



# Preparing for Unconventional Oil Spills by Rail

Thanks to Union Pacific and BNSF Railroads for provision of information useful in this presentation

**July 5, 2013**

**Lac-Mégantic, Quebec,  
Canada**

**Unattended train derailed,  
spilling oil and catching fire**

**Forty-seven people were  
killed and 30 buildings burned**

**About 1.6 million gallons of  
oil was spilled.**





**October 19, 2013  
Gainford, Alberta, Canada**

**9 tank cars of propane and 4  
tank cars of crude oil derailed**

**About 100 residents were  
evacuated**

**3 propane cars burned, but  
the oil cars pushed away and  
did not burn.**

**November 7, 2013**

**Aliceville, AL**

**26 railcars derailed with approx. 749,000 of oil spilled, with resulting fire**

**Affected Lubbub Creek, which discharges into the Tombigbee River**





**December 30, 2013**

**Casselton, North Dakota**

**Fire engulfed oil rail cars**

**2,000 residents evacuated**

**Over 400,000 gallons of crude  
oil involved**

**Jan. 20, 2014**

**Schuylkill River, Philadelphia,  
PA**

**Six cars of Bakken oil derailed  
on bridge over river**

**No spill occurred**





**April 30, 2014**

**James River, Lynchburg  
Virginia**

**15 cars derailed**

**30,000 gallons of oil spilled  
into river**

**Downtown area evacuated**

**City Water supply intakes  
shut off**

**January 7, 2014**

**Plaster Rock, New Brunswick,  
Canada**

**5 cars of oil caught fire and  
exploded after derailment**

**45 homes evacuated**



**Feb. 16, 2015**

**Kanawha River, Mount  
Carbon, WV**

**28 oil cars derailed; 19 cars in  
fire**

**One house destroyed; large  
area evacuated**



**May 6, 2015**

**5 cars carrying oil derailed and burned near the small town of Heimdal, ND**

**30 people were evacuated from the community for 1 day**

**Approximately 60,000 gallons of oil discharged into a slough near the railroad**





## Characteristics Of The Five Types Of Oil Classifications

Gasoline Products (Group I)	Diesel-like Products and Light Crude Oils (Group II)	Medium-grade Crude Oils and Intermediate Products (Group III)	Heavy Crude Oils and Residual Products (Group IV)	Low API Oils - heavier than water (Group V)
Examples – Gasoline	Examples – No. 2 fuel oil, jet fuels, kerosene, West Texas crude, Alberta crude	Examples – North Slope crude, South Louisiana crude, No. 4 fuel oil, IFO 180, lube oils	Examples – Venezuela crude, San Joaquin Valley crude, Bunker C, No. 6 fuel oil	Examples – Very heavy No. 6 fuel oil, Residual Oils, Vacuum Bottoms, Heavy slurry oils
<ul style="list-style-type: none"> <li>• Very volatile and highly flammable (flash point near 100°F/40°C)</li> </ul>	<ul style="list-style-type: none"> <li>• Moderately volatile (flash point varies 100-150°F/40-65°C)</li> </ul>	<ul style="list-style-type: none"> <li>• Moderately volatile (flash point higher than 125°F/50°C)</li> </ul>	<ul style="list-style-type: none"> <li>• Slightly volatile (flash point greater than 150°F/65°C)</li> </ul>	<ul style="list-style-type: none"> <li>• Very low volatility</li> </ul>
<ul style="list-style-type: none"> <li>• High evaporation rates; narrow cut fraction with no residues</li> </ul>	<ul style="list-style-type: none"> <li>• Refined products can evaporate to no residue; crude oils do have residue after evaporation completed</li> </ul>	<ul style="list-style-type: none"> <li>• Up to one-third will evaporate in the first 24 hours</li> </ul>	<ul style="list-style-type: none"> <li>• Very little product loss by evaporation</li> </ul>	<ul style="list-style-type: none"> <li>• No evaporation when submerged</li> </ul>
<ul style="list-style-type: none"> <li>• Low viscosity; spread rapidly to thin sheen</li> </ul>	<ul style="list-style-type: none"> <li>• Low to moderate viscosity; spread rapidly into thin slicks</li> <li>• Specific gravity of &lt;0.85; API gravity of 35-45</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate to high viscosity</li> <li>• Specific gravity of 0.85-0.95; API gravity of 17.5-35</li> </ul>	<ul style="list-style-type: none"> <li>• Very viscous to semisolid</li> <li>• Specific gravity of 0.95-1.00; API gravity of 10-17.5</li> </ul>	<ul style="list-style-type: none"> <li>• Very viscous to semisolid</li> <li>• Specific gravity greater than 1.00; API gravity less than 10</li> </ul>
<ul style="list-style-type: none"> <li>• High acute toxicity to biota</li> </ul>	<ul style="list-style-type: none"> <li>• Moderate to high acute toxicity to biota; product-specific toxicity related to type and concentration of aromatic compounds</li> </ul>	<ul style="list-style-type: none"> <li>• Variable acute toxicity, depending on amount of light fraction present</li> </ul>	<ul style="list-style-type: none"> <li>• Low acute toxicity relative to other oil types</li> </ul>	<ul style="list-style-type: none"> <li>• Low acute toxicity relative to other oil types</li> </ul>
<ul style="list-style-type: none"> <li>• Does not emulsify</li> </ul>	<ul style="list-style-type: none"> <li>• Can form stable emulsions</li> </ul>	<ul style="list-style-type: none"> <li>• Can form stable emulsions</li> </ul>	<ul style="list-style-type: none"> <li>• Can form stable emulsions</li> </ul>	<ul style="list-style-type: none"> <li>• Can form stable emulsions</li> </ul>
<ul style="list-style-type: none"> <li>• Will penetrate substrate; non-adhesive</li> </ul>	<ul style="list-style-type: none"> <li>• Tend to penetrate substrate; fresh spills are not adhesive</li> <li>• Stranded light crudes tend to smother organisms</li> </ul>	<ul style="list-style-type: none"> <li>• Variable substrate penetration and adhesion</li> <li>• Stranded oil tends to smother organisms</li> </ul>	<ul style="list-style-type: none"> <li>• Little penetration of substrate likely, but can be highly adhesive</li> <li>• Stranded oil tends to smother organisms</li> </ul>	<ul style="list-style-type: none"> <li>• Little penetration of substrate likely, but can be highly adhesive</li> <li>• Stranded and submerged oil tends to smother organisms</li> </ul>

# **Some Region 6 EPA Initiatives**



Volume 28 No. 2 February, 2015	<h2 style="margin: 0;">Region 6 LEPC Update</h2> <p style="margin: 0;">Steve Mason, EPA Region 6  <a href="mailto:mason.steve@epa.gov">mason.steve@epa.gov</a>                  Hilary Gafford, Weston Solutions  <a href="mailto:hilary.gafford@westonsolutions.com">hilary.gafford@westonsolutions.com</a></p>	
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In this special issue, we will be discussing the basics of Bakken oil, including its properties and hazards, as well as preparedness and response planning activities – Steve and Hilary

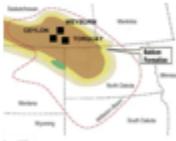
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**BAKKEN CRUDE OIL**

- Introduction: What is Bakken oil?
- How is it being transported?
- Recent incidents
- Where is Bakken oil coming from?
- Bakken properties and hazards
  - Planning / Response issues

**Introduction**



In recent years, the large increase in the production and movement of Bakken oil have raised concerns of planning and response officials, due to the properties and hazards of these types of oils. The rapid increase in energy production from shale formations in the United States, from such regions as Colorado, Pennsylvania, South Dakota, and Texas during the past decade has greatly affected the number of rail shipments of crude oil. This fact sheet will focus on the Bakken oil and how local and State officials should appropriately address these oils if they are being transported through their areas and communities.

Bakken oil, or Bakken crude, is also known as "North Dakota Sweet," or "North Dakota Light" crude oil, due to its low sulfur content. In this respect, it is similar to traditional crude oil from West Texas, known as West Texas intermediate crude. This type of crude oil is very desirable, and out of each barrel produced, approximately 95% of it is refined into gasoline, diesel fuel, or jet fuel.

Since Bakken crude, as stated above, is comparable to West Texas Intermediate, their material safety data sheets (MSDSs) or Safety Data Sheets (SDSs) are almost identical. They are both designated with Packing Group I or II under transportation regulations, and are usually placarded with the UN 1267 (Petroleum crude oil).



**February, 2015 LEPC Update**

**Several articles covering the basics of Bakken oil, including properties and hazards, as well as preparedness and response planning activities**

**Distributed to every LEPC, tribe, RMP and FRP facilities**

**Participated in State  
Conference Calls to all 48  
states about preparedness  
activities for rail shipments of  
oil**

**All 5 of our States participated  
in these calls**



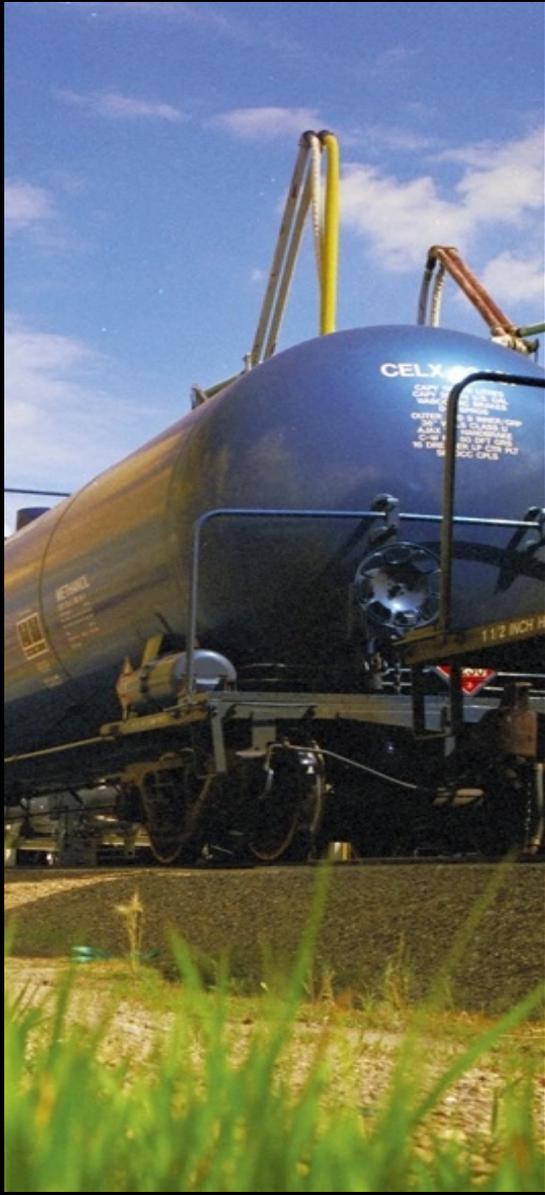
## NRT

### Bakken Oil Training

- Powerpoint Slides
- Webinar Recording



[http://www.nrt.org/production/NRT/NRTWeb.nsf/AllPagesByTitle/SP-EmergingRisksResponderAwarenessTrainingBakkenCrudeOil\(2015\)?Opendocument](http://www.nrt.org/production/NRT/NRTWeb.nsf/AllPagesByTitle/SP-EmergingRisksResponderAwarenessTrainingBakkenCrudeOil(2015)?Opendocument)



## United States

- CFR - Code of Federal Regulations
- 29 CFR – HAZWOPER
- 40 CFR – Environmental
- 49 CFR – Transportation
- 49 CFR Part 179 – Specification of Tank Cars

## International

- IMDG – International Maritime of Dangerous Goods
- Used internationally for intermodal shipments

## Standards

- AAR Pamphlet 34
- OT-55
- AAR Interchange Rules
- AAR M-1002, Section C – Specifications for Tank Cars

## Regulations and Standards Apply to

- Shippers
- Transporters
- Receiving customers
- Tank car builders and repair facilities

- Response Plans
  - HMERP
  - OPA-90
  - GRP
- Training
  - Public Responders
  - Employees
  - Private/Industry
- Drills/Exercises
- Commodity Flow Data



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