

# A Nor-Cal EMS Webcast for Continuing Education

Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

*“The Sticky Truth about  
Bakken Crude”*

Presented by:

Gerry Gray, Deputy Fire Chief Redding Fire  
Department, SCHMRT Operations Director

©2015 Northern California EMS, Inc.  
All Right Reserved Worldwide

Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

# *"The Sticky Truth about Bakken Crude"*



GERRY GRAY  
DEPUTY FIRE CHIEF – REDDING FD  
SCHMRT OPERATIONS DIRECTOR

Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

## Crude Oil 101

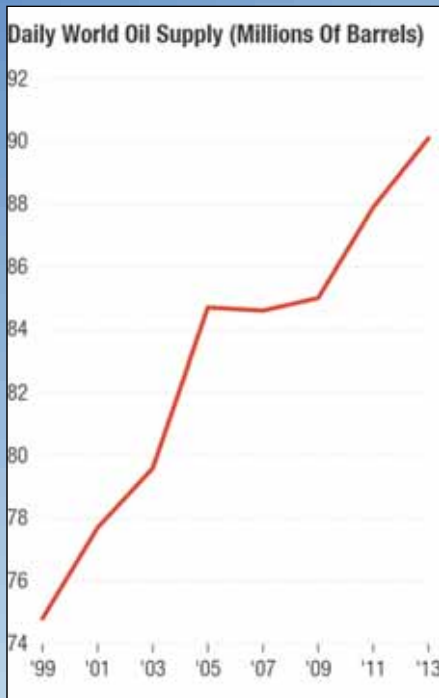
- Two theories on origin of crude oil:
  - (A) Biogenic Theory: Organic material from dead plants and tiny marine organisms settle at the bottom of oceans, river beds, swamps. Over 100,000 years are covered with sediment and under pressure transform to crude.
  - (B) Abiogenic Theory: The earth contains *vast amounts* of naturally-occurring crude which seep upwards to fill underground pools. Based upon Russian exploratory data.

Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.



Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

## Oil Politics & Supply



- “US overtakes Saudi Arabia and Russia as largest oil & natural gas producer.”  
*--April 2014 Institute for Energy Research*
- US produced 11M+ barrels per day in 2014. Increasing!
- ‘Peak Oil’ predictions & claims of 2007-2008 now *seem* to be invalid.
- *Reason: FRACKING*

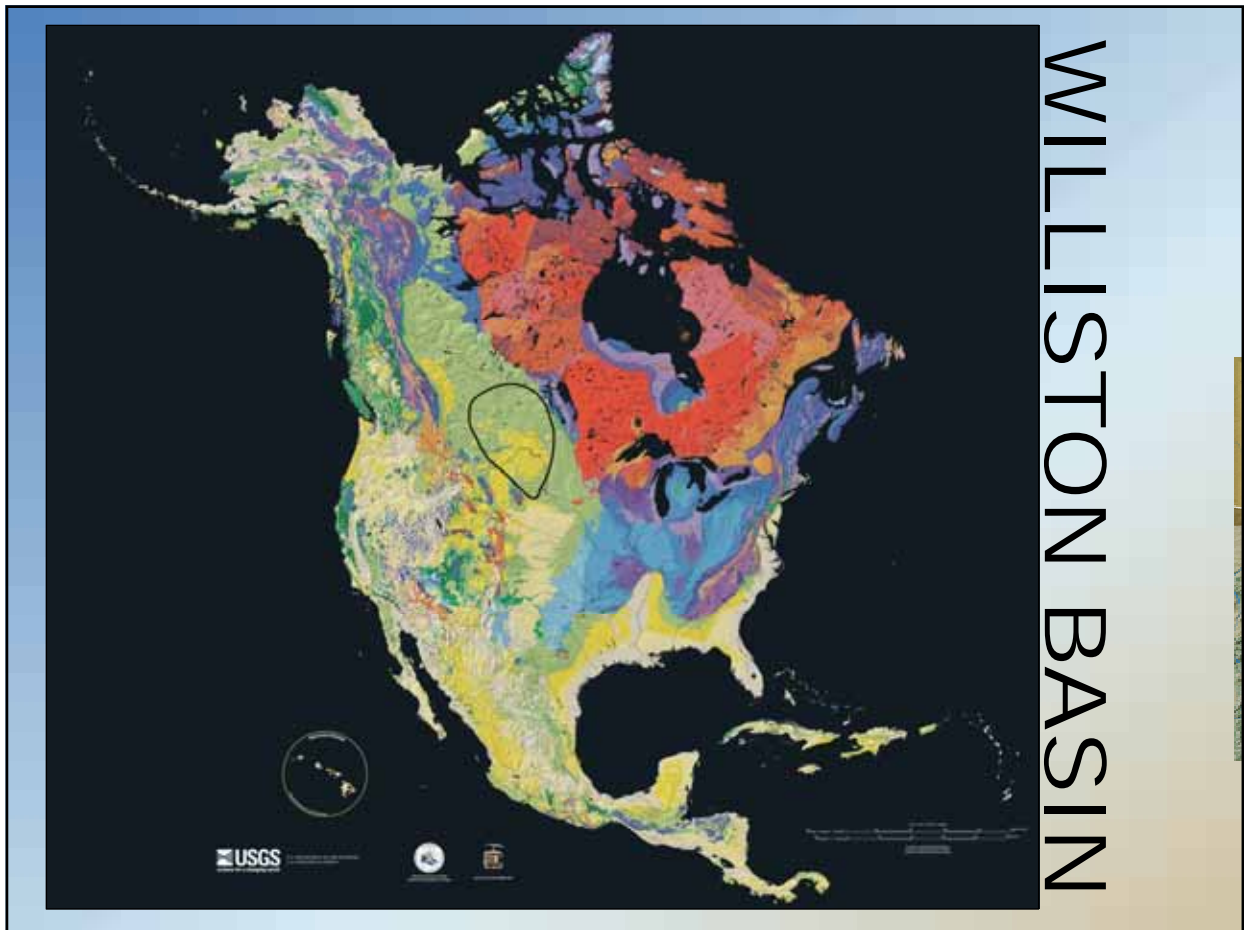
Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

## Oil Politics & Supply

- Saudi Arabia may be attempting to oversupply the global market in hopes of discouraging US further production and exploration. Result: oversupply = lower fuel prices for consumers.
- \$70/b is approximate 'break-even' point for US shale oil production. Crude is currently @ around \$92/b and dropping.
- "(US production) is also expected to reduce our dependence on oil imports to 22 percent in 2015—the lowest level in 45 years."

*--Institute for Energy Research*

Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.



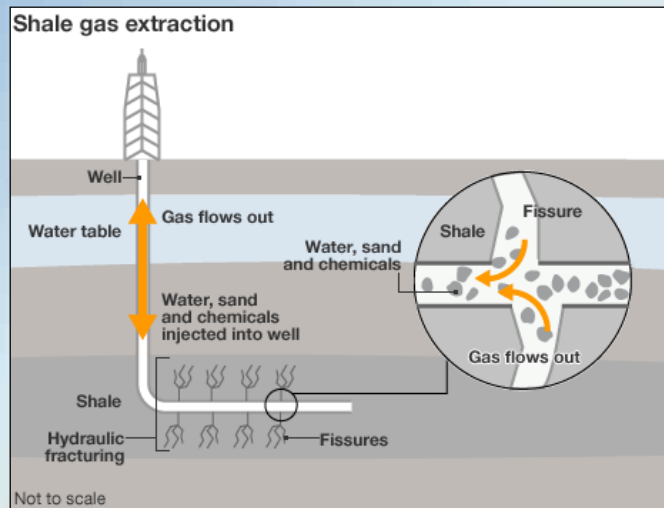
Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.



### WILLISTON BASIN FACTS:

- Bakken Shale region: center of massive shale oil deposit beneath Williston, ND.
- Advances in horizontal drilling & 'fracking' mostly responsible for new US production.

### FRACKING:



Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

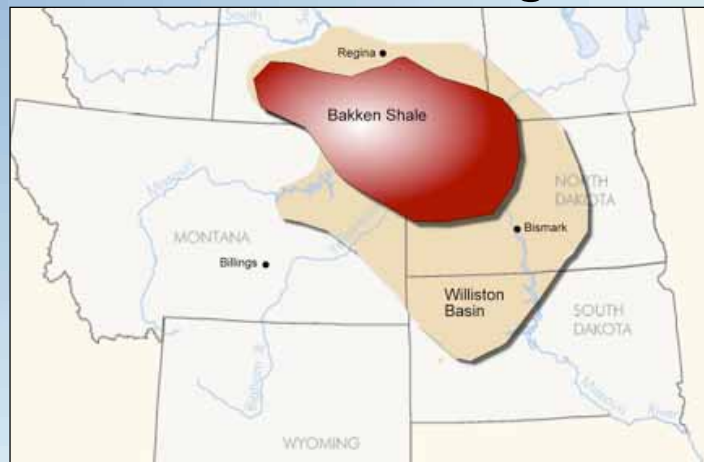
FRACKING (Fracturing the shale layer):

Movie

Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

## BAKKEN SHALE OIL FACTS:

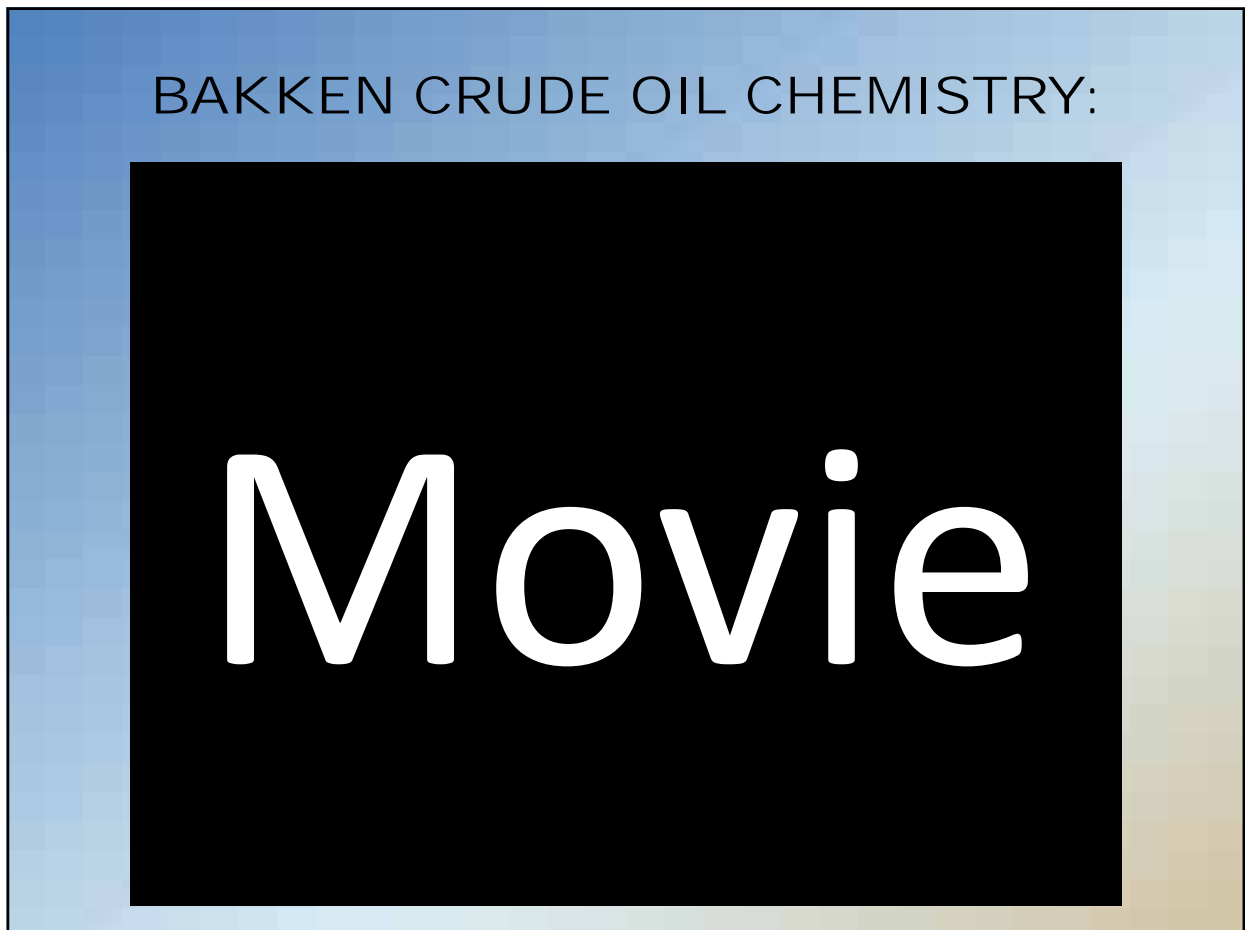
- 4,000 new wells drilled in 5 years
- New US DOE estimates up to 11 billion barrels of potential oil. This translates to over 35 years worth of US production from this region.



Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

## BAKKEN SHALE OIL FACTS:

- Reid Vapor Pressures (HC volatility)
  - Typical crude oil: 3-5 psi
  - Gasoline: 9-10 psi
  - Bakken Crude: 8-16 psi
- This *volatility* of the Bakken Crude is at the heart of the debate over how to safely deliver the oil to refineries.
- No transcontinental pipeline to deliver abundance of crude to west coast refineries.
- Railroad is next feasible option for delivery.



Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

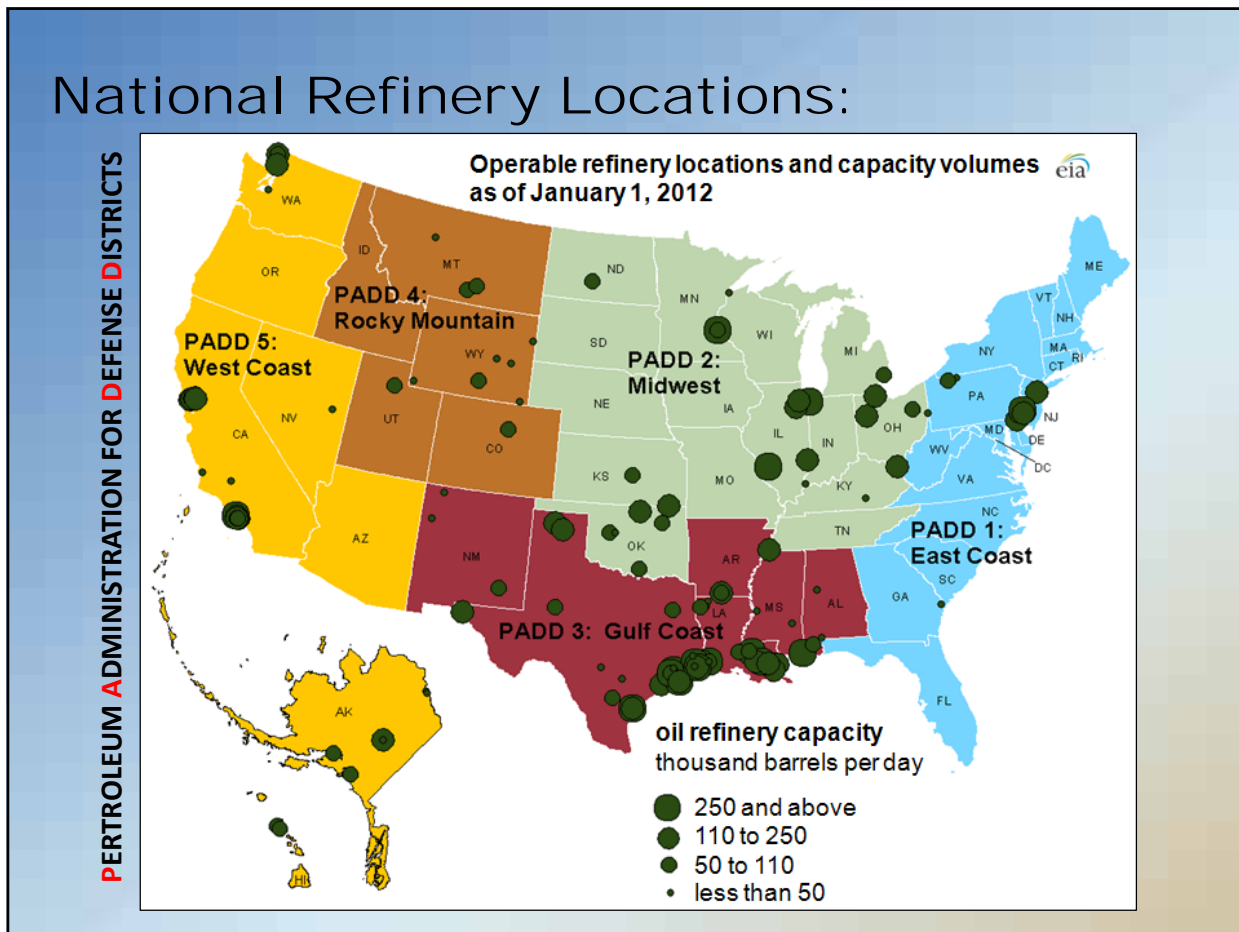
## BAKKEN CRUDE OIL CHEMISTRY:

- When conventional 'heavy' crude oil spills or leaks it rarely goes up in flames.
- Up to 30% of Bakken 'light' crude is made up of toxic and explosive gases. Typically, these gases are separated out of the crude oil before transport. Economic pressures are forcing this stage to be skipped.
- Bakken crude now shipped as "Packing Group II or III".

### Packing Group Definitions:

- *DOT Packing Group III*
  - Least hazardous properties
  - Many Bakken crude shipments
- *DOT Packing Group II*
  - Moderate hazardous properties
  - Some Bakken crude shipments
- *DOT Packing Group I*
  - Greatest hazardous properties
  - Preliminary directive from DOT is for replacement of old DOT 111 railcars for transporting crude in PG-I.

## National Refinery Locations:



Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.



## California RR System Map:

Two primary RR companies:

- Union Pacific (UP)
- Burlington Northern (BNSF)



Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

## Traditional DOT 111 Railcar:

- Non-pressurized loads only!
- 30,000 gallon capacity



Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

- 06/07/2013 - Quebec town of Lac-Mégantic
- o Massive explosions from crude only
  - o 40+ buildings destroyed
  - o 47 deaths
  - o Shipment listed as PG III



Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

06/07/2013 - Quebec town of Lac-Mégantic

# Movie

Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

11/08/2013 – Aliceville, Alabama

- 2.7M gallons of Bakken Crude oil



Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

12/30/2013 – Casselton, ND



Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

12/30/2013 – Casselton, ND

# Movie

Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.



04/30/2014 – Lynchburg, Virginia



Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.



05/09/2014 – Greeley, Colorado

- 6 cars of 100-car Bakken crude UP train derailed with no explosion or fire.



Joshua Polson/jpolson@greeleytribune.com | The Greeley Tribune

Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

10/07/2014 – Wadena, Saskatchewan

- Petroleum distillates in DOT 111 cars



Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

## Can such disaster affect the North State?

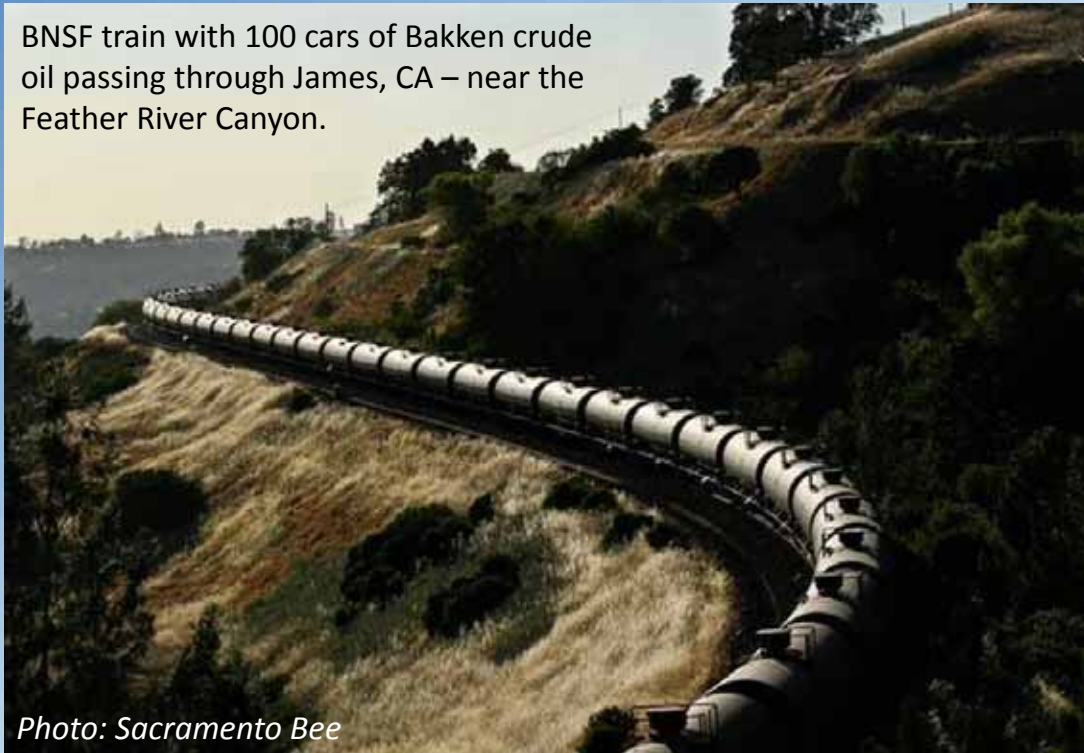


BNSF train with 100 cars of Bakken crude oil passing through Sacramento, CA.

Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

## Can such disaster affect the North State?

BNSF train with 100 cars of Bakken crude oil passing through James, CA – near the Feather River Canyon.



*Photo: Sacramento Bee*

Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

## Can such disaster affect the North State?

“Newly released information reveals that tank cars loaded with oil from the Bakken formation, a volatile crude that has a history of exploding, rumble through downtown Sacramento and through Stockton about once a week. Before they get there, they travel along the Feather River, a major tributary of the Sacramento and a key source of drinking water. They pass through rural Northern California counties — Modoc, Lassen, Placer, Plumas, Yuba and Butte — before reaching their destination in Contra Costa County.”

*--Molly Samuel, KQED Science (June 25, 2014)*

Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.



## Can such disaster affect the North State?

Up to 100 Bakken crude oil cars now pass down our line through Redding each day and this will increase to 200 cars per day in the near future.

*--Jennifer Johnson, Union Pacific RR Hazmat to SCHMRT in 2013*

Presented by Gerry Gray, Deputy Fire Chief  
Redding Fire Department, SCHMRT  
Operations Director and recorded live in  
front of an audience at the October 25, 2014  
Northstate Prehospital "Fall" Conference by  
Engineer Bill Bogenreif.

## What are the solutions?

- DOT mandates/changes:
  - 'HHFT' - High Hazard Flammable Train
    - 20 railcars of crude/flammables
    - HHFT routes must be re-examined
    - HHFT prompts notice to State
    - HHFT reduced speed limits
    - HHFT must have enhanced braking
    - Dramatic changes to DOT 111 railcar:
      - ✓ Not in effect until Oct, 2015
      - ✓ Increase puncture resistance
      - ✓ 9/16-inch steel wall vs. 7/16-inch
      - ✓ Allow current DOT 111 railcars to be retrofitted or retired within 5 years
- Additional pipelines (short to medium term)?
- Alternative energy solutions (long term)?