

# **NORTHERN PLAINS**

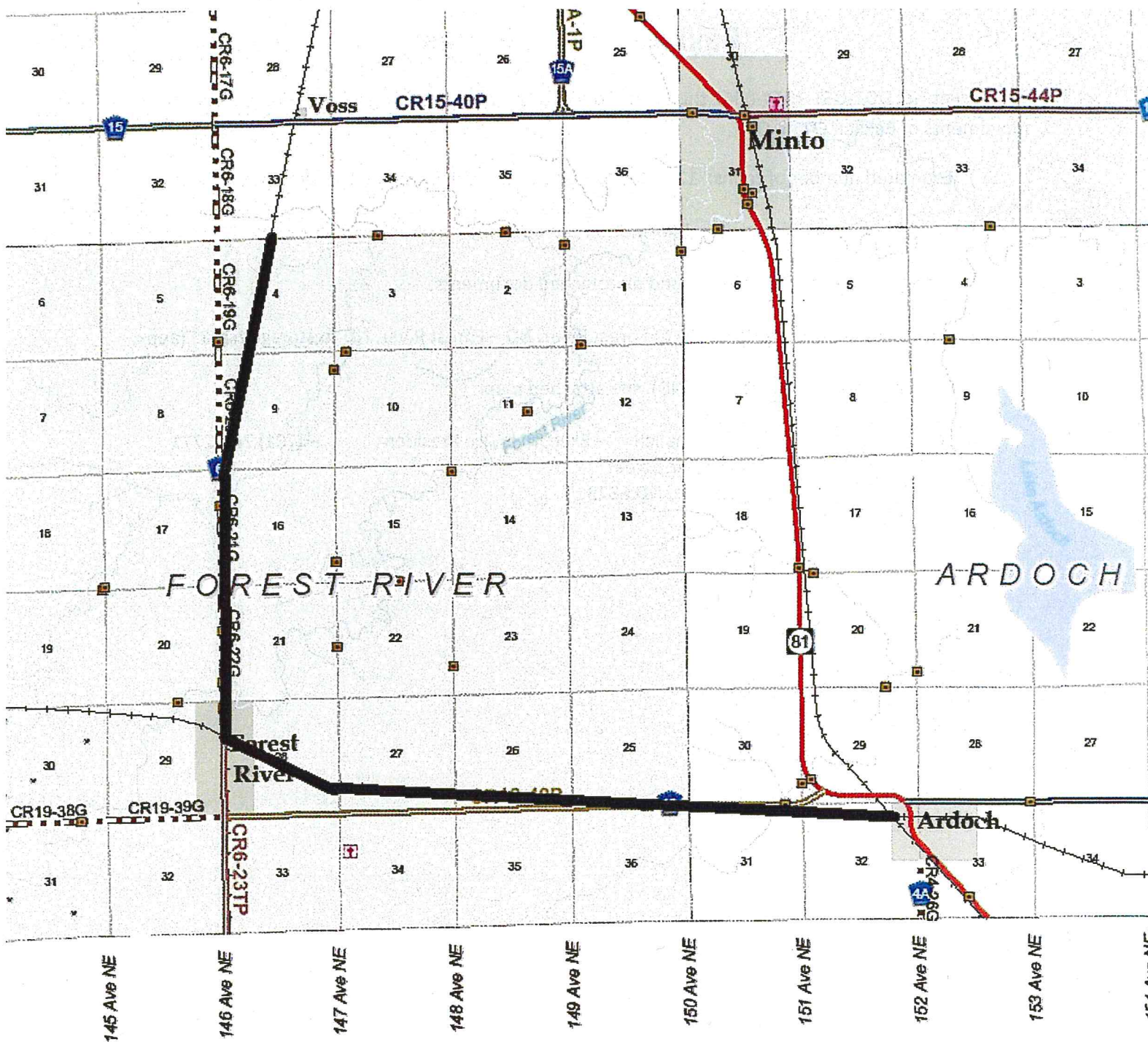


## **NPR / MRI / MHC Notification of expected movement of Bakken crude oil trains.**

Per Docket No. DOT-OST-2014-0067 this is our notice to the SERC providing information pertaining to movements of Bakken Crude Oil.

- A.) Estimated number of trains: 12 trains annually or .23 trains per week all within Walsh Co.
- B.) All of identity and description information can be found on attached documents.
- C.) Emergency Response can be found on attached documents.
- D.) Route information: Ardoch, ND to Forest River, ND – Forest River, ND to storage track. (appx. 4.5 miles north of Forest River, ND) see attached map.

Point of Contact :      Jesse Chalich    – Executive Vice President      – (701) 741-2771  
                                 114 Main Street  
                                 Fordville, ND 58231



**Black line identifies route.**

**R53W**

**+**

**R52W**



\*\*\*\*\*DANGEROUS\*\*\*\*\*

## Shipping Document - Straight Bill Of Lading

Shippers BOL No.  
010865DRRevision  
0

FOR EMERGENCY CONTACT IN U.S. CALL CHEMTREC #204043 800-424-9300

Car No: MULTI-CARS      Bill Type: REVENUE      Ship Date: 05/18/2014  
 Destination: PHILADELPHIA, PA      Origin: DORE, ND  
 Routing: BNSF-CHGO-CSXT      MUSKET CORPORATION  
 Switching Info:      DORE, ND

CareOf/ShipTo  
 PHILADELPHIA ENERGY SOLUTIONS  
 PHILADELPHIA , PA

Shipper  
 SHELL TRADING (US) CO  
 1000 MAIN  
 HOUSTON , TX 77002

Consignee  
 JP MORGAN VENT ENERGY  
 PHILADELPHIA , PA

Freight Charges  
 SHELL TRADING (US) CO  
 1000 MAIN  
 HOUSTON , TX 77002

Lessee:      Sect 7: YES

Freight: PREPAID      Fob:      Rule-11: NO

Reference NoACCOUNT OF (DEST)

SHELL TRADING (US) CO  
 1000 MAIN  
 HOUSTON, TX

## RR Contract:

Product: PETROLEUM CRUDE OIL 01  
 STCC Code: 4910165      DOT E-7616  
HAZMAT Information  
 UN1267// PETROLEUM CRUDE OIL//3//PGI

Placards: FLAMMABLE

No. Of Packages: 104 RAILCARS

Seal No's:

Car Capacity Gallons	Outage			Loaded - ORIGIN WEIGHTS						LBS/GAL	CERTIFIED OR TARIFF WEIGHT (SUBJECT TO CORRECTION)
	TABLE	INS	GAL+VC	GALLONS	UM	GRAVITY	TEMP	VCF	GALS@60		
U.S.									2,874,693		19,408,101

LITRES

## Comments:

ER - RETURN EMPTY VIA REVERSE ROUTE;

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

THAD DAVIS

SIGNATURE

Page 1



# Bakken Crude

## Safety Data Sheet

according to Hazardous Products Act and Controlled Products Regulations and 29 CFR § 1910.1200

Revision date: March 19, 2014

Supersedes: Not applicable

Version: 1

**MUSKET**

### SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

#### **1.1. Product identifier**

*Product form* : Liquid mixture  
*Name* : Bakken Crude  
*Synonyms* : Crude Oil

#### **1.2. Relevant identified uses of the substance or mixture and uses advised against**

##### **1.2.1. Relevant identified uses**

*Use of the substance/preparation* : Raw product used in petroleum hydrocarbon and petrochemical refining.

##### **1.2.2. Uses advised against**

None known.

#### **1.3. Details of the supplier of the safety data sheet**

Musket Corporation  
1111 Bagby St.  
Houston, TX 77002  
Tel: (713) 332-5726

#### **1.4. Emergency telephone number**

*Emergency number* : CHEMTREC's 24-hr Number: 1-800-424-9300 USA shipments  
CANUTEC's 24-hr Number: 1-613-996-6666 CAN shipments

### SECTION 2: HAZARDS IDENTIFICATION

#### **2.1. Classification of the substance or mixture**

##### **2.1.1. WHMIS Classification**

B-2 Flammable liquid  
D-1A Material causing immediate and serious toxic effects (Very toxic)  
D-2B Material causing other toxic effects (Toxic)

##### **2.1.2. Classification according to 2012 29 CFR § 1910.1200 [OSHA GHS]**

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Flammable Liquids - Category 2

Aspiration Toxicity - Category 1

Germ Cell Mutagenicity - Category 1B

Carcinogenicity - Category 1B

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Reproductive toxicity - Category 2  
Eye Damage/Irritation - Category 2A  
Skin Corrosion/Irritation - Category 2

### 2.1.3. Adverse physicochemical, human health and environmental effects

May contain or release toxic hydrogen sulfide vapor, which may accumulate in confined spaces. Inhaled hydrogen sulfide may cause central nervous system depression resulting in headache, dizziness, nausea, unconsciousness, and death. Repeated exposure may cause skin dryness or cracking.

## 2.2. Label elements

### 2.2.1. Labeling according to WHMIS



### 2.2.2. Labelling according to 2012 29 CFR § 1910.1200 [OSHA GHS]

Hazard pictograms (OSHA)



Signal word (OSHA)

Hazard statements (OSHA)

Precautionary statements (OSHA)

- : Danger
- : Highly flammable liquid and vapor.
- : May be fatal if swallowed and enters airways.
- : Causes serious eye irritation.
- : Causes skin irritation.
- : Suspected of damaging fertility or the unborn child.
- : May cause genetic defects.
- : May cause cancer.
- : Keep away from heat, sparks, open flames, hot surfaces – No smoking.
- : Keep container tightly closed.
- : Use only outdoors or in a well-ventilated area.
- : Ground container and receiving equipment and use non-sparking, explosion-proof equipment and tools.
- : Take precautionary measures against static discharge.
- : Obtain special instructions before use.
- : Do not handle until all safety precautions have been read and understood.
- : Wear respiratory protection, protective gloves, protective clothing, eye protection, and face protection.
- : Wash hands thoroughly after handling.
- : Take off contaminated clothing and wash it before reuse.
- : If exposed or concerned: Get medical attention.
- : Do not breathe vapors or mist.
- : If swallowed: Immediately call a poison center or doctor.
- : Do NOT induce vomiting.
- : If inhaled: Remove person to fresh air and keep comfortable for breathing.
- : Immediately call a poison center or doctor.
- : If on skin (or hair): Take off immediately all contaminated clothing.
- : Rinse skin with water.
- : If in eyes: Rinse cautiously with water for several minutes.
- : Remove contact lenses, if present and easy to do. Continue rinsing.



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If irritation persists: Get medical attention.  
In case of fire: Use dry chemical, carbon dioxide, foam, or water fog to extinguish.  
Store in a cool, well-ventilated place.  
Store locked up.  
Dispose of contents and container in accordance with local, regional, national, and international regulations.

### 2.3. Other hazards

Spills of this product present a serious slipping hazard.

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1. Substance

Not applicable.

### 3.2. Mixtures

Name	Product Identifier (CASRN)	Concentration
Crude Oil <sup>a</sup>	8002-05-9	~100%
Benzene <sup>b</sup>	71-43-2	0.1-1.0%
Cyclohexane <sup>b</sup>	110-82-7	0.1-1.0%
Ethylbenzene <sup>b</sup>	100-41-4	0.1-1.0%
n-Hexane <sup>b</sup>	110-54-3	1.0-5.0%
Hydrogen sulfide <sup>b</sup>	7783-06-4	<0.0005% <sup>c</sup>
Toluene <sup>b</sup>	108-88-3	0.1-1.0%

<sup>a</sup> Crude oil may contain variable levels of impurities, such as paraffinic and aromatic hydrocarbons and small amounts of nitrogen and sulfur compounds.

<sup>b</sup> These ingredients are impurities of a complex mixture.

<sup>c</sup> Concentration is present in %v/v.

## SECTION 4: FIRST AID MEASURES

### 4.1. Description of first aid measures

- First-aid measures after inhalation* : Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center or doctor. If breathing difficulties develop or if victim is not breathing, oxygen should be administered by qualified personnel. Get medical attention immediately.
- First-aid measures after skin contact* : Remove contaminated clothing/shoes, wipe excess from skin. Wash contaminated area thoroughly with soap and water or waterless hand cleanser. Do not use gasoline or solvent (naphtha, kerosene, etc.) for washing this product from exposed skin areas. If irritation or redness develops and persists, get medical attention. Disregard contaminated leather goods.
- First-aid measures after eye contact* : In case of contact with eyes, remove contact lenses if present and easy to do. Immediately hold eyelids apart and flush the affected eye(s) with clean water for at least 20 minutes. Get medical attention immediately.

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*First-aid measures after ingestion* : Do NOT induce vomiting. Do not give anything by mouth. Wash out mouth with water. Get medical attention immediately. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties.

### **4.2. Most important symptoms and effects, both acute and delayed**

*Symptoms/injuries after inhalation* : May contain or release toxic hydrogen sulfide vapor, which may accumulate in confined spaces. May cause irritations to the nose, throat, lungs, and respiratory tract. Inhaled hydrogen sulfide may cause central nervous system depression resulting in headache, dizziness, nausea, unconsciousness, and death.

*Symptoms/injuries after skin contact* : May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly. Irritation from exposure may aggravate existing open wounds, skin disorders, and dermatitis (skin rash).

*Symptoms/injuries after eye contact* : Contact with eyes may cause moderate to severe irritation. May cause eye tearing, redness, and discomfort.

*Symptoms/injuries after ingestion* : May cause aspiration and result in chemical pneumonia, severe lung damage, respiratory failure, or even death. May cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

### **4.3. Indication of any immediate medical attention and special treatment needed**

Treat symptomatically. If large quantities have been ingested or inhaled, contact poison treatment specialist immediately. For inhalation of hydrogen sulfide, consider oxygen therapy.

## **SECTION 5: FIREFIGHTING MEASURES**

### **5.1. Extinguishing media**

*Suitable extinguishing media:* : Foam, water fog, dry chemical powder, carbon dioxide.

*Unsuitable extinguishing media* : Do not use water jet, as this could spread the fire; however, water may be used to cool fire-exposed containers.

### **5.2. Special hazards arising from the substance or mixture**

*Fire hazard* : Flash point and explosive limits are highly dependent on the crude oil source. Unless otherwise indicated, treat as a FLAMMABLE LIQUID (refer to Section 9 for flash point, flammable/explosive limits). The vapor is heavier than air and may travel long distances to an ignition source and flash back. Vapor can accumulate in low areas. Runoff to sewer may cause fire or explosion hazard.

*Reactivity* : This material can be ignited by heat, sparks, flames, or other sources of ignition. If container is not properly cooled, it can rupture in the heat of a fire. When heated, hydrogen sulfide and toxic sulfur oxides may be given off. Refer to Section 10 for combustion products.

### **5.3. Advice for firefighters**

*Protective equipment for firefighters* : Wear full protective clothing and NIOSH/MSHA-approved pressure-demand self-contained breathing apparatus.



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according to Hazardous Products Act and Controlled Products Regulations and 29 CFR § 1910.1200

### SECTION 6: ACCIDENTAL RELEASE MEASURES

#### **6.1. Personal precautions, protective equipment and emergency procedures**

##### **6.1.1. For non-emergency personnel**

No action shall be taken involving any personal risk or without suitable training. Evacuate the area and eliminate all ignition sources. Stay upwind and away from spill/release. Avoid direct contact with material. Carefully contain and stop the source of the spill, if safe to do so. Wear appropriate personal protective equipment (Refer to Section 8).

##### **6.1.2. For emergency responders**

<i>Protective equipment</i>	: Wear appropriate personal protective equipment (Refer to Section 8).
<i>Emergency procedures</i>	: Inform relevant authorities in accordance with all applicable regulations. Response and clean-up crews must be properly trained and must utilize appropriate personal protective equipment (Refer to Section 8).

#### **6.2. Environmental precautions**

Avoid entry of spilt material and runoff into sewer or drainage systems, unless system is designed and permitted to handle such material. Do not discharge solid water stream patterns into the liquid resulting in splashing.

#### **6.3. Methods and material for containment and cleaning up**

<i>Containment</i>	: Use foam on spills to minimize vapors. Protect bodies of water by diking, absorbents, or absorbent boom, if possible.
<i>Cleaning up</i>	: Take up with sand or other inert and oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal.

#### **6.4. Reference to other sections**

Refer to Section 8 for personal protection equipment. Refer to Section 13 for disposal considerations.

### SECTION 7: HANDLING AND STORAGE

#### **7.1. Precautions for safe handling**

<i>Precautions for safe handling</i>	: Avoid exposure – obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid contact with skin and eyes or clothing. Avoid breathing vapors or mists. Wear appropriate personal protective equipment (Refer to Section 8). Handle as FLAMMABLE LIQUID. Keep container tightly closed. The vapor is heavier than air and may create an explosive mixture of vapor and air. Hydrogen sulfide may accumulate in enclosed spaces. Avoid confined spaces and areas with poor ventilation. Keep away from heat, sparks, and open flame. No smoking. Electrical equipment should be approved for classified area. Use non-sparking, explosion-proof equipment and tools. Take precautionary measures against static discharge. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.
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### Hygiene measures

: Handle in accordance with good industrial hygiene and safety practice. Workers should wash hands with soap and water before eating, drinking, smoking, or using toilet facilities. Promptly remove contaminated clothing and wash it before reuse. Keep contaminated clothing away from sources of ignition. Dispose of leather articles including shoes which cannot be decontaminated.

## 7.2. Conditions for safe storage, including any incompatibilities

### Technical measures:

: This material may contain or release dangerous levels of hydrogen sulfide. In a tank, barge, or other closed container, the vapor space above this material may accumulate hazardous concentrations of hydrogen sulfide. Check atmosphere for oxygen content, hydrogen sulfide and flammability prior to entry.

### Storage condition(s)

: Keep in a cool, well-ventilated place. Keep container tightly closed. Store locked up. Keep containers closed and clearly labeled. Containers that have been opened must be resealed and kept upright to prevent leakage. Keep away from heat, sparks, and open flame. Keep away from food and drink. Store away from incompatible materials. Hydrogen sulfide can react with iron in crude oil storage tanks or handling equipment to form iron sulfide. Dry iron sulfide can burn on exposure to air (pyrophoric).

### Incompatible materials

: Strong acids, strong oxidizing agents.

## 7.3. Specific end use(s)

Raw product used in petroleum hydrocarbon and petrochemical refining.

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control parameters

Name	Product identifier (CASRN)	Exposure Limits
Crude Oil	8002-05-9	ACGIH: Not established NIOSH: 1800 mg/m <sup>3</sup> (CEIL), 15 minutes; 350 mg/m <sup>3</sup> (TWA) OSHA: Not established
Benzene	71-43-2	ACGIH: 0.5 ppm (TWA); 2.5 ppm (STEL) NIOSH: 0.1 ppm (TWA); 1 ppm (STEL) OSHA: 10 ppm (TWA); 25 ppm (CEIL); 50 ppm (STEL), 10 minutes
Cyclohexane	110-82-7	ACGIH: 100 ppm (TWA) NIOSH: 300 ppm (TWA) OSHA: 300 ppm (TWA); 1050 mg/m <sup>3</sup> (TWA)
Ethylbenzene	100-41-4	ACGIH: 20 ppm (TWA) NIOSH: 100 ppm, 435 mg/m <sup>3</sup> (TWA); 125 ppm, 545 mg/m <sup>3</sup> (ST) OSHA: 100 ppm, 435 mg/m <sup>3</sup> (TWA)
n-Hexane	110-54-3	ACGIH: 50 ppm (TWA) NIOSH: 50 ppm (TWA); 180 mg/m <sup>3</sup> (TWA) OSHA: 500 ppm (TWA); 1800 mg/m <sup>3</sup> (TWA)



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Name	Product identifier (CASRN)	Exposure Limits
Hydrogen sulfide	7783-06-4	ACGIH: 1 ppm (TWA); 5 ppm (STEL) NIOSH: 10 ppm (CEIL), 10 minutes OSHA: 20 ppm (CEIL); 50 ppm (STEL), 10 minutes
Toluene	108-88-3	ACGIH: 20 ppm (TWA) NIOSH: 100 ppm, 375 mg/m <sup>3</sup> (TWA); 150 ppm, 560 mg/m <sup>3</sup> (ST) OSHA: 200 ppm (TWA); 300 ppm (CEIL), 500 ppm (10 minute maximum peak)

### 8.2. Exposure controls

<i>Appropriate engineering controls</i>	: Use adequate ventilation to keep vapor concentration of this product below occupational exposure and flammability limits, particularly in confined spaces.
<i>Personal protective equipment</i>	: Gloves, goggles, protective clothing, respirator
<i>Hand protection</i>	: Chemical resistant, impervious gloves.
<i>Eye protection</i>	: Safety glasses or goggles.
<i>Skin and Body protection</i>	: Chemical resistant clothing.
<i>Respiratory protection</i>	: A NIOSH certified air-purifying respiratory with an organic vapor cartridge may be used under conditions where hydrogen sulfide is not detected and airborne concentrations of hydrocarbons are expected to exceed exposure limits. Where there is potential for airborne exposure to hydrogen sulfide above exposure limits, a NIOSH approved, self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode should be used. If benzene concentrations equal or exceed applicable exposure limits, OSHA requirements for personal protective equipment, exposure monitoring and training may apply.
<i>Environmental exposure controls</i>	: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection regulations.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1. Information on basic physical and chemical properties

<i>Physical state</i>	: Liquid
<i>Color</i>	: Light to dark brown
<i>Odor</i>	: "Rotten egg" if hydrogen sulfide is present.
<i>Odor threshold</i>	: No information available
<i>pH</i>	: No information available
<i>Melting point</i>	: Pour Point of <-54°C (<-65.2°F)
<i>Boiling point</i>	: Initial Boiling Point of 33.7°C (92.66°F)
<i>Flash point</i>	: < 21°C (<69.8°F) (Closed cup)
<i>Evaporation rate</i>	: No information available
<i>Flammability (solid, gas)</i>	: No information available
<i>Explosive limits</i>	: No information available
<i>Vapor pressure</i>	: 15.2 psi at 37.8°C (100°F)
<i>Relative vapor density at 20°C</i>	: No information available
<i>Relative density</i>	: 0.8079 g/mL at 15.56°C (60°F) Average API Gravity of 43.5 °API at 15.56°C (60°F)

# Bakken Crude

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<i>Solubility</i>	: Insoluble in water
<i>Log Pow</i>	: No information available
<i>Log Kow</i>	: No information available
<i>Self ignition temperature</i>	: No information available
<i>Decomposition temperature</i>	: No information available
<i>Viscosity, kinematic</i>	: 3.337 cSt at 15.56°C (60°F)
<i>Viscosity, dynamic</i>	: 2.696 kg/m*s at 15.56°C (60°F)
<i>Explosive properties</i>	: No information available
<i>Oxidizing properties</i>	: No information available

### **9.2. Other information**

<i>Upper flammable Limit</i>	: Variable depending on crude sources ~15%
<i>Lower Flammable Limit</i>	: Variable depending on crude sources ~0.5%
<i>Sensitivity to mechanical impact</i>	: No information available
<i>Sensitivity to static discharge</i>	: Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

## **SECTION 10: STABILITY AND REACTIVITY**

### **10.1. Reactivity**

This product is stable under the normal conditions of use.

### **10.2. Chemical stability**

This product is stable under the normal conditions of use.

### **10.3. Possibility of hazardous reactions**

Under normal conditions of storage and use, hazardous polymerization is not known to occur.

### **10.4. Conditions to avoid**

Avoid high temperatures and all sources of ignition. Prevent vapor accumulation.

### **10.5. Incompatible materials**

Strong acids, strong bases, strong oxidizing agents, metals, metal oxides, interhalogens, metal salts.

### **10.6. Hazardous decomposition products**

May generate carbon oxides, nitrogen oxides, sulfur oxides, sulfur compounds (H<sub>2</sub>S), smoke and irritating vapors when heated to decomposition.

# Bakken Crude

## Safety Data Sheet

according to Hazardous Products Act and Controlled Products Regulations and 29 CFR § 1910.1200

### SECTION 11: TOXICOLOGICAL INFORMATION

#### 11.1. Information on toxicological effects

##### 11.1.1. Product Data:

*Routes of entry* : Oral, inhalation, skin and eye contact.  
*Acute toxicity* : No product data available.

##### 11.1.2. Ingredient Data:

Name	Product identifier (CASRN)	Route & Species	Acute Toxicity Value (LD <sub>50</sub> /LC <sub>50</sub> )
Crude Oil	8002-05-9	Oral, rat	>4,300 mg/kg
		Dermal, rabbit	>2,000 mg/kg
Benzene	71-43-2	Oral, rat	930 mg/kg
		Dermal, rabbit	>8,240 mg/kg
		Inhalation, rat (vapor)	13,700 ppm (4h)
Cyclohexane	110-82-7	Oral, rat	6,200 mg/kg
		Dermal, rabbit	>2,000 mg/kg
		Inhalation, rat	>9,500 ppm (4h)
Ethylbenzene	100-41-4	Oral, rat	3,500 mg/kg
		Dermal, rabbit	15,380 mg/kg
		Inhalation, rat	~4,000 ppm (4h)
n-Hexane	110-54-3	Oral, rat	15,820 mg/kg
		Dermal, rabbit	>3,295 mg/kg
		Inhalation, rat	38,500 ppm (4h)
Hydrogen sulfide	7783-06-4	Inhalation, rat (gas)	444 ppm (4h)
Toluene	108-88-3	Oral, rat	3,000 mg/kg
		Dermal, rabbit	12,125 mg/kg
		Inhalation, rat	7,585 ppm (4h)

*Skin corrosion/irritation* : May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly. Irritation from exposure may aggravate existing open wounds, skin disorders, and dermatitis (skin rash).

*Serious eye damage/irritation* : Contact with eyes may cause moderate to severe irritation. Exposed victims may experience eye tearing, redness, and discomfort.

*Respiratory or skin sensitization* : Contact with this product is not expected to cause sensitization, based upon the available data and the known hazards of the components.

*Mutagenicity* : Some crude oils and crude oil fractions have been positive in mutagenicity studies. This product may contain benzene as a part of complex mixture at ≥0.1% that has been shown to cause mutagenicity in laboratory tests. Therefore, this product is considered to be mutagenic.



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<i>Carcinogenicity</i>	: Crude oil was assessed by IARC and results were inconclusive (Group 3: not classifiable as to its carcinogenicity to humans). Crude oil is not listed as a carcinogen by the NTP or OSHA. This product may contain benzene as a part of complex mixture at $\geq 0.1\%$ that has been shown to cause carcinogenicity in laboratory tests. Therefore, this product is considered to be carcinogenic.
<i>Reproductive toxicity</i>	: This product is known to contain n-hexane as a part of complex mixture at $\geq 0.1\%$ that has been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is expected to be a reproductive toxin.
<i>Teratogenicity/Embryotoxicity</i>	: Dermal exposure to crude oil during pregnancy resulted in limited evidence of developmental toxicity in laboratory animals. Decreased fetal weight and increased resorptions were noted at maternally toxic doses. No significant effects on pup growth or other developmental landmarks were observed. This product may contain toluene as a part of complex mixture at $\geq 0.1\%$ that has been shown to cause teratogenicity in laboratory tests. Therefore, this product is considered to be teratogenic.
<i>Specific target organ toxicity (single exposure)</i>	: At high concentrations (500-1,000 ppm), hydrogen sulfide acts as a systemic poison, causing unconsciousness and death. In lower concentrations (50-500 ppm), hydrogen sulfide acts as a respiratory irritant, and may cause fluid in the lungs or bronchial pneumonia.
<i>Specific target organ toxicity (repeated exposure)</i>	: May cause skin irritation with prolonged or repeated contact. Chronic exposure to hydrogen sulfide of 50 ppm or greater may induce bronchitis and inflammation of the mucous membrane of the respiratory system. At 250 ppm, hydrogen sulfide may cause bronchial pneumonia and pulmonary edema.
<i>Aspiration hazard</i>	: May cause aspiration and result in chemical pneumonia, severe lung damage, respiratory failure, or even death. Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.
<i>Potential adverse human health effects and symptoms</i>	: Victims of overexposure may experience irritation of the digestive track and respiratory tract, nausea, vomiting, diarrhea, headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.
<i>Toxicologically synergistic materials</i>	: None known.

## SECTION 12: ECOLOGICAL INFORMATION

### **12.1. Toxicity**

Coating action of the oil can kill birds, plankton, algae and fish. Keep out of all bodies of water and sewage drainage systems.

### **12.2. Persistence and degradability**

Most crude oils are not regarded as readily biodegradable; however, they will slowly biodegrade.

### **12.3. Bioaccumulative potential**

Hydrocarbon components of crude oil have the potential to bioaccumulate.

### **12.4. Mobility in soil**

No information available.

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according to Hazardous Products Act and Controlled Products Regulations and 29 CFR § 1910.1200

### **12.5. Other adverse effects**

None anticipated.

## **SECTION 13: DISPOSAL CONSIDERATIONS**

### **13.1. Waste treatment methods**

*Waste disposal recommendations* : Comply with relevant regulations with regards to disposal, recycling, treatment, transportation and storage of contents and containers.

## **SECTION 14: TRANSPORT INFORMATION**

### **14.1. UN number:**

1267

### **14.2. UN proper shipping name**

PETROLEUM CRUDE OIL

### **14.3. Transport hazard class(es)**

Hazard Class 3

### **14.4. Packing group**

Packing group I

### **14.5. Special precautions**

No information available.

## **SECTION 15: REGULATORY INFORMATION**

### **15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

#### **15.1.1. National regulations**

*Canada* : This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations* and the MSDS contains all the information required by the *Controlled Products Regulations*.

*US* : This product has been classified in accordance with the 2012 hazard criteria of the OSHA's HCS and the SDS contains all the information required by the 29 CFR § 1910.1200.

All compounds in this product are listed in the Canada Domestic Substances List (DSL) and the US Toxic Substances Control Act (TSCA) Chemical Substance Inventory (1985).

# Bakken Crude

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according to Hazardous Products Act and Controlled Products Regulations and 29 CFR § 1910.1200

### SECTION 16: OTHER INFORMATION

*Name and phone number of the group, department or party responsible for the preparation of the SDS* : Andy Lash, Compliance and Equipment Manager, Musket Corporation  
Phone: (713) 332-4831

*Sources of key data* : Report of Analysis

*Abbreviations and acronyms* : ACGIH – American Conference of Governmental Industrial Hygienists  
bw – body weight  
CAN – Canada  
CAS – Chemical Abstracts Service  
CFR – Code of Federal Regulations  
DSL – Domestic Substances List  
EPA – Environmental Protection Agency  
GHS – Globally Harmonized System  
HCS – Hazard Communication Standard  
IARC – International Agency for Research on Cancer  
LC<sub>50</sub> – Acute lethal concentration causing 50% lethality in animals  
LD<sub>50</sub> – Acute lethal dose causing 50% lethality in animals  
MSDS – Material Safety Data Sheet  
NIOSH – National Institute of Occupational Safety and Health  
NTP – National Toxicology Program  
OSHA – Occupational Safety and Health Administration  
ppm – parts per million  
RCRA – The Resource Conservation and Recovery Act  
SCBA – Self Contained Breathing Apparatus  
SDS – Safety Data Sheet  
STEL – Short-Term Exposure Limit (generally 15 minutes)  
TSCA – Toxic Substances Control Act  
TWA – Time-Weighted Average  
US(A) – United States (of America)  
WHMIS - Workplace Hazardous Materials Information System

Disclaimer: The information given is based on data currently available to us and is believed to be correct. No warranty is expressed or implied regarding the accuracy of this data or the results obtained from the use thereof. No responsibility is assumed for injury or damage from the use of the products described herein.



## **7 Emergency Response Actions**

### **7.1 General Spill Response Procedures**

When a leak is discovered in a rail car, the situation must be handled in a very safe and efficient manner, regardless of the size of the leak. Minor leaks have the potential for developing into an emergency situation. If the situation is not properly handled, minor problems can escalate rapidly. The following steps should be observed when responding to spill, regardless of size;

- APPROACH CAUTIOUSLY
- IDENTIFY THE HAZARDS
- SECURE THE SCENE
- DECIDE ON SITE ENTRY
- MINIMIZE CONTACT WITH SPILLED MATERIAL

#### **7.1.1 Spill Containment**

Spills should be contained as close to the source as possible. Every effort should be made to contain spilled materials and prevent them from entering surface waters, groundwater, sewers, and drainage ditches. The Emergency Coordinator should implement containment actions, except when fuel oil and/or non-regulated commodities are involved. Minor spills of fuel oil and/or non-regulated commodities can often be quickly contained with nearby resources such as sorbent materials or local vacuum trucks.

Attempts to contain materials should begin only after the identities and associated hazards of the materials have been ascertained and it has been determined safe to proceed. PPE appropriate for the materials to be contained should always be worn when attempting to contain a spill.

Techniques involved in stopping the release of materials from their containers include:

- Close and/or tighten valves, dome lids, and other openings
- Adjust the physical orientation of the leaking container
- Patch or plug the openings
- Cool gas containers with a water spray

Techniques for containing spilled materials once released from their containers include:

- Erect dikes
- Divert liquid into a sump or trench
- Block sewers, culverts, and drainage ditches with earthen dams
- Collect spillage in portable containers
- Apply sorbents to immobilize liquid spillage
- Lace booms on water channels

### **7.1.2 Removal of Spilled Products**

Immediate response measures must be taken after spilled materials have been contained to begin removal and disposal of spilled products. Removal procedures should be initiated only if it has been determined that it is safe to proceed. Appropriate PPE should always be worn when removing spilled materials.

Techniques for removing spilled materials include the following:

- Remove liquids from sumps, trenches, and diked areas
- Remove impacted soils

## **7.2 Site Access Control**

A site must be controlled to reduce the possibility of (1) exposure of personnel to hazardous conditions, and (2) contaminant transport by personnel or equipment from the site. The possibility of exposure or translocation of substances can be reduced by one or more of the following:

- Setting up security to exclude non-responding personnel from the general area of the incident
- Establishing work zones within the site
- Implementing appropriate decontamination procedures

### **7.2.1 Work Zones**

Work zones control the movement of personnel and equipment within the contaminated area to small areas of the site to minimize the spread of contaminants. Typically, three contiguous work zones are recommended:



#### *Exclusion Zone*

The exclusion zone is the innermost of three concentric areas and is where contamination is located. All personnel entering the zone must wear appropriate protective gear. An entry and exit point must be established at the periphery of the Exclusion Zone.

#### *Contaminant Reduction Zone*

A Contaminant Reduction Zone is located between the Exclusion Zone and the Support Zone, and provides a transition zone between the contaminated and clean zones. Most decontamination is performed within this zone.

#### *Support Zone*

The Support Zone is considered an uncontaminated area and is used for staging equipment to be used in cleanup activities. Traffic in the support zone is restricted to authorized personnel. No contaminated clothing or equipment is allowed within this area.

### **7.2.2 Evacuation**

A vapor release of a hazardous materials or an uncontrolled fire can pose a serious threat to surrounding communities. By Minnesota State Law, if community evacuation is warranted, the Incident Commander will be responsible for ordering and evacuation of community residents. Under no circumstances will Northern Plains personnel order the evacuation of persons from a community.

## **7.3 Chemical-Specific Response Procedures**

DOT hazard class definitions and general precautions for responding to incidents involving materials of each hazard class are presented in Appendix F.

## APPENDIX F

### DOT HAZARD CLASS DEFINITIONS AND SPECIFIC RESPONSE PROCEDURES

#### Class 3 - Flammable and Combustible Liquids

Flammable liquids are liquids with flash points of less than 100 degrees Fahrenheit.

Combustible liquids are liquids with flash points between 100 and 200 degrees Fahrenheit.

Flash point is the temperature at which the liquid will give off enough vapor to form an ignitable mixture in the air. It is important to understand that it is the vapor which burns, not the liquid.

The possibility of ignition is greatest for liquids having low flash points, in particular flammable liquids. The lower the flash point, the greater the danger of fire. When leakage occurs as a result of a derailment, ignition is often caused instantaneously by friction sparks.

Flammable liquids with low boiling points, such as ethylene oxide, carbon bisulfide and diethyl ether, may develop sufficient pressure inside the tank that the criteria for assessing damage to compressed gas tanks should be used to evaluate the hazard.

If trailers or box cars carrying packages of flammable or combustible liquids are involved in an accident, one should approach the incident as if the packages are broken open and leakage is present which could cause a fire. The presence of vapors may or may not be indicated by odors. Combustible gas detectors should always be used to detect the presence of flammable vapors.

Flammable liquids spilled from broken packages should be thoroughly covered with chemically compatible dry absorbent materials, such as earth, sand or special sorbents. All ignition sources should be removed from the immediate area.

If fire does not occur immediately after an accident, the hazards associated with the leakage of flammable liquids are often greater than when fire is present. The vapors of flammable liquids may spread over considerable distances, much further and more rapidly than the liquid. While the liquid will flow down hill, the vapors will travel down wind and may engulf high spots or accumulate in low lying areas depending on the vapor density of the liquid spilled. Vapors cannot be confined and will ignite upon contact with any spark or flame. Vapors will burn with great rapidity, violence, and intense heat back to the liquid surface from which they originated. After such a flash of fire, the vapor will burn above the surface of the liquid.

If flammable or combustible liquids are released, or suspected to have been released, the following actions should be taken to avoid setting the vapors on fire:

- Eliminate all sources of ignition in the vicinity. This includes radios, lanterns, torches, flares, fusees, open flames, all smoking materials, and internal combustion engines. When lights are necessary, use only explosion proof flashlights;
- An explosimeter or combustible gas detector should be used to determine the presence and extent of any flammable vapors;
- Keep personnel and ignition sources at least 2500 feet away, until the presence or boundary of any flammable vapors is known. Continual monitoring of the area is necessary until the leakage is stopped and the vapors are known to have dispersed;
- If safe to do so, holes, trenches and/or earthen dikes should be constructed ahead of the path of flowing liquid to contain the spillage. This will limit the amount of surface area from which the vapors can come, and will also minimize environmental damage. This action should only be taken after consulting with           Railway Hazardous Materials Coordinator;
- Liquid spillage should be covered with sand, dirt or any other available material which will blanket the surface and reduce the rate of evaporation. The vapor of gasoline and most other flammable and combustible liquids is heavier than air and will tend to hover near the ground, setting in low lying areas sheltered from the wind. Vapors will not drift or flow against the wind, but may travel a considerable distance with it;
- Vapors can be dispersed by spraying with a water fog; although the run-off should be checked for flammable vapor emissions. Do not permit flammable or combustible liquids to drain into sewers because vapors arising from these



liquids may ignite at some point far distant from the leak and cause serious personal injury and/or property damage. Spilled liquids or the run-off from firefighting operations should not be allowed to enter surface waterways, since considerable environmental damage may occur;

- Attempt to close tank valves and stop all leaks if possible. Wooden plugs are helpful in stopping or reducing the rate of leakage, but care must be taken to avoid creating sparks. Such attempts should only be made after the identity and hazards of the materials are known. Proper protective equipment must always be worn. Remember: liquids classified as flammable by the DOT may also be extremely toxic or corrosive, and may be absorbed through the skin;
- Wrecking operations, as well as the transfer of the contents of any containers, should not be attempted until all vapors are dispersed. . . . . Railway Hazardous Materials personnel will provide technical assistance, and will monitor the area to determine when it is safe to begin wrecking operations.
- Cutting torches must not be used until the area is declared free of all flammable vapors.
- Empty or partially empty cars which contain residues of flammable or combustible liquids are still extremely dangerous since they contain vapors which may readily ignite if they come in contact with an ignition source.
- A damaged tank car leaking a flammable liquid should not be unnecessarily moved until the leak is stopped, or . . . . . Railway Hazardous Materials Coordinator has approved the move. Tank cars with very small leaks may be able to be moved short distances to safer and more isolated locations. If possible, a bucket should be placed under the leak to prevent the spread of the liquid; and
- Do not allow trains to pass on adjoining tracks, or vehicles to pass on adjoining roads, as long as the explosimeter shows readings at 20% of the lower explosive limit.

**Client:** Musket Corporation  
**Job Location:** San Francisco, CA, USA  
**Our Reference Number:** US410-0012129  
**Lab Reference Number:** 2014-SANF-000316

**Client Reference Number:**  
None

**Sample ID:** 2014-SANF-000316-018  
**Sample Designated As:** Bakken Crude  
**Vessel/Location:** Fairview, MT  
**Representing:** Composite

**Date Taken:** 1-Mar-2014  
**Date Submitted:** 5-Mar-2014  
**Date Tested:** 7-Mar-2014

Method	Test	Result	Unit
* ASTM D323	Test Temperature	122	°F
* ASTM D323	Reid Vapor Pressure (Proc A)	16.30	psi
ASTM D4294	Sulfur Content	0.0868	Wt %
ISM TM0172	NACE Corrosion Rating	E	
ASTM D86	IBP Recovery	44.1	°C
ASTM D5705	Test Temperature	77	°F
ASTM D5705	Average H2S Result	< 5	ppm v/v
ASTM D56	Corrected Flash Point	<21	°C
ASTM D6730	Light Ends	See Attached Report	
ASTM D5002	Density 15.56 °C/ 60 °F	0.8079	g/mL
ASTM D5002	API Gravity @ 60 °F	43.5	°API
ASTM D4928	Water Content	0.05	Mass %
ASTM D4928	Water Content	0.04	Vol %
ASTM D97	Pour Point	<-54	°C
ASTM D664	Procedure Used	A	
ASTM D664	Acid Number	< 0.10	mg KOH/g
IP 501	Sodium	37	mg/kg
IP 501	Vanadium	< 1	mg/kg
IP 501	Nickel	< 1	mg/kg
IP 501	Iron	7	mg/kg
ASTM D445	Kinematic Viscosity @ 60 °F	3.337	cSt
ASTM D445	Dynamic Viscosity @ 60 °F	2.696	kg/m*s

\* Results obtained from the average of the individual samples from Fairview, Mt

Signed: \_\_\_\_\_

Intertek  
Nathaniel Preston, Chemist

Date: 3/7/2014



# Detailed Hydrocarbon Analysis Summary Report -

Report Date: 3/7/2014 12:38:33 PM

RawFile: C:\Chem32\1\DATA\140306a\140306A 2014-03-06 15-55-00\204B0401.D\204B0401.CDF

Acquired: 03/07/14 01:05:15

Sample: 316-018

Analyzed: 3/7/2014 12:38:33 PM

Processed 335 Peaks

Reference File: C:\Chem32\DHARef\ID6730\_V1.DHA

Comments:

Yield: 52.65

Int Std: methyl-t-butylether

Int Std Amt: 0.21

Sample Wt: 4.44

Sample Den: 1.00

## SUMMARY REPORT

<u>Group Type</u>	<u>Total(Mass%)</u>	<u>Total(Vol%)</u>	<u>Total(Mol%)</u>
Paraffins:	12.50	18.72	14.29
I-Paraffins:	11.63	16.77	11.37
Olefins:	1.36	1.85	1.27
Napthenes:	11.27	14.69	11.41
Aromatics:	6.43	7.27	5.44
Total C14+:	7.30	9.57	3.89
Total Unknowns:	2.15	3.07	1.46

### Oxygenates:

Total: 0.00(Mass%) 0.00(Vol%)

Total Oxygen Content: 0.00(Mass%)

Multisubstituted Aromatics: 4.69(Mass%) 5.32(Vol%)

Average Molecular Weight: 101.68

Relative Density: 0.67

Reid Vapor Pressure @ 100F: 3.74

Calculated Octane Number: 56.05

	IBP	T10	T50	T90	FBP
BP by Mass (Deg F)	10.90	161.24	488.66	T90	488.66
BP by Vol (Deg F)	-43.67	140.47	345.47	T90	488.66

Percent Carbon: 85.54

Percent Hydrogen: 14.46

Bromine Number (Calc): 2.36

**Detailed Hydrocarbon Analysis Detail Report -**

Report Date: 3/7/2014 12:38:33 PM

RawFile: C:\Chem32\1\DATA\140306a\140306A 2014-03-06 15-55-00\204B0401.D\204B0401.CDF

Sample: 316-018

Processed 335 Peaks

Reference File: C:\Chem32\DHARef\AD6730\_V1.DHA

Comments:

Acquired: 03/07/14 01:05:15

Analyzed: 3/7/2014 12:38:33 PM

Yield: 52.65%

Int Std: methyl-t-butylether

Int Std Amt: 0.21

Sample Wt: 4.44

Sample Den: 1.00

**Oxygenates**

<u>Compound</u>	<u>Mass%</u>	<u>Mass% Oxygen</u>	<u>Vol%</u>
methyl-t-butylether : X5	4.49	0.81	8.11

**Molecular Weight and Relative Density Data**

<u>Group</u>	<u>Avg Mw.</u>	<u>Avg Rel. Density</u>
C1	0.00	0.00
C2	0.00	0.00
C3	44.10	0.50
C4	58.12	0.58
C5	71.85	0.63
C6	85.25	0.69
C7	98.76	0.73
C8	112.16	0.75
C9	125.85	0.76
C10	139.01	0.79
C11	153.14	0.80
C12	166.45	0.81
C13	184.09	0.76
Total Sample:	102.00	0.67

**Octane Number****Research Octane Number:** 56.00*(Calculated from Individual Component Values)***Contribution to Total by:**

Paraffins:	11.50
Iso-Paraffins:	15.50
Aromatics:	11.00
Napthenes:	15.80
Olefins:	2.22
Oxygenates:	0.00

# Detailed Hydrocarbon Analysis Detail Report -

Report Date: 3/7/2014 12:38:33 PM

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Acquired: 03/07/14 01:05:15

Sample: 316-018

Analyzed: 3/7/2014 12:38:33 PM

Processed 335 Peaks

Reference File: C:\Chem32\DHARef\6730\_V1.DHA

Comments:

Yield: 52.65%

Int Std: methyl-t-butylether

Int Std Amt: 0.2085

Sample Wt: 4.4360

Sample Den: 1.00

## Totals by Group Type & Carbon Number (in Mass Percent)

	<u>Paraffins</u>	<u>I-Paraffins</u>	<u>Olefins</u>	<u>Napthenes</u>	<u>Aromatics</u>	<u>Unknowns</u>	<u>Total</u>
C1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
C2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
C3	0.27084	0.00000	0.00000	0.00000	0.00000	0.00000	0.27084
C4	1.45338	0.26260	0.00000	0.00000	0.00000	0.00000	1.71598
C5	1.99532	1.07435	0.14677	0.18689	0.00000	0.00000	3.40332
C6	1.81535	1.87450	0.00000	1.70067	0.19221	0.00000	5.58273
C7	1.67867	1.65612	0.00000	3.74187	0.37151	0.00000	7.44816
C8	1.48525	1.12907	0.71582	3.10203	0.87419	0.00000	7.30637
C9	1.01228	1.96874	0.23876	1.67382	1.31958	0.00000	6.21318
C10	0.87577	2.15341	0.04287	0.67727	1.85819	0.13839	5.74589
C11	0.73116	1.04834	0.04376	0.16218	0.88879	0.47818	3.35242
C12	0.64851	0.35514	0.07141	0.02293	0.93005	0.40143	2.42946
C13	0.53490	0.10967	0.10278	0.00000	0.00000	1.13222	1.87957
Total:	12.50141	11.63192	1.36217	11.26766	6.43453	2.15022	43.19770

Oxygenates 0.00000

Total C14+: 7.29783

Total Unknowns: 2.15022

Grand Total: 52.64575

## Totals by Group Type & Carbon Number (in Volume Percent)

	<u>Paraffins</u>	<u>I-Paraffins</u>	<u>Olefins</u>	<u>Napthenes</u>	<u>Aromatics</u>	<u>Unknowns</u>	<u>Total</u>
C1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
C2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
C3	0.54114	0.00000	0.00000	0.00000	0.00000	0.00000	0.54114
C4	2.51102	0.47128	0.00000	0.00000	0.00000	0.00000	2.98230
C5	3.18639	1.73394	0.21711	0.25072	0.00000	0.00000	5.38816
C6	2.75303	2.85147	0.00000	2.24230	0.21870	0.00000	8.06550
C7	2.45527	2.41622	0.00000	4.93702	0.42850	0.00000	10.23700
C8	2.11423	1.59807	0.93778	4.03790	1.00735	0.00000	9.69534
C9	1.41064	2.73708	0.34671	2.14143	1.51171	0.00000	8.14758
C10	1.19968	2.93631	0.05793	0.84549	2.10366	0.19770	7.34076
C11	0.98274	1.40711	0.05833	0.20273	0.95238	0.68312	4.28640
C12	0.86123	0.47163	0.09416	0.02866	1.04516	0.57347	3.07432
C13	0.70717	0.14506	0.13421	0.00000	0.00000	1.61745	2.60390
Total:	18.72254	16.76818	1.84623	14.68625	7.26745	3.07174	59.29066

Oxygenates 0.00000

Total C14+: 9.56717

Total Unknowns: 3.07174

Grand Total: 71.92956



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Comments:

Yield: 52.65%

Int Std: methyl-t-butylether

Int Std Amt: 0.2085

Sample Wt: 4.4360

Sample Den: 1.00

**Totals by Group Type & Carbon Number (in Mol Percent)**

	<u>Paraffins</u>	<u>I-Paraffins</u>	<u>Olefins</u>	<u>Napthenes</u>	<u>Aromatics</u>	<u>Unknowns</u>	<u>Total</u>
C1	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
C2	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
C3	0.64972	0.00000	0.00000	0.00000	0.00000	0.00000	0.64972
C4	2.64515	0.47793	0.00000	0.00000	0.00000	0.00000	3.12308
C5	2.92547	1.57518	0.22792	0.28188	0.00000	0.00000	5.01046
C6	2.22838	2.30100	0.00000	2.13762	0.26030	0.00000	6.92730
C7	1.77215	1.74835	0.00000	4.03137	0.42652	0.00000	7.97839
C8	1.37543	1.04559	0.67478	2.92428	0.87104	0.00000	6.89111
C9	0.83491	1.62378	0.20007	1.40258	1.16139	0.00000	5.22273
C10	0.65111	1.60100	0.03233	0.51077	1.47193	0.10289	4.37002
C11	0.49482	0.71031	0.03000	0.11120	0.63913	0.34049	2.32595
C12	0.40274	0.22058	0.04488	0.01441	0.60630	0.27868	1.56760
C13	0.30691	0.06292	0.05962	0.00000	0.00000	0.74233	1.17178
Total:	14.28679	11.36662	1.26961	11.41411	5.43661	1.46439	43.77374

Oxygenates 0.00000

Total C14+: 3.89135

Total Unknowns: 1.46439

Grand Total: 49.12949

## Detailed Hydrocarbon Analysis Detail Report -

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Processed 335 Peaks

Reference File: C:\Chem32\DHARef\ID6730\_V1.DHA

Comments:

Yield: 52.65%

Int Std: methyl-t-butylether

Int Std Amt: 0.21

Sample Wt: 4.44

Sample Den: 1.00

Hold

## Components Listed in Chromatographic Order

Page: 5

Minutes	Index	Group	Component	Mass %	Volume %	Mol %
6.694	300.000	P3	propane	0.27	0.54	0.65
7.633	374.390	I4	i-butane	0.26	0.47	0.48
8.523	400.000	P4	n-butane	1.45	2.51	2.65
11.809	478.400	I5	i-pentane	1.07	1.73	1.58
13.418	500.000	P5	n-pentane	2.00	3.19	2.93
14.961	528.110	O5	1t,3-pentadiene	0.15	0.22	0.23
15.767	540.820	I6	2,2-dimethylbutane	0.02	0.03	0.02
17.705	567.350	N5	cyclopentane	0.19	0.25	0.28
17.884	569.570	I6	2,3-dimethylbutane	0.08	0.13	0.10
18.235	573.820	I6	2-methylpentane	1.11	1.69	1.36
19.269	585.620	I6	3-methylpentane	0.67	1.00	0.82
20.652	600.000	P6	n-hexane	1.82	2.75	2.23
22.629	624.290	I7	2,2-dimethylpentane	0.02	0.03	0.02
22.792	626.160	N6	methylcyclopentane	1.13	1.50	1.41
23.193	630.680	I7	2,4-dimethylpentane	0.07	0.10	0.07
25.074	650.520	A6	benzene	0.19	0.22	0.26
25.498	654.710	I7	3,3-dimethylpentane	0.01	0.02	0.02
25.870	658.310	N6	cyclohexane	0.57	0.74	0.72
26.868	667.650	I7	2-methylhexane	0.50	0.74	0.53
27.016	668.990	I7	2,3-dimethylpentane	0.23	0.33	0.24
27.302	671.560	N7	1,1-dimethylcyclopentane	0.23	0.30	0.25
27.804	676.000	I7	3-methylhexane	0.74	1.08	0.79
28.500	681.980	N7	1c,3-dimethylcyclopentane	0.51	0.68	0.55
28.823	684.680	N7	1t,3-dimethylcyclopentane	0.48	0.64	0.51
28.974	685.940	I7	3-ethylpentane	0.08	0.12	0.09
29.145	687.340	N7	1t,2-dimethylcyclopentane	0.91	1.21	0.98
30.740	700.000	P7	n-heptane	1.68	2.46	1.77
33.441	718.260	N7	methylcyclohexane	1.50	1.95	1.62
33.872	721.010	N8	1,1,3-trimethylcyclopentane	0.36	0.48	0.34
35.221	729.320	N7	ethylcyclopentane	0.11	0.15	0.12
35.367	730.200	I8	2,5-dimethylhexane	0.06	0.09	0.06
35.673	732.020	I8	2,4-dimethylhexane	0.10	0.14	0.09
36.602	737.440	N8	1c,2t,4-trimethylcyclopentane	0.37	0.49	0.35
36.809	738.630	I8	3,3-dimethylhexane	0.03	0.05	0.03
37.863	744.540	N8	1t,2c,3-trimethylcyclopentane	0.40	0.52	0.38
39.295	752.260	A7	toluene	0.37	0.43	0.43
40.430	758.150	I8	2,3-dimethylhexane	0.09	0.13	0.09
40.551	758.770	I8	2-methyl-3-ethylpentane	0.13	0.19	0.12

## Detailed Hydrocarbon Analysis Detail Report -

Report Date: 3/7/2014 12:38:33 PM

RawFile: C:\Chem32\1\DATA\140306a\140306A 2014-03-06 15-55-00\204B0401.D\204B0401.CDF

Acquired: 03/07/14 01:05:15

Sample: 316-018

Analyzed: 3/7/2014 12:38:33 PM

Processed 335 Peaks

Reference File: C:\Chem32\DHARe\ND6730\_V1.DHA

Comments:

Yield: 52.65%

Int Std: methyl-t-butylether

Int Std Amt: 0.21

Sample Wt: 4.44

Sample Den: 1.00

Hold

## Components Listed in Chromatographic Order

Page: 6

Minutes	Index	Group	Component	Mass %	Volume %	Mol %
41.658	764.300	O8	*2-ethylhexene-1	0.69	0.90	0.65
41.963	765.790	I8	4-methylheptane	0.23	0.32	0.21
42.178	766.840	I8	3-methyl-3-ethylpentane	0.04	0.05	0.03
42.291	767.380	I8	3,4-dimethylhexane	0.05	0.07	0.04
42.806	769.850	N8	1c,3-dimethylcyclohexane	0.05	0.07	0.05
43.247	771.940	I8	3-methylheptane	0.39	0.56	0.37
43.543	773.330	N8	1c,2t,3-trimethylcyclopentane	0.77	1.00	0.73
43.960	775.260	N8	1t,4-dimethylcyclohexane	0.21	0.28	0.20
45.196	780.880	N8	1,1-dimethylcyclohexane	0.07	0.09	0.06
46.043	784.620	N8	3c-ethylmethylcyclopentane	0.07	0.09	0.07
46.552	786.840	N8	3t-ethylmethylcyclopentane	0.07	0.09	0.06
46.862	788.170	N8	2t-ethylmethylcyclopentane	0.17	0.22	0.16
47.355	790.270	N8	1,1-methylethylcyclopentane	0.03	0.04	0.03
48.033	793.120	N8	1t,2-dimethylcyclohexane	0.28	0.36	0.27
49.717	800.000	P8	n-octane	1.49	2.11	1.38
51.838	808.580	N8	i-propylcyclopentane	0.05	0.07	0.05
53.513	815.080	O8	O51	0.03	0.03	0.02
54.786	819.860	N8	N2	0.02	0.03	0.02
56.630	826.580	N8	1c,2-dimethylcyclohexane	0.15	0.18	0.14
58.256	832.300	N9	1,1,4-trimethylcyclohexane	0.43	0.56	0.36
58.868	834.400	I9	2,2,3-trimethylhexane	0.24	0.33	0.20
59.322	835.950	I9	2,4-dimethylheptane	0.03	0.05	0.03
60.002	838.240	I9	4,4-dimethylheptane	0.30	0.42	0.25
60.796	840.880	N8	n-propylcyclopentane	0.04	0.05	0.03
61.116	841.930	I9	2,5-dimethylheptane	0.10	0.14	0.08
61.867	844.380	I9	3,5-dimethylheptane	0.04	0.06	0.03
62.311	845.810	I9	2,6-dimethylheptane	0.08	0.11	0.07
62.892	847.660	N9	1,1,3-trimethylcyclohexane	0.03	0.04	0.03
64.363	852.280	N9	1c,2t,4t-trimethylcyclohexane	0.03	0.04	0.02
64.940	854.060	A8	ethylbenzene	0.17	0.20	0.17
65.473	855.680	N9	1c,3c,5c-trimethylcyclohexane	0.21	0.27	0.18
68.200	863.780	A8	1,3-dimethylbenzene	0.38	0.44	0.38
68.586	864.900	A8	1,4-dimethylbenzene	0.12	0.14	0.12
68.792	865.490	I9	2,3-dimethylheptane	0.14	0.20	0.12
69.681	868.030	I9	3,4-dimethylheptane	0.12	0.16	0.10
70.578	870.560	I9	I5	0.05	0.07	0.04
71.649	873.530	I9	4-methyloctane	0.19	0.27	0.16
72.013	874.520	I9	2-methyloctane	0.23	0.32	0.19



## Detailed Hydrocarbon Analysis Detail Report -

Report Date: 3/7/2014 12:38:33 PM

RawFile: C:\Chem32\1\DATA\140306a\140306A 2014-03-06 15-55-00\204B0401.D\204B0401.CDF

Acquired: 03/07/14 01:05:15

Sample: 316-018

Analyzed: 3/7/2014 12:38:33 PM

Processed 335 Peaks

Reference File: C:\Chem32\DHARef\ID6730\_V1.DHA

Comments:

Yield: 52.65%

Int Std: methyl-t-butylether

Int Std Amt: 0.21

Sample Wt: 4.44

Sample Den: 1.00

Hold

## Components Listed in Chromatographic Order

Page: 7

Minutes	Index	Group	Component	Mass %	Volume %	Mol %
72.490	875.820	N9	N15	0.03	0.04	0.02
73.247	877.870	N9	1c,2t,3c-trimethylcyclohexane	0.07	0.09	0.05
73.638	878.910	I9	3-ethylheptane	0.06	0.08	0.05
74.087	880.110	I9	3-methyloctane	0.31	0.44	0.26
75.117	882.820	N9	1,1,2-trimethylcyclohexane	0.04	0.05	0.03
75.392	883.530	A8	1,2-dimethylbenzene	0.19	0.22	0.19
77.269	888.350	N9	N19	0.34	0.44	0.29
77.884	889.900	N9	N20	0.13	0.16	0.11
81.087	897.770	O9	t-nonene-2	0.03	0.04	0.02
81.693	899.220	I9	I10	0.07	0.09	0.06
82.021	900.000	P9	n-nonane	1.01	1.41	0.83
82.233	901.170	N9	1,1-methylethylcyclohexane	0.16	0.20	0.14
82.769	904.100	O9	t-nonene-3	0.03	0.04	0.03
83.020	905.470	N9	N25	0.03	0.03	0.02
84.355	912.680	A9	i-propylbenzene	0.02	0.03	0.02
84.737	914.720	O9	c-nonene-2	0.18	0.26	0.15
85.309	917.760	N9	i-propylcyclohexane	0.08	0.09	0.06
86.012	921.460	I10	2,4-dimethyloctane	0.04	0.05	0.03
86.276	922.850	--	unknown	0.03	0.04	0.02
86.595	924.510	I10	2,2-dimethyloctane	0.06	0.09	0.05
87.323	928.280	N9	N29	0.03	0.04	0.03
87.876	931.120	I10	2,6-dimethyloctane	0.22	0.30	0.16
88.216	932.860	I10	2,5-dimethyloctane	0.07	0.10	0.05
88.914	936.410	N9	n-butylcyclopentane	0.06	0.08	0.05
89.260	938.150	I10	I13	0.09	0.13	0.07
89.706	940.390	I10	I14	0.05	0.06	0.03
90.134	942.530	I10	3,3-dimethyloctane	0.29	0.40	0.22
90.700	945.340	--	unknown	0.09	0.13	0.07
90.988	946.760	A9	n-propylbenzene	0.04	0.04	0.03
91.189	947.760	I10	3,6-dimethyloctane	0.09	0.13	0.07
91.568	949.620	I10	3-methyl-5-ethylheptane	0.19	0.27	0.14
91.956	951.510	N10	N32	0.05	0.07	0.04
92.620	954.740	A9	1,3-methylethylbenzene	0.17	0.20	0.15
92.996	956.560	A9	1,4-methylethylbenzene	0.07	0.08	0.06
93.370	958.360	N10	N33	0.13	0.16	0.09
94.202	962.330	A9	1,3,5-trimethylbenzene	0.28	0.32	0.25
94.508	963.780	I10	I15	0.09	0.12	0.06
94.756	964.950	N10	N34	0.06	0.08	0.05

## Detailed Hydrocarbon Analysis Detail Report -

Report Date: 3/7/2014 12:38:33 PM

RawFile: C:\Chem32\1\DATA\140306a\140306A 2014-03-06 15-55-00\204B0401.D\204B0401.CDF

Acquired: 03/07/14 01:05:15

Sample: 316-018

Analyzed: 3/7/2014 12:38:33 PM

Processed 335 Peaks

Reference File: C:\Chem32\DHARef\D6730\_V1.DHA

Comments:

Yield: 52.65%

Int Std: methyl-t-butylether

Int Std Amt: 0.21

Sample Wt: 4.44

Sample Den: 1.00

Hold

## Components Listed in Chromatographic Order

Page: 8

Minutes	Index	Group	Component	Mass %	Volume %	Mol %
95.406	968.010	I10	5-methylnonane	0.06	0.08	0.04
95.733	969.540	I10	4-methylnonane	0.25	0.33	0.18
95.970	970.650	A9	1,2-methylethylbenzene	0.05	0.06	0.04
96.239	971.900	I10	2-methylnonane	0.20	0.28	0.15
96.584	973.500	--	unknown	0.03	0.04	0.02
96.885	974.890	I10	3-ethyloctane	0.09	0.12	0.07
97.113	975.940	N10	N35	0.04	0.05	0.03
97.432	977.400	I10	3-methylnonane	0.22	0.30	0.16
98.309	981.410	I10	I19	0.03	0.04	0.02
98.780	983.540	A9	1,2,4-trimethylbenzene	0.53	0.60	0.46
99.407	986.360	N10	i-butylcyclohexane	0.17	0.21	0.13
99.669	987.530	I10	I21	0.05	0.06	0.03
99.936	988.730	I10	I22	0.07	0.09	0.05
100.348	990.560	N10	N37	0.03	0.04	0.02
101.031	993.580	O10	2,3-dimethyloctene-2	0.04	0.06	0.03
101.259	994.590	N10	1t-methyl-2-n-propylcyclohexane	0.06	0.07	0.04
101.608	996.120	A10	i-butylbenzene	0.02	0.03	0.02
101.999	997.830	A10	sec-butylbenzene	0.09	0.11	0.07
102.496	1000.000	P10	n-decane	0.88	1.20	0.65
103.051	1003.990	N10	N38	0.03	0.04	0.03
103.490	1007.140	A9	1,2,3-trimethylbenzene	0.16	0.17	0.14
103.735	1008.890	--	unknown	0.03	0.04	0.03
103.909	1010.120	A10	1,3-methyl-i-propylbenzene	0.04	0.05	0.03
104.398	1013.600	I11	I27	0.05	0.07	0.03
104.952	1017.510	I11	I29	0.02	0.03	0.02
105.119	1018.690	--	unknown	0.02	0.03	0.02
105.265	1019.710	A10	2-3-dihydroindene	0.03	0.03	0.03
105.495	1021.320	--	unknown	0.04	0.05	0.03
105.831	1023.670	N10	sec-butylcyclohexane	0.10	0.12	0.08
106.134	1025.780	I11	I30	0.02	0.02	0.01
106.423	1027.790	A10	1,2-methyl-i-propylbenzene	0.28	0.32	0.22
107.082	1032.350	N11	N40	0.16	0.20	0.11
107.339	1034.120	I11	I31	0.06	0.07	0.04
107.758	1036.990	I11	I32	0.09	0.12	0.06
107.982	1038.530	--	unknown	0.03	0.04	0.02
108.236	1040.260	A10	1,3-diethylbenzene	0.06	0.07	0.05
108.637	1042.990	A10	1,3-methyl-n-propylbenzene	0.09	0.11	0.07
108.846	1044.410	I11	I33	0.11	0.15	0.07

## Detailed Hydrocarbon Analysis Detail Report -

Report Date: 3/7/2014 12:38:33 PM

RawFile: C:\Chem32\1\DATA\140306a\140306A 2014-03-06 15-55-00\204B0401.D\204B0401.CDF

Acquired: 03/07/14 01:05:15

Sample: 316-018

Analyzed: 3/7/2014 12:38:33 PM

Processed 335 Peaks

Reference File: C:\Chem32\DHARE\AD6730\_V1.DHA

Comments:

Yield: 52.65%

Int Std: methyl-t-butylether

Int Std Amt: 0.21

Sample Wt: 4.44

Sample Den: 1.00

Hold

## Components Listed in Chromatographic Order

Page: 9

Minutes	Index	Group	Component	Mass %	Volume %	Mol %
109.032	1045.670	A10	1,4-diethylbenzene	0.03	0.03	0.02
109.185	1046.700	A10	1,4-methyl-n-propylbenzene	0.03	0.03	0.02
109.338	1047.730	A10	n-butylbenzene	0.04	0.05	0.03
109.682	1050.050	A10	1,3-dimethyl-5-ethylbenzene	0.09	0.10	0.07
110.159	1053.250	I11	I34	0.11	0.15	0.08
110.359	1054.580	--	unknown	0.03	0.04	0.02
110.790	1057.450	A10	1,2-methyl-n-propylbenzene	0.13	0.15	0.10
111.196	1060.150	I11	I36	0.02	0.03	0.01
111.576	1062.660	I11	I37	0.09	0.12	0.06
112.019	1065.570	I11	I38	0.11	0.15	0.07
112.235	1066.990	--	unknown	0.04	0.06	0.03
112.539	1068.990	A10	1,4-dimethyl-2-ethylbenzene	0.18	0.21	0.14
112.859	1071.070	I11	I39	0.03	0.04	0.02
113.431	1074.790	I11	I40	0.21	0.29	0.14
113.869	1077.630	I11	I41	0.05	0.07	0.04
114.126	1079.290	--	unknown	0.05	0.07	0.03
114.572	1082.150	I11	I42	0.02	0.03	0.01
114.882	1084.140	A11	1,4-methyl-t-butylbenzene	0.02	0.02	0.01
115.051	1085.220	I11	I43	0.05	0.07	0.03
115.252	1086.500	--	unknown	0.06	0.09	0.04
115.617	1088.830	--	unknown	0.06	0.09	0.04
115.838	1090.220	O11	undecene-1	0.04	0.06	0.03
116.136	1092.110	--	unknown	0.06	0.09	0.04
116.389	1093.710	A10	1,2-dimethyl-3-ethylbenzene	0.07	0.08	0.06
116.681	1095.550	A11	1,2-ethyl-i-propylbenzene	0.06	0.07	0.04
116.961	1097.310	--	unknown	0.03	0.04	0.02
117.147	1098.480	--	unknown	0.03	0.04	0.02
117.389	1100.000	P11	n-undecane	0.73	0.98	0.49
117.958	1104.860	A10	1,2,4,5-tetramethylbenzene	0.11	0.13	0.09
118.443	1108.980	A10	1,2,3,5-tetramethylbenzene	0.18	0.21	0.14
118.651	1110.750	--	unknown	0.02	0.03	0.02
118.973	1113.470	--	unknown	0.02	0.03	0.02
119.257	1115.860	--	unknown	0.02	0.03	0.02
119.423	1117.260	--	unknown	0.04	0.06	0.03
119.764	1120.130	--	unknown	0.03	0.04	0.02
119.898	1121.250	A11	1,2-methyl-t-butylbenzene	0.08	0.09	0.06
120.621	1127.290	A10	5-methylindan	0.14	0.16	0.11
121.110	1131.350	I12	I44	0.13	0.17	0.08



## Detailed Hydrocarbon Analysis Detail Report -

Report Date: 3/7/2014 12:38:33 PM

RawFile: C:\Chem32\1\DATA\140306a\140306A 2014-03-06 15-55-00\204B0401.D\204B0401.CDF

Acquired: 03/07/14 01:05:15

Sample: 316-018

Analyzed: 3/7/2014 12:38:33 PM

Processed 335 Peaks

Reference File: C:\Chem32\DHARef\1D6730\_V1.DHA

Comments:

Yield: 52.65%

Int Std: methyl-t-butylether

Int Std Amt: 0.21

Sample Wt: 4.44

Sample Den: 1.00

Hold

## Components Listed in Chromatographic Order

Page: 10

Minutes	Index	Group	Component	Mass %	Volume %	Mol %
121.407	1133.810	A10	4-methylindan	0.08	0.09	0.06
121.730	1136.470	A11	1,2-ethyl-n-propylbenzene	0.17	0.19	0.12
121.943	1138.230	A10	2-methylindan	0.06	0.07	0.05
122.224	1140.540	A11	1,3-methyl-n-butylbenzene	0.07	0.08	0.05
122.516	1142.930	A12	1,3-di-i-propylbenzene	0.10	0.11	0.06
122.712	1144.540	A11	s-pentylbenzene	0.07	0.08	0.05
122.938	1146.380	--	unknown	0.02	0.03	0.02
123.230	1148.770	A11	n-pentylbenzene	0.07	0.08	0.05
123.649	1152.170	N12	1t-M-2-(4-MP)cyclopentane	0.02	0.03	0.01
123.849	1153.790	A12	1,2-di-i-propylbenzene	0.05	0.06	0.03
124.407	1158.300	--	unknown	0.12	0.17	0.08
124.564	1159.560	A12	1,4-di-i-propylbenzene	0.07	0.08	0.05
124.746	1161.030	--	unknown	0.02	0.03	0.01
125.025	1163.260	A10	tetrahydronaphthalene	0.09	0.09	0.07
125.544	1167.410	I12	I45	0.14	0.19	0.09
125.776	1169.270	A12	1-t-butyl-3,5-dimethylbenzene	0.05	0.05	0.03
126.340	1173.750	A12	1,4-ethyl-t-butylbenzene	0.09	0.10	0.06
126.675	1176.400	--	unknown	0.01	0.02	0.01
126.857	1177.830	I12	I46	0.03	0.03	0.02
127.105	1179.790	I12	I47	0.02	0.03	0.01
127.368	1181.860	--	unknown	0.02	0.03	0.01
127.520	1183.050	I12	I48	0.04	0.05	0.02
127.715	1184.580	--	unknown	0.07	0.11	0.05
128.240	1188.690	A12	1,3-di-n-propylbenzene	0.10	0.12	0.07
128.447	1190.310	A12	A5	0.03	0.04	0.02
128.706	1192.320	O12	dodecene-1	0.07	0.09	0.04
129.697	1200.000	P12	n-dodecane	0.65	0.86	0.40
130.588	1208.550	--	unknown	0.04	0.05	0.02
131.134	1213.770	--	unknown	0.02	0.02	0.01
131.475	1217.010	A12	1,3,5-triethylbenzene	0.27	0.31	0.18
132.342	1225.220	A12	1,2,4-triethylbenzene	0.05	0.05	0.03
132.465	1226.380	--	unknown	0.03	0.04	0.02
132.803	1229.570	--	unknown	0.08	0.11	0.05
133.152	1232.850	--	unknown	0.06	0.08	0.04
133.431	1235.460	--	unknown	0.03	0.04	0.02
133.670	1237.690	--	unknown	0.05	0.07	0.03
133.903	1239.860	--	unknown	0.02	0.02	0.01
134.112	1241.810	A12	1,4-methyl-n-pentylbenzene	0.08	0.09	0.05

## Detailed Hydrocarbon Analysis Detail Report -

Report Date: 3/7/2014 12:38:33 PM

RawFile: C:\Chem32\1\DATA\140306a\140306A 2014-03-06 15-55-00\204B0401.D\204B0401.CDF

Acquired: 03/07/14 01:05:15

Sample: 316-018

Analyzed: 3/7/2014 12:38:33 PM

Processed 335 Peaks

Reference File: C:\Chem32\DHARef\1D6730\_V1.DHA

Comments:

Yield: 52.65%

Int Std: methyl-t-butylether

Int Std Amt: 0.21

Hold

Sample Wt: 4.44

Sample Den: 1.00

## Components Listed in Chromatographic Order

Page: 11

Minutes	Index	Group	Component	Mass %	Volume %	Mol %
134.396	1244.450	--	unknown	0.06	0.09	0.04
134.615	1246.480	--	unknown	0.05	0.08	0.03
135.168	1251.600	A12	n-hexylbenzene	0.03	0.03	0.02
135.596	1255.550	--	unknown	0.11	0.16	0.07
135.796	1257.380	--	unknown	0.09	0.13	0.06
136.130	1260.440	--	unknown	0.02	0.03	0.01
136.308	1262.080	--	unknown	0.06	0.09	0.04
136.516	1263.980	--	unknown	0.02	0.02	0.01
136.805	1266.620	--	unknown	0.14	0.20	0.09
136.990	1268.300	--	unknown	0.07	0.10	0.05
137.524	1273.150	I13	I50	0.11	0.15	0.06
137.965	1277.140	A11	1,2,3,4,5-pentamethylbenzene	0.16	0.16	0.11
138.297	1280.140	--	unknown	0.03	0.04	0.02
138.592	1282.800	A11	2-methylnaphthalene	0.12	0.12	0.09
139.068	1287.070	--	unknown	0.10	0.15	0.08
139.578	1291.620	O13	tridecene-1	0.10	0.13	0.06
140.000	1295.390	--	unknown	0.07	0.10	0.04
140.308	1298.120	A11	1-methylnaphthalene	0.07	0.07	0.05
140.519	1300.000	P13	n-tridecane	0.53	0.71	0.31
140.792	1302.870	+	C14+	0.06	0.08	0.03
141.103	1306.120	+	C14+	0.04	0.05	0.02
141.313	1308.320	+	C14+	0.03	0.04	0.01
141.575	1311.050	+	C14+	0.04	0.05	0.02
141.871	1314.130	+	C14+	0.10	0.13	0.05
142.110	1316.620	+	C14+	0.04	0.05	0.02
142.544	1321.110	+	C14+	0.13	0.17	0.07
142.998	1325.810	+	C14+	0.04	0.05	0.02
143.407	1330.030	+	C14+	0.39	0.51	0.21
143.837	1334.440	+	C14+	0.05	0.06	0.03
144.110	1337.240	+	C14+	0.04	0.06	0.02
144.256	1338.740	+	C14+	0.05	0.07	0.03
144.607	1342.320	+	C14+	0.02	0.02	0.01
144.790	1344.190	+	C14+	0.02	0.03	0.01
145.056	1346.890	+	C14+	0.06	0.08	0.03
145.209	1348.450	+	C14+	0.06	0.08	0.03
145.397	1350.350	+	C14+	0.05	0.06	0.02
145.700	1353.420	+	C14+	0.08	0.10	0.04
146.106	1357.520	+	C14+	0.21	0.28	0.11

## Detailed Hydrocarbon Analysis Detail Report -

Report Date: 3/7/2014 12:38:33 PM

RawFile: C:\Chem32\1\DATA\140306a\140306A 2014-03-06 15-55-00\204B0401.D\204B0401.CDF

Acquired: 03/07/14 01:05:15

Sample: 316-018

Analyzed: 3/7/2014 12:38:33 PM

Processed 335 Peaks

Reference File: C:\Chem32\DHARef\ID6730\_V1.DHA

Comments:

Yield: 52.65%

Int Std: methyl-t-butylether

Int Std Amt: 0.21

Sample Wt: 4.44

Sample Den: 1.00

Hold

## Components Listed in Chromatographic Order

Page: 12

Minutes	Index	Group	Component	Mass %	Volume %	Mol %
146.465	1361.140	+	C14+	0.22	0.29	0.12
146.961	1366.130	+	C14+	0.09	0.12	0.05
147.198	1368.500	+	C14+	0.05	0.06	0.03
147.433	1370.860	+	C14+	0.04	0.05	0.02
147.646	1372.980	+	C14+	0.10	0.13	0.05
148.015	1376.650	+	C14+	0.05	0.06	0.03
148.423	1380.710	+	C14+	0.17	0.23	0.09
148.854	1384.980	+	C14+	0.06	0.08	0.03
149.105	1387.470	+	C14+	0.03	0.04	0.01
149.280	1389.190	+	C14+	0.06	0.08	0.03
149.906	1395.350	+	C14+	0.13	0.17	0.07
150.069	1396.960	+	C14+	0.07	0.09	0.04
150.379	1400.000	+	C14+	0.47	0.62	0.25
150.628	1400.000	+	C14+	0.06	0.08	0.03
150.936	1400.000	+	C14+	0.08	0.11	0.04
151.091	1400.000	+	C14+	0.03	0.04	0.02
151.335	1400.000	+	C14+	0.14	0.19	0.08
151.679	1400.000	+	C14+	0.13	0.17	0.07
152.021	1400.000	+	C14+	0.05	0.07	0.03
152.313	1400.000	+	C14+	0.04	0.05	0.02
152.565	1400.000	+	C14+	0.04	0.05	0.02
153.225	1400.000	+	C14+	0.10	0.13	0.05
153.462	1400.000	+	C14+	0.04	0.06	0.02
153.598	1400.000	+	C14+	0.02	0.03	0.01
153.903	1400.000	+	C14+	0.09	0.12	0.05
154.172	1400.000	+	C14+	0.06	0.08	0.03
154.628	1400.000	+	C14+	0.04	0.05	0.02
154.812	1400.000	+	C14+	0.03	0.04	0.02
155.075	1400.000	+	C14+	0.17	0.23	0.09
155.360	1400.000	+	C14+	0.06	0.08	0.03
155.563	1400.000	+	C14+	0.03	0.04	0.02
155.862	1400.000	+	C14+	0.09	0.12	0.05
156.388	1400.000	+	C14+	0.27	0.35	0.14
156.812	1400.000	+	C14+	0.03	0.04	0.02
156.996	1400.000	+	C14+	0.09	0.11	0.05
157.216	1400.000	+	C14+	0.07	0.10	0.04
157.821	1400.000	+	C14+	0.08	0.11	0.04
158.102	1400.000	+	C14+	0.03	0.04	0.02



## Detailed Hydrocarbon Analysis Detail Report -

Report Date: 3/7/2014 12:38:33 PM

RawFile: C:\Chem32\1\DATA\140306a\140306A 2014-03-06 15-55-00\204B0401.D\204B0401.CDF

Acquired: 03/07/14 01:05:15

Sample: 316-018

Analyzed: 3/7/2014 12:38:33 PM

Processed 335 Peaks

Reference File: C:\Chem32\DHARef\ND6730\_V1.DHA

Comments:

Yield: 52.65%

Int Std: methyl-t-butylether

Int Std Amt: 0.21

Sample Wt: 4.44

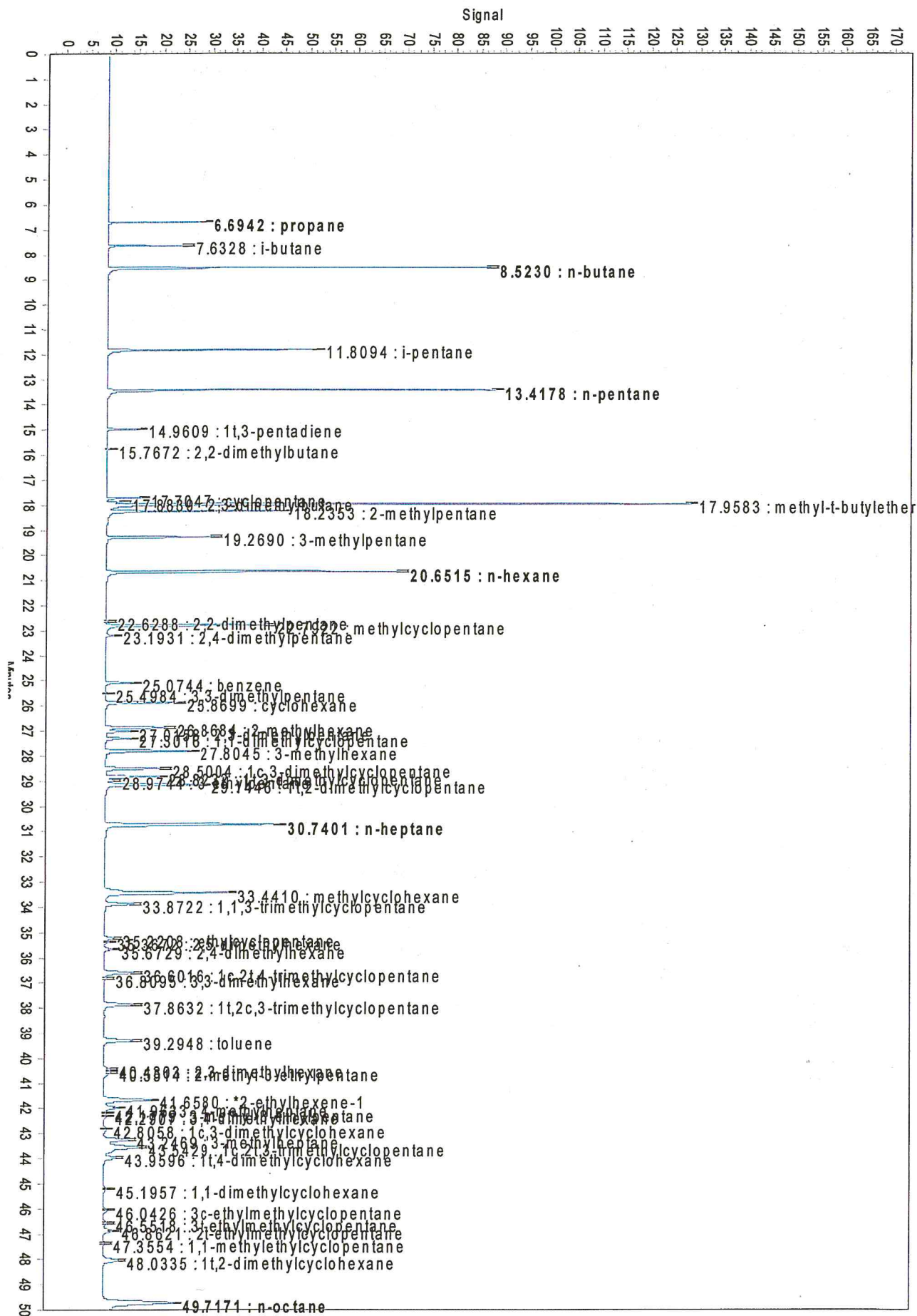
Sample Den: 1.00

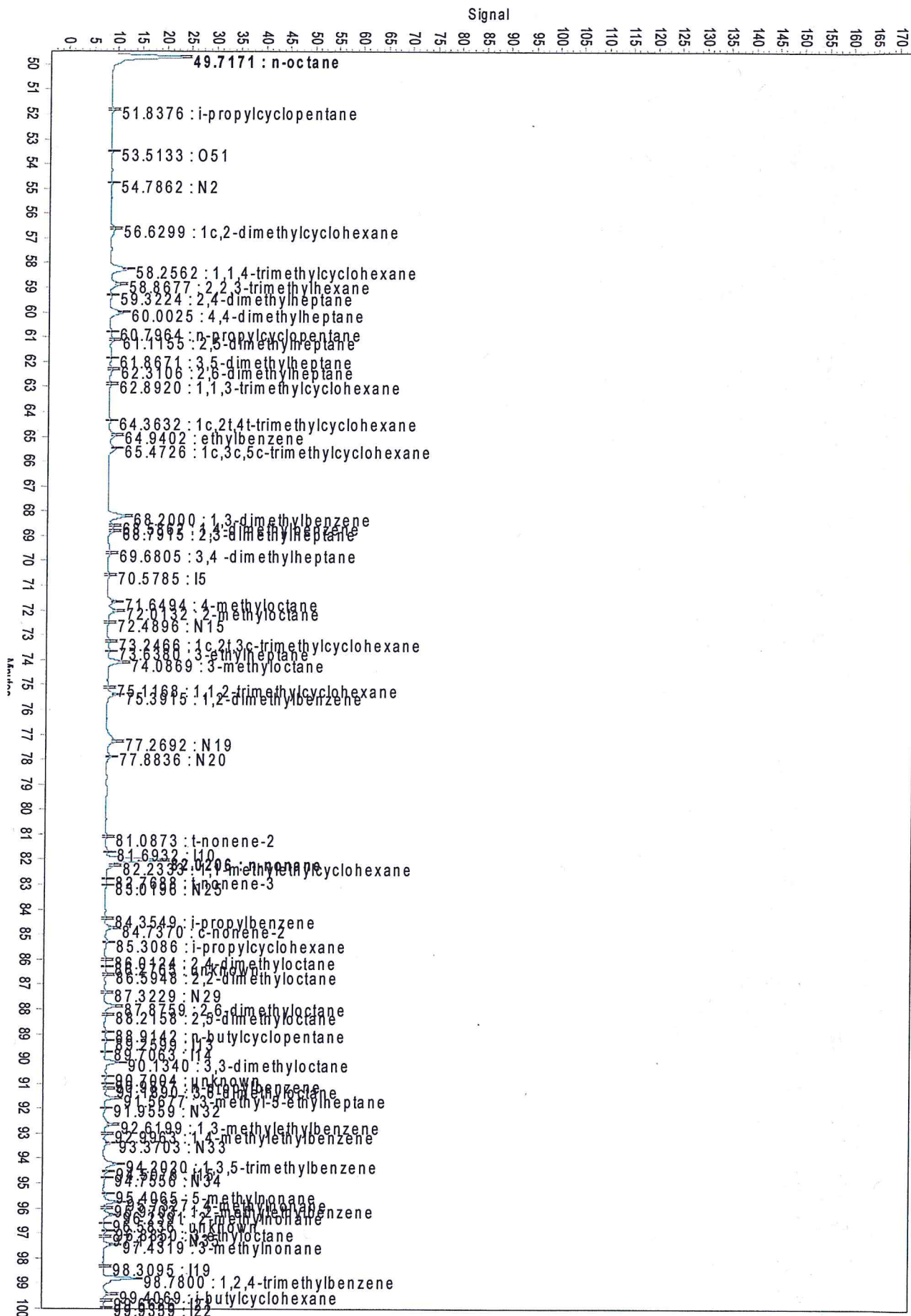
Hold

## Components Listed in Chromatographic Order

Page: 13

<u>Minutes</u>	<u>Index</u>	<u>Group</u>	<u>Component</u>	<u>Mass %</u>	<u>Volume %</u>	<u>Mol %</u>
158.251	1400.000	+	C14+	0.03	0.04	0.01
158.759	1400.000	+	C14+	0.09	0.11	0.05
159.283	1400.000	+	C14+	0.07	0.09	0.04
159.529	1400.000	+	C14+	0.44	0.57	0.23
159.781	1400.000	+	C14+	0.08	0.10	0.04
160.211	1400.000	+	C14+	0.13	0.17	0.07
160.853	1400.000	+	C14+	0.05	0.07	0.03
161.251	1400.000	+	C14+	0.08	0.11	0.04
161.745	1400.000	+	C14+	0.09	0.11	0.05
162.157	1400.000	+	C14+	0.04	0.05	0.02
162.347	1400.000	+	C14+	0.03	0.04	0.01
162.859	1400.000	+	C14+	0.02	0.03	0.01
163.112	1400.000	+	C14+	0.08	0.11	0.04
163.469	1400.000	+	C14+	0.05	0.06	0.03
163.663	1400.000	+	C14+	0.04	0.06	0.02
163.846	1400.000	+	C14+	0.05	0.06	0.02
164.252	1400.000	+	C14+	0.07	0.09	0.04
164.354	1400.000	+	C14+	0.04	0.05	0.02
164.647	1400.000	+	C14+	0.12	0.16	0.07
165.106	1400.000	+	C14+	0.09	0.11	0.05
165.320	1400.000	+	C14+	0.02	0.03	0.01
165.521	1400.000	+	C14+	0.05	0.07	0.03
165.747	1400.000	+	C14+	0.04	0.06	0.02
165.991	1400.000	+	C14+	0.03	0.04	0.01
167.639	1400.000	+	C14+	0.08	0.10	0.04
168.177	1400.000	+	C14+	0.34	0.44	0.18
168.512	1400.000	+	C14+	0.05	0.07	0.03
168.992	1400.000	+	C14+	0.03	0.04	0.02
169.324	1400.000	+	C14+	0.03	0.04	0.02
169.683	1400.000	+	C14+	0.02	0.03	0.01









316-018 (C:\Chem321\DATA\140306a140306a.2014-03-06 15-55-00\204B0401.D\204B0401.CDF)  
Start Time: 149.500 - End Time: 170.997

