

Staff Analysis of Crude Oil Samples Submitted to PHMSA

May 19, 2014

Crude Oil Data Sent to PHMSA Compiled by API

- More than 200 samples of Bakken and other crudes (largely WTI)
- Bakken crude oil is very similar to other light crudes

		Other Crudes	Bakken
Vapor Pressure PSI (ASTM D6377)	Avg Min Max	7.24 1.43 11.46	11.81 3.60 15.37
Sulfur Wt % (D4294)	Avg Min Max	0.14 0.01 0.64	0.1 0.02 0.25
API Gravity (D5002)	Avg Min Max	40.36 34.40 46.9	42.66 38.60 47.07
Initial Boiling Point (D86) °F	Avg Min Max	101.94 (PG II) 83.40 (PG I) 182.80 (PG II)	91.96 (PG I) 79.10 (PG I) 150.80 (PG II)

There is no practical difference in vapor pressures between the Bakken and other light crudes

Gravity is as expected for light crude

IBP solidly within range of Hazard Class 3

Crude Oil Properties

- Reid Vapor Pressure is not a good indicator of flammability
 - Preliminary analysis of simulations using the Fire Effects on Tank Cars (**AFFTAC**) Model shows that there is not a good correlation between RVP and flammability
- API Crude Oil Physical Properties Ad Hoc Group is considering if other crude oil properties are more appropriate in the selection of tank cars (e.g., ignitability, flammability, light end volumetric percent, etc.)
 - Recent addition of PHMSA and Transport Canada representatives on the committee
- Results will inform the API Crude Oil Classification & Loading WG and tank car design

Industry Action

- **API is developing a standard for classifying, loading/unloading, and transporting crude oil to ensure it is moved safely**
- **API, NDPC, AFPM have all studied the physical properties of crude oil**
 - Bakken crude is similar to other light, sweet crude oils
 - Bakken is a Class 3, PG I or PG II material
 - Tank cars are designed to handle crude oil

