

Update on Federally Sponsored Research of Crude Oil Characterization and Suggestions for State Participation

**Presentation to the NDIC
Bismarck, North Dakota
January 9, 2015**

(modified for presentation to OGRC on May 26, 2015)

**John Harju
Associate Director for Research**

The slide features a dark blue background with a repeating pattern of text: "RESEARCH AND DEVELOPMENT PROGRAMS, OPPORTUNITIES FOR TECHNOLOGY COMMERCIALIZATION", "WORLD-CLASS CENTERS OF EXCELLENCE", "ENVIRONMENTAL TECHNOLOGIES TO PROTECT AND CLEAN OUR AIR, WATER, AND SOIL", and "INDUSTRY, GOVERNMENT, AND THE RESEARCH COMMUNITY". The EERC logo, consisting of a red and white stylized globe, is positioned on the left. The text "EERC Energy & Environmental Research Center (EERC)" is prominently displayed in the center. The University of North Dakota logo is in the bottom right corner.

EERC Energy & Environmental Research Center (EERC)
Energy & Environmental Research Center
Putting Research into Practice

UNIVERSITY OF NORTH DAKOTA

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Crude-by-Rail Concerns

- Recent accidents have raised concerns about the safety of rail transport of tight oil. These concerns include:
 - Physical and chemical properties of tight oil.
 - Adequacy of transport rules/regulations.
 - Rail integrity.
 - Packaging.
 - Tight oil-conditioning and stabilization practices.

Ongoing Response

- To address these concerns, the following work has begun:
 - Physical and chemical properties of tight oil
 - ♦ NDPC, PHMSA, AFPM, API characterization studies
 - Transport rules/regulations
 - ♦ PHMSA rulemaking ongoing
 - Rail integrity
 - ♦ FRA, PHMSA evaluating
 - Packaging
 - ♦ FRA, PHMSA evaluating
 - Tight oil-conditioning and stabilization practices
 - ♦ NDIC Oil Conditioning Order #25417

DOE Study

What It Is and What It Isn't

Comprehensive tight oil characterization effort intended to assess oil properties relative to its safe storage and transport.

- Phase I – Problem Definition (funded – complete Q1 2015)
 - Scoping/planning effort
 - DOE, NETL, PHMSA, Sandia, EERC
 - ◆ Literature review and identification of data gaps
 - ◆ Development of comprehensive sampling and analysis plan to define:
 - Sample locations (physical process, geography).
 - Sampling methodology.
 - Analytical methods.
 - Characterization relative to combustion science.
- Phase II – Comprehensive Tight Oil Characterization (pending)
 - Crude oil sampling and analysis, combustion testing
 - DOE, NETL, PHMSA, Sandia, EERC, others

Limitations of EERC's Role Within DOE Effort

- Sandia National Lab was contracted by DOE NETL; \$500K.
- DOE, DOT, PHMSA are financing and directing the effort.
- The EERC's subcontract from Sandia is \$100K and focused on documenting crude oil-conditioning operations, reviewing available tight oil characterization data, and supporting preparation of a sampling and analysis plan.
 - Limited ability to participate in additional tasks or travel
- Additional funding from OGRC can ensure the EERC is adequately engaged and knowledgeable about factors influencing production operations and North Dakota-specific efforts and enable appropriate representation within the DOE characterization study.

DOE Phase I

- Literature review
- Sampling and analysis plan
- Funded and work ongoing

DOE Phase II

- Comprehensive tight oil characterization
- Oil sampling and analysis
- Combustion testing
- Funding and timeline uncertain

Adequate Resources for EERC Participation
 \$150K

Q4 2014	Q1 2015	Q2 2015	Q3 2015	Q4 2015	Q1 2016	Q2 2016
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SANDIA REPORT

SAND2015-1823
Unlimited Release
Printed March 2015

Literature Survey of Crude Oil Properties Relevant to Handling and Fire Safety in Transport

DOE/DOT Tight Crude Oil Flammability and Transportation Spill Safety Project

David Lord, Anay Luketa, Chad Wocken, Steve Schlasner, Ted Aulich, Ray Allen,
and David Rudeen

Prepared by
Sandia National Laboratories
Albuquerque, New Mexico 87185 and Livermore, California 94550

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Contact Information

Energy & Environmental Research Center

University of North Dakota

15 North 23rd Street, Stop 9018

Grand Forks, ND 58202-9018

World Wide Web: **www.undeerc.org**

Telephone No. (701) 777-5157

Fax No. (701) 777-5181

John Harju, Associate Director for Research

jharju@undeerc.org