes in the judgment of IDEM the fact that continuance of this registration is not consistent with purposes of this article.

### B.4 Prior Permits Superseded [326 IAC 2-1.1-9.5]

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- (a) All terms and conditions of permits established prior to Registration No. R091-30683-00143 and issued pursuant to permitting programs approved into the state implementation plan have been either:
  - (1) incorporated as originally stated,
  - (2) revised, or
  - (3) deleted.
- (b) All previous registrations and permits are superseded by this registration.

### B.5 Annual Notification [326 IAC 2-5.1-2(f)(3)] [326 IAC 2-5.5-4(a)(3)]

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Pursuant to 326 IAC 2-5.1-2(f)(3) and 326 IAC 2-5.5-4(a)(3):

- (a) An annual notification shall be submitted by an authorized individual to the Office of Air Quality stating whether or not the source is in operation and in compliance with the terms and conditions contained in this registration.
- (b) The annual notice shall be submitted in the format attached no later than March 1 of each year to:

Indiana Department of Environmental Management  
Compliance and Enforcement Branch, Office of Air Quality  
100 North Senate Avenue  
MC 61-53 IGCN 1003

Indianapolis, IN 46204-2251

- (c) The notification shall be considered timely if the date postmarked on the envelope or certified mail receipt, or affixed by the shipper on the private shipping receipt, is on or before the date it is due. If the document is submitted by any other means, it shall be considered timely if received by IDEM, OAQ on or before the date it is due.

**B.6 Source Modification Requirement [326 IAC 2-5.5-6(a)]**

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Pursuant to 326 IAC 2-5.5-6(a), an application or notification shall be submitted in accordance with 326 IAC 2 to the Office of Air Quality (OAQ) if the source proposes to construct new emission units, modify existing emission units, or otherwise modify the source.

**B.7 Registrations [326 IAC 2-5.1-2(i)]**

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Pursuant to 326 IAC 2-5.1-2(i), this registration does not limit the source's potential to emit.

**B.8 Preventive Maintenance Plan [326 IAC 1-6-3]**

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- (a) If required by specific condition(s) in Section D of this registration, the Registrant shall prepare and maintain Preventive Maintenance Plans (PMPs) no later than ninety (90) days after issuance of this registration or ninety (90) days after initial start-up, whichever is later, including the following information on each facility:

- (1) Identification of the individual(s) responsible for inspecting, maintaining, and repairing emission control devices;
- (2) A description of the items or conditions that will be inspected and the inspection schedule for said items or conditions; and
- (3) Identification and quantification of the replacement parts that will be maintained in inventory for quick replacement.

If, due to circumstances beyond the Registrant's control, the PMPs cannot be prepared and maintained within the above time frame, the Registrant may extend the date an additional ninety (90) days provided the Registrant notifies:

Indiana Department of Environmental Management  
Compliance and Enforcement Branch, Office of Air Quality  
100 North Senate Avenue  
MC 61-53 IGCN 1003  
Indianapolis, Indiana 46204-2251

The Registrant shall implement the PMPs.

- (b) A copy of the PMPs shall be submitted to IDEM, OAQ upon request and within a reasonable time, and shall be subject to review and approval by IDEM, OAQ. IDEM, OAQ may require the Registrant to revise its PMPs whenever lack of proper maintenance causes or is the primary contributor to an exceedance of any limitation on emissions.
- (c) To the extent the Registrant is required by 40 CFR Part 60 or 40 CFR Part 63 to have an Operation Maintenance, and Monitoring (OMM) Plan for a unit, such OMM Plan is deemed to satisfy the PMP requirements of 326 IAC 1-6-3 for that unit.

**SECTION C**

**SOURCE OPERATION CONDITIONS**

Entire Source

**Emission Limitations and Standards [326 IAC 2-5.1-2(g)] [326 IAC 2-5.5-4(b)]**

**C.1 Opacity [326 IAC 5-1]**

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations), opacity shall meet the following, unless otherwise stated in this registration:

- (a) Opacity shall not exceed an average of forty percent (40%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.
- (b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

**C.2 Fugitive Dust Emissions [326 IAC 6-4]**

The Registrant shall not allow fugitive dust to escape beyond the property line or boundaries of the property, right-of-way, or easement on which the source is located, in a manner that would violate 326 IAC 6-4 (Fugitive Dust Emissions).

**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
OFFICE OF AIR QUALITY  
COMPLIANCE AND ENFORCEMENT BRANCH**

**REGISTRATION  
ANNUAL NOTIFICATION**

This form should be used to comply with the notification requirements under 326 IAC 2-5.1-2(f)(3) and 326 IAC 2-5.5-4(a)(3).

<b>Company Name:</b>	Knoll Brothers Petroleum
<b>Address:</b>	1575 E US Highway 12
<b>City:</b>	Michigan City, Indiana 46360
<b>Phone Number:</b>	219-874-7310
<b>Registration No.:</b>	R091-30683-00143

I hereby certify that Knoll Brothers Petroleum is :

still in operation.

I hereby certify that Knoll Brothers Petroleum is :

no longer in operation.

in compliance with the requirements of Registration No. R091-30683-00143.

not in compliance with the requirements of Registration No. R091-30683-00143.

<b>Authorized Individual (typed):</b>
<b>Title:</b>
<b>Signature:</b>
<b>Phone Number:</b>
<b>Date:</b>

If there are any conditions or requirements for which the source is not in compliance, provide a narrative description of how the source did or will achieve compliance and the date compliance was, or will be achieved.

<b>Noncompliance:</b>

# Indiana Department of Environmental Management Office of Air Quality

## Technical Support Document (TSD) for a Registration

### Source Description and Location

**Source Name:** Knoll Brothers Petroleum  
**Source Location:** 1575 E US Highway 12, Michigan City, Indiana 46360  
**County:** LaPorte  
**SIC Code:** 4959 and 5171  
**Registration No.:** R091-30683-00143  
**Permit Reviewer:** Nathan C. Bell

On July 6, 2011, the Office of Air Quality (OAQ) received an application from Knoll Brothers Petroleum related to the construction and operation of a new stationary air sparging/soil vapor extraction system for the remediation of soil and groundwater contaminated with petroleum hydrocarbons.

### Existing Approvals

There have been no previous approvals issued to this source.

### County Attainment Status

The source is located in LaPorte County.

Pollutant	Designation
SO <sub>2</sub>	Better than national standards.
CO	Unclassifiable or attainment effective November 15, 1990.
O <sub>3</sub>	Attainment effective July 19, 2007, for the 8-hour ozone standard. <sup>1</sup>
PM <sub>10</sub>	Unclassifiable effective November 15, 1990.
NO <sub>2</sub>	Cannot be classified or better than national standards.
Pb	Not designated.
<sup>1</sup> Unclassifiable or attainment effective November 15, 1990, for the 1-hour standard which was revoked effective June 15, 2005. Unclassifiable or attainment effective April 5, 2005, for PM <sub>2.5</sub> .	

- (a) **Ozone Standards**  
 Volatile organic compounds (VOC) and Nitrogen Oxides (NOx) are regulated under the Clean Air Act (CAA) for the purposes of attaining and maintaining the National Ambient Air Quality Standards (NAAQS) for ozone. Therefore, VOC and NOx emissions are considered when evaluating the rule applicability relating to ozone. LaPorte County has been designated as attainment or unclassifiable for ozone. Therefore, VOC and NOx emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2.
  
- (b) **PM<sub>2.5</sub>**  
 LaPorte County has been classified as attainment for PM<sub>2.5</sub>. On May 8, 2008 U.S. EPA promulgated the requirements for Prevention of Significant Deterioration (PSD) for PM<sub>2.5</sub> emissions. These rules became effective on July 15, 2008. On May 4, 2011 the air pollution control board issued an emergency rule establishing the direct PM<sub>2.5</sub> significant level at ten (10) tons per year. This rule became effective, June 28, 2011. Therefore, direct PM<sub>2.5</sub> and SO<sub>2</sub> emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2. See the State Rule Applicability – Entire Source section.
  
- (c) **Other Criteria Pollutants**  
 LaPorte County has been classified as attainment or unclassifiable in Indiana for all other criteria

pollutants. Therefore, these emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2.

**Fugitive Emissions**

The fugitive emissions of criteria pollutants, hazardous air pollutants, and greenhouse gases are counted toward the determination of 326 IAC 2-5.1-2 (Registrations) applicability.

**Background and Description of Emission Units and Pollution Control Equipment**

The Office of Air Quality (OAQ) has reviewed an application, submitted by Knoll Brothers Petroleum on July 6, 2011, relating to the construction and operation of a stationary air sparging/soil vapor extraction system for the remediation of soil and groundwater contaminated with petroleum hydrocarbons.

The following is a list of the new emission units:

- (a) One (1) air sparging and soil vapor extraction (AS/SVE) remediation system, identified as AS/SVE-1, approved for construction in 2011, for the remediation of soil and groundwater contaminated with petroleum hydrocarbons at a maximum air flow rate of 87.30 standard cubic feet per minute (scfm).
- (b) Fugitive emissions from paved roads.

**Enforcement Issues**

There are no pending enforcement actions related to this source.

**Emission Calculations**

See Appendix A of this TSD for detailed emission calculations.

**Permit Level Determination – Registration**

The following table reflects the unlimited potential to emit (PTE) of the entire source before controls. Control equipment is not considered federally enforceable until it has been required in a federally enforceable permit.

Process/ Emission Unit	Potential To Emit of the Entire Source (tons/year)									
	PM	PM10*	PM2.5	SO <sub>2</sub>	NO <sub>x</sub>	VOC	CO	GHGs as CO <sub>2</sub> e**	Total HAPs	Worst Single HAP
Remediation System AS/SVE-1	0.00	0.00	0.00	0.00	0.00	13.52	0.00	0.00	1.65	0.54 (toluene)
Paved Roads (fugitive)	0.35	0.07	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total PTE of Entire Source</b>	<b>0.35</b>	<b>0.07</b>	<b>0.02</b>	<b>0.00</b>	<b>0.00</b>	<b>13.52</b>	<b>0.00</b>	<b>0.00</b>	<b>1.65</b>	<b>0.54 (toluene)</b>
Exemptions Levels**	5	5	5	10	10	5 or 10	25	100,000	25	10
Registration Levels**	25	25	25	25	25	25	100	100,000	25	10

negl. = negligible  
 \*Under the Part 70 Permit program (40 CFR 70), particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM10), not particulate matter (PM), is considered as a "regulated air pollutant".  
 \*\*The 100,000 CO<sub>2</sub>e threshold represents the Title V and PSD subject to regulation thresholds for GHGs in order to determine whether a source's emissions are a regulated NSR pollutant under Title V and PSD.

- (a) The potential to emit (PTE) (as defined in 326 IAC 2-1.1-1) of VOC is within the ranges listed in 326 IAC 2-5.1-2(a)(1). The PTE of all other regulated criteria pollutants are less than the ranges listed in 326 IAC 2-5.1-2(a)(1). Therefore, the source is subject to the provisions of 326 IAC 2-5.1-2 (Registrations). A Registration will be issued.
- (b) The potential to emit (PTE) (as defined in 326 IAC 2-1.1-1(16)) of any single HAP is less than ten (10) tons per year and the PTE of a combination of HAPs is less than twenty-five (25) tons per year. Therefore, this source is an area source under Section 112 of the Clean Air Act (CAA) and not subject to the provisions of 326 IAC 2-7.
- (c) The potential to emit (PTE) (as defined in 326 IAC 2-1.1-1) greenhouse gases (GHGs) is less than the Title V subject to regulation threshold of one hundred thousand (100,000) tons of CO<sub>2</sub> equivalent emissions (CO<sub>2</sub>e) per year. Therefore, the source is not subject to the provisions of 326 IAC 2-7.

### Federal Rule Applicability Determination

#### New Source Performance Standards (NSPS)

- (a) There are no New Source Performance Standards (NSPS) (326 IAC 12 and 40 CFR Part 60) included in the permit.

#### National Emission Standards for Hazardous Air Pollutants (NESHAP)

- (b) The requirements of the National Emission Standards for Hazardous Air Pollutants: Site Remediation, 40 CFR 63, Subpart GGGGG (326 IAC 20-87), are not included in the permit since the remediation system is not co-located with any other stationary sources that emit hazardous air pollutants (HAPs) and meet an affected source definition specified for a source category that is regulated by another subpart under 40 CFR Part 63, and is not a major source of HAPs.
- (c) There are no National Emission Standards for Hazardous Air Pollutants (NESHAPs) (326 IAC 14, 326 IAC 20 and 40 CFR Part 63) included in the permit.

#### Compliance Assurance Monitoring (CAM)

- (d) Pursuant to 40 CFR 64.2, Compliance Assurance Monitoring (CAM) is not included in the permit because the unlimited potential to emit of the source is less than the Title V major source thresholds and the source is not required to obtain a Part 70 or Part 71 permit.

### State Rule Applicability Determination

The following state rules are applicable to the source:

#### **326 IAC 2-5.1-2 (Registrations)**

Registration applicability is discussed under the Permit Level Determination – Registration section above.

#### **326 IAC 2-4.1 (Major Sources of Hazardous Air Pollutants (HAP))**

The potential to emit of any single HAP is less than ten (10) tons per year and the potential to emit of a combination of HAPs is less than twenty-five (25) tons per year. Therefore, this source is an area source under Section 112 of the Clean Air Act (CAA) and not subject to the provisions of 326 IAC 2-4.1.

#### **326 IAC 2-6 (Emission Reporting)**

Pursuant to 326 IAC 2-6-1, this source is not subject to this rule, because it is not required to have an operating permit under 326 IAC 2-7 (Part 70), it is located in LaPorte County, it has actual emissions of NO<sub>x</sub> and VOC of less than twenty-five (25) tons per year, and it does not emit lead

into the ambient air at levels equal to or greater than 5 tons per year. Therefore, 326 IAC 2-6 does not apply.

**326 IAC 5-1 (Opacity Limitations)**

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Alternative Opacity Limitations), opacity shall meet the following, unless otherwise stated in this permit:

- (a) Opacity shall not exceed an average of forty percent (40%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.
- (b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

**326 IAC 6-4 (Fugitive Dust Emissions Limitations)**

The source is subject to the requirements of 326 IAC 6-4, because the paved roads have the potential to emit fugitive particulate emissions. Pursuant to 326 IAC 6-4 (Fugitive Dust Emissions Limitations), the source shall not allow fugitive dust to escape beyond the property line or boundaries of the property, right-of-way, or easement on which the source is located, in a manner that would violate 326 IAC 6-4.

**326 IAC 6-5 (Fugitive Particulate Matter Emission Limitations)**

The source is not subject to the requirements of 326 IAC 6-5, because the source does not have potential fugitive particulate emissions greater than 25 tons per year. Therefore, 326 IAC 6-5 does not apply.

**326 IAC 8-1-6 (VOC Rules: General Reduction Requirements for New Facilities)**

The remediation system AS/SVE-1 is not subject to the requirements of 326 IAC 8-1-6, since the unlimited potential VOC emissions are less than twenty-five (25) tons per year.

<b>Conclusion and Recommendation</b>
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Unless otherwise stated, information used in this review was derived from the application and additional information submitted by the applicant. An application for the purposes of this review was received on July 6, 2011.

The construction and operation of this source shall be subject to the conditions of the attached proposed Registration No. R091-30683-00143. The staff recommends to the Commissioner that this Registration be approved.

<b>IDEM Contact</b>
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- (a) Questions regarding this proposed permit can be directed to Nathan Bell at the Indiana Department Environmental Management, Office of Air Quality, Permits Branch, 100 North Senate Avenue, MC 61-53 IGCN 1003, Indianapolis, Indiana 46204-2251 or by telephone at (317) 233-5670 or toll free at 1-800-451-6027 extension 35670.
- (b) A copy of the findings is available on the Internet at: <http://www.in.gov/ai/appfiles/idem-caats/>
- (c) For additional information about air permits and how the public and interested parties can participate, refer to the IDEM's Guide for Citizen Participation and Permit Guide on the Internet at: [www.idem.in.gov](http://www.idem.in.gov)

**Appendix A: Emissions Calculations  
Emission Summary**

**Company Name:** Knoll Brothers Petroleum  
**Source Address:** 1575 E US Highway 12, Michigan City, Indiana 46360  
**Registration No.:** R091-30683-00143  
**Reviewer:** Nathan Bell

Process Description	Unlimited Potential to Emit (PTE) (tons/year)									
	PM	PM10	PM2.5	SO2	NOx	VOC	CO	GHGs as CO <sub>2</sub> e	Total HAPs	Worst Single HAP
Remediation System AS/SVE-1	0.00	0.00	0.00	0.00	0.00	13.52	0.00	0.00	1.65	0.54 (toluene)
Paved Roads (fugitive)	0.35	0.07	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00 (---)
<b>Total PTE</b>	<b>0.35</b>	<b>0.07</b>	<b>0.02</b>	<b>0.00</b>	<b>0.00</b>	<b>13.52</b>	<b>0.00</b>	<b>0.00</b>	<b>1.65</b>	<b>0.54 (toluene)</b>

**Appendix A: Emissions Calculations  
Remediation System AS/SVE-1**

**Company Name:** Knoll Brothers Petroleum  
**Source Address:** 1575 E US Highway 12, Michigan City, Indiana 46360  
**Registration No.:** R091-30683-00143  
**Reviewer:** Calculations submitted by Knoll Brothers Petroleum and reviewed by Nathan Bell

**Contaminant Mass Calculations  
Knoll Brothers Petroleum - Michigan City, Indiana**

**1) Dissolved Phase Contaminant Mass**

Dissolved Phase Gasoline				Dissolved Phase Diesel and/or Kerosene			
Constants				Constants			
Volume Conversion	7.48	gal per ft <sup>3</sup>		Volume Conversion	7.48	gallons per ft <sup>3</sup>	
Water Density	8.35	lbs per gal		Water Density	8.35	lbs per gal	
Input				Input			
Influence Area	Thickness	Soil Porosity	Contamination Concentration	Influence Area	Thickness	Soil Porosity	Contamination Concentration
(ft <sup>2</sup> )	(ft)		(ppb)	(ft <sup>2</sup> )	(ft)		(ppb)
19,964	6	0.30	313,846	19,964	6	0.30	208,580
	TPV:	77,970	ft <sup>3</sup>		TPV:	8,412	ft <sup>3</sup>
	IGWV:	23,391	ft <sup>3</sup>		IGWV:	2,524	ft <sup>3</sup>
	IGWV:	174,965	gal		IGWV:	18,877	gal
	IGWM:	1,460,955	lbs		IGWM:	157,619	lbs
	<b>DPHM-G:</b>	<b>459</b>	<b>lbs</b>		<b>DPHM-D:</b>	<b>33</b>	<b>lbs</b>

**Assumptions:**

- The influence area value is based on the remediation system vacuum radius of influence of 46 feet at each extraction well as determined during pilot testing activities and depicted in Figure 1.
- Thickness of groundwater contamination is estimated conservatively at six (6) feet based on the fact that petroleum hydrocarbons have a specific gravity of less than one (1) and will therefore tend to float on the groundwater surface instead of distributing evenly within the water column.
- A typical soil porosity of 30% (0.30) is utilized.
- The contaminant concentration is the average of the historical maximum GRO or DRO concentration as measured in the five (5) monitoring wells located within remediation system vacuum radius of influence (MW-1, MW-2, MW-3, MW-8, and EEIMW-19) depicted on Figure 2.

**Calculation Explanation:**

TPV (Total Plume Volume) (ft<sup>3</sup>)= Plume Area (ft<sup>2</sup>) \* Thickness (ft)  
 IGWV (Impacted Groundwater Volume) (ft<sup>3</sup>)= TPV (ft<sup>3</sup>) \* Soil Porosity  
 IGWV (gallons) = IGWV (ft<sup>3</sup>) \* 7.48 (gal/ft<sup>3</sup>)  
 IGWM (Impacted Groundwater Mass) (lbs) = IGWV (gal) \* Water Density (lbs/gal)  
 DPHM-G/D (Dissolved Phase Hydrocarbon Mass for Gasoline/Diesel) (lbs) = (Contaminant Concentrations (ppb) / 10<sup>6</sup>) \* IGWM (lbs)

Company Name: Knoll Brothers Petroleum  
 Source Address: 1575 E US Highway 12, Michigan City, Indiana 46360  
 Registration No.: R091-30683-00143  
 Reviewer: Calculations submitted by Knoll Brothers Petroleum and reviewed by Nathan Bell

Contaminant Mass Calculations Continued

2) Adsorbed Hydrocarbon Mass (Hydrocarbons adsorbed to soil above and below water table)

Soil Adsorbed Gasoline				Soil Adsorbed Diesel and/or Kerosene			
<i>Constants</i>				<i>Constants</i>			
Solid Mineral Density (Quartz)	165.4	lbs/ft <sup>3</sup>		Solid Mineral Density (Quartz)	165.4	lbs/ft <sup>3</sup>	
<i>Input</i>				<i>Input</i>			
Influence Area	Thickness	Soil Porosity	Contamination Concentration	Influence Area	Thickness	Soil Porosity	Contamination Concentration
(ft <sup>2</sup> )	(ft)		(ppm)	(ft <sup>2</sup> )	(ft)		(ppm)
19,964	13.6	0.30	1,981.3	19,964	13.6	0.30	3,949.3
TISV:		42,133	ft <sup>3</sup>	TISV:		155,162	ft <sup>3</sup>
SMV:		29,493	ft <sup>3</sup>	SMV:		108,613	ft <sup>3</sup>
SMM:		4,878,159	lbs	SMM:		17,964,656	lbs
<b>AHM-G:</b>		<b>9,665</b>	<b>lbs</b>	<b>AHM-D:</b>		<b>70,948</b>	<b>lbs</b>

**Assumptions:**

- The influence area is based to the total vacuum radius of influence of the high vacuum remediation system as depicted in Figure 2.
- The contaminated thickness was estimated by summing the total thickness of all soil sample intervals exhibiting soil vapor concentrations greater than 100 parts per million (ppm) as measured by a MiniRae 2000 photoionization detector (PID) (Table 1). For calculations, the impacted soil thickness value used is the average contaminated thickness observed in borings within the influence area of the remediation system.
- A typical soil porosity of 30% (0.30) is utilized.
- The contaminant concentration is the average of the maximum GRO or DRO concentration (Table 3) measured in each boring located within the remediation system radius of influence depicted on Figures 3.

**Calculation Explanation:**

TISV (Total Impacted Soil Volume) (ft<sup>3</sup>) = Plume Area (ft<sup>2</sup>) \* Thickness (ft)  
 SMV (Soil Mineral Volume) (ft<sup>3</sup>) = TISV (ft<sup>3</sup>) \* (1 - Soil Porosity)  
 SMM (Soil Mineral Mass) (lbs) = SMV (ft<sup>3</sup>) \* Solid Mineral Density (lbs/ft<sup>3</sup>)  
 AHM-G/D (Adsorbed Hydrocarbon Mass for Gasoline/Diesel) (lbs) = (Contaminant Concentration (ppm) / 10<sup>6</sup>) \* SMM (lbs)

**Appendix A: Emissions Calculations  
Remediation System AS/SVE-1**

**Company Name:** Knoll Brothers Petroleum  
**Source Address:** 1575 E US Highway 12, Michigan City, Indiana 46360  
**Registration No.:** R091-30683-00143  
**Reviewer:** Calculations submitted by Knoll Brothers Petroleum and reviewed by Nathan Bell

**Contaminant Mass Calculations Continued**

**3) Total Volatile Organic Compounds (VOCs) Potential to Emit**

Potential Gasoline Range Mass (lbs):	10,124	(Sum of DPHM-G and AHM-G)
Potential Diesel Range Mass (lbs):	70,981	(Sum of DPHM-D and AHM-D)
<b>Total Hydrocarbon Mass (lbs):</b>	<b>81,104</b>	(Sum of Dissolved Phase and Adsorbed Hydrocarbons)

System Operational Period :	3	years
<b>VOC PTE:</b>	<b>13.5</b>	<b>tons/year</b>

**Assumptions:**

- System Operational Period is the estimated time that will be required to reduce petroleum impacts at this site to below IDEM closure levels.
- It is assumed that all potential hydrocarbons that can be captured and emitted by the remediation system are composed of 100% VOCs.

**Calculation Explanation:**

VOC PTE (Total VOCs Potential to Emit) (tons/year) = Total Hydrocarbon Mass (lbs) / 2000 (lbs/ton) / System Operational Period (years)

**Contaminant Mass Calculations Continued**

**4) Individual Hazardous Air Pollutants (HAPs) Potential to Emit**

HAP	Gasoline		Diesel		Total Hydrocarbon Mass	
	Concentration	Total Mass PTE	Concentration	Total Mass PTE	Totals lbs	tons/year
		(lbs)		(lbs)		(3 years)
Benzene	4.9%	496.06	1.0%	709.81	1205.86	0.201
Toluene	25.0%	2530.90	1.0%	709.81	3240.71	0.540
Ethylbenzene	3.0%	303.71	1.0%	709.81	1013.52	0.169
Xylenes	15.0%	1518.54	1.0%	709.81	2228.35	0.371
MTBE	15.0%	1518.54	0.0%	0.00	1518.54	0.253
Naphthalene	5.0%	506.18	0.01%	7.10	513.28	0.086
Isopropylbenzene	2.0%	202.47	0.0%	0.00	202.47	0.034
					<b>Sum:</b>	<b>1.654</b>

**Assumptions:**

-Maximum HAPs percentages in gasoline based on attached MSDS (benzene 4.9%, toluene 25%, ethylbenzene 3.0%, xylene 15%, MTBE 5%)  
 ASSUMED maximum concentrations in gasoline of other HAPs constituents detected at the site: naphthalene 5%, isopropylbenzene 2%

-Maximum HAPs percentages in diesel based on attached MSDS (naphthalene 0.01%). ASSUMED maximum concentrations in diesel of other HAPs constituents detected at the site: benzene 1.0%, toluene 1.0%, ethylbenzene 1.0%, xylenes 1.0%

**Calculation Explanation:**

-The individual HAP PTE is estimated by multiplying the total Potential Gasoline Range Mass or Potential Diesel Range mass by the corresponding percentage composition in gasoline or diesel fuels.

**Appendix A: Emission Calculations  
Fugitive Dust Emissions - Paved Roads**

**Company Name:** Knoll Brothers Petroleum  
**Source Address:** 1575 E US Highway 12, Michigan City, Indiana 46361  
**Registration No.:** R091-30683-00143  
**Reviewer:** Calculations submitted by Knoll Brothers Petroleum and reviewed by Nathan Be

**Paved Roads at Industrial Site**

The following calculations determine the amount of emissions created by paved roads, based on 8,760 hours of use and AP-42, Ch 13.2.1 (1/2011).

Vehicle Information (provided by source)

Type	Maximum number of vehicles per day	Number of one-way trips per day per vehicle	Maximum trips per day (trip/day)	Maximum Weight Loaded (tons/trip)	Total Weight driven per day (ton/day)	Maximum one-way distance (feet/trip)	Maximum one-way distance (mi/trip)	Maximum one-way miles (miles/day)	Maximum one-way miles (miles/yr)
Vehicle (entering plant) (one-way trip)	10.0	1.0	10.0	16.0	160.0	200	0.038	0.4	138.3
Vehicle (leaving plant) (one-way trip)	10.0	1.0	10.0	43.0	430.0	200	0.038	0.4	138.3
<b>Total</b>			<b>20.0</b>		<b>590.0</b>			<b>0.8</b>	<b>276.5</b>

Average Vehicle Weight Per Trip =  $\frac{29.5}{0.04}$  tons/trip  
 Average Miles Per Trip =  $\frac{29.5}{0.04}$  miles/trip

Unmitigated Emission Factor,  $E_f = [k * (sL)^{0.91} * (W)^{1.02}]$  (Equation 1 from AP-42 13.2.1)

	PM	PM10	PM2.5	
where k =	0.011	0.0022	0.00054	lb/VMT = particle size multiplier (AP-42 Table 13.2.1-1)
W =	29.5	29.5	29.5	tons = average vehicle weight (provided by source)
sL =	9.7	9.7	9.7	g/m <sup>2</sup> = silt loading value for paved roads at iron and steel production facilities - Table 13.2.1-3)

Taking natural mitigation due to precipitation into consideration, Mitigated Emission Factor,  $E_{ext} = E * [1 - (p/4N)]$  (Equation 2 from AP-42 13.2.1)

Mitigated Emission Factor,  $E_{ext} = E_f * [1 - (p/4N)]$   
 where p = 125 days of rain greater than or equal to 0.01 inches (see Fig. 13.2.1-2)  
 N = 365 days per year

	PM	PM10	PM2.5	
Unmitigated Emission Factor, $E_f$ =	2.745	0.549	0.1348	lb/mile
Mitigated Emission Factor, $E_{ext}$ =	2.510	0.502	0.1232	lb/mile

Process	Unmitigated PTE of PM (tons/yr)	Unmitigated PTE of PM10 (tons/yr)	Unmitigated PTE of PM2.5 (tons/yr)	Mitigated PTE of PM (tons/yr)	Mitigated PTE of PM10 (tons/yr)	Mitigated PTE of PM2.5 (tons/yr)
Vehicle (entering plant) (one-way trip)	0.19	0.04	0.01	0.17	0.03	0.01
Vehicle (leaving plant) (one-way trip)	0.19	0.04	0.01	0.17	0.03	0.01
	<b>0.38</b>	<b>0.08</b>	<b>0.02</b>	<b>0.35</b>	<b>0.07</b>	<b>0.02</b>

**Methodology**

Total Weight driven per day (ton/day) = [Maximum Weight Loaded (tons/trip)] \* [Maximum trips per day (trip/day)]  
 Maximum one-way distance (mi/trip) = [Maximum one-way distance (feet/trip) / 5280 ft/mile]  
 Maximum one-way miles (miles/day) = [Maximum trips per year (trip/day)] \* [Maximum one-way distance (mi/trip)]  
 Average Vehicle Weight Per Trip (ton/trip) = SUM[Total Weight driven per day (ton/day)] / SUM[Maximum trips per day (trip/day)]  
 Average Miles Per Trip (miles/trip) = SUM[Maximum one-way miles (miles/day)] / SUM[Maximum trips per year (trip/day)]  
 Unmitigated PTE (tons/yr) = [Maximum one-way miles (miles/yr)] \* [Unmitigated Emission Factor (lb/mile)] \* (ton/2000 lbs)  
 Mitigated PTE (tons/yr) = [Maximum one-way miles (miles/yr)] \* [Mitigated Emission Factor (lb/mile)] \* (ton/2000 lbs)

**Abbreviations**

PM = Particulate Matter  
 PM10 = Particulate Matter (<10 um)  
 PM2.5 = Particulate Matter (<2.5 um)  
 PTE = Potential to Emit



# INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

*We Protect Hoosiers and Our Environment.*

*Mitchell E. Daniels Jr.*  
**Governor**

*Thomas W. Easterly*  
**Commissioner**

100 North Senate Avenue  
Indianapolis, Indiana 46204  
(317) 232-8603  
Toll Free (800) 451-6027  
[www.idem.IN.gov](http://www.idem.IN.gov)

## SENT VIA U.S. MAIL: CONFIRMED DELIVERY AND SIGNATURE REQUESTED

TO: Larry Knoll  
Knoll Brothers Petroleum  
1575 E US Hwy 12  
Michigan City, IN 46360

DATE: July 28, 2011

FROM: Matt Stuckey, Branch Chief  
Permits Branch  
Office of Air Quality

SUBJECT: Final Decision  
Registration  
091 - 30683 - 00143

Enclosed is the final decision and supporting materials for the air permit application referenced above. Please note that this packet contains the original, signed, permit documents.

The final decision is being sent to you because our records indicate that you are the contact person for this application. However, if you are not the appropriate person within your company to receive this document, please forward it to the correct person.

A copy of the final decision and supporting materials has also been sent via standard mail to:  
Sean Coats Creek Run LLC Environmental Engineering  
OAQ Permits Branch Interested Parties List

If you have technical questions regarding the enclosed documents, please contact the Office of Air Quality, Permits Branch at (317) 233-0178, or toll-free at 1-800-451-6027 (ext. 3-0178), and ask to speak to the permit reviewer who prepared the permit. If you think you have received this document in error, please contact Joanne Smiddie-Brush of my staff at 1-800-451-6027 (ext 3-0185), or via e-mail at [jbrush@idem.IN.gov](mailto:jbrush@idem.IN.gov).

Final Applicant Cover letter.dot 11/30/07

# Mail Code 61-53

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2		Laurence A. McHugh Barnes & Thornburg 100 North Michigan South Bend IN 46601-1632 (Affected Party)									
3		LaPorte County Commissioners 555 Michigan Avenue # 202 LaPorte IN 46350 (Local Official)									
4		Mr. Chris Hernandez Pipefitters Association, Local Union 597 8762 Louisiana St., Suite G Merrillville IN 46410 (Affected Party)									
5		Michigan City-City Council and Mayors Office 100 E. Michigan Blvd. Michigan City IN 46360 (Local Official)									
6		LaPorte County Health Department County Complex, 4th Floor, 809 State St. LaPorte IN 46350-3329 (Health Department)									
7		Mr. Dick Paulen Barnes & Thornburg 121 W Franklin Street Elkhart IN 46216 (Affected Party)									
8		Mark Zeltwanger 26545 CR 52 Nappanee IN 46550 (Affected Party)									
9		Sean Coats Creek Run LLC Environmental Engineering PO Box 114 Montpelier IN 47359 (Consultant)									
10		12 East Business, LLC 1508 East US Highway 12 Michigan City IN 46360 (Affected Party)									
11		Lake Industries, Inc. 1617 East US Highway 12 Michigan City IN 46360 (Affected Party)									
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