



EERC

Energy & Environmental Research Center®
Putting Research into Practice

EERC ... The International Center for Applied Energy Technology®



UND University of
North Dakota
Grand Forks

ALG: 1626-093-04
NDIC: 16147
Interval (ft): 10721



Critical Applied Research for Williston Basin Producers

19th Williston Basin
Petroleum
Conference
Regina,
Saskatchewan
May 1-3, 2011

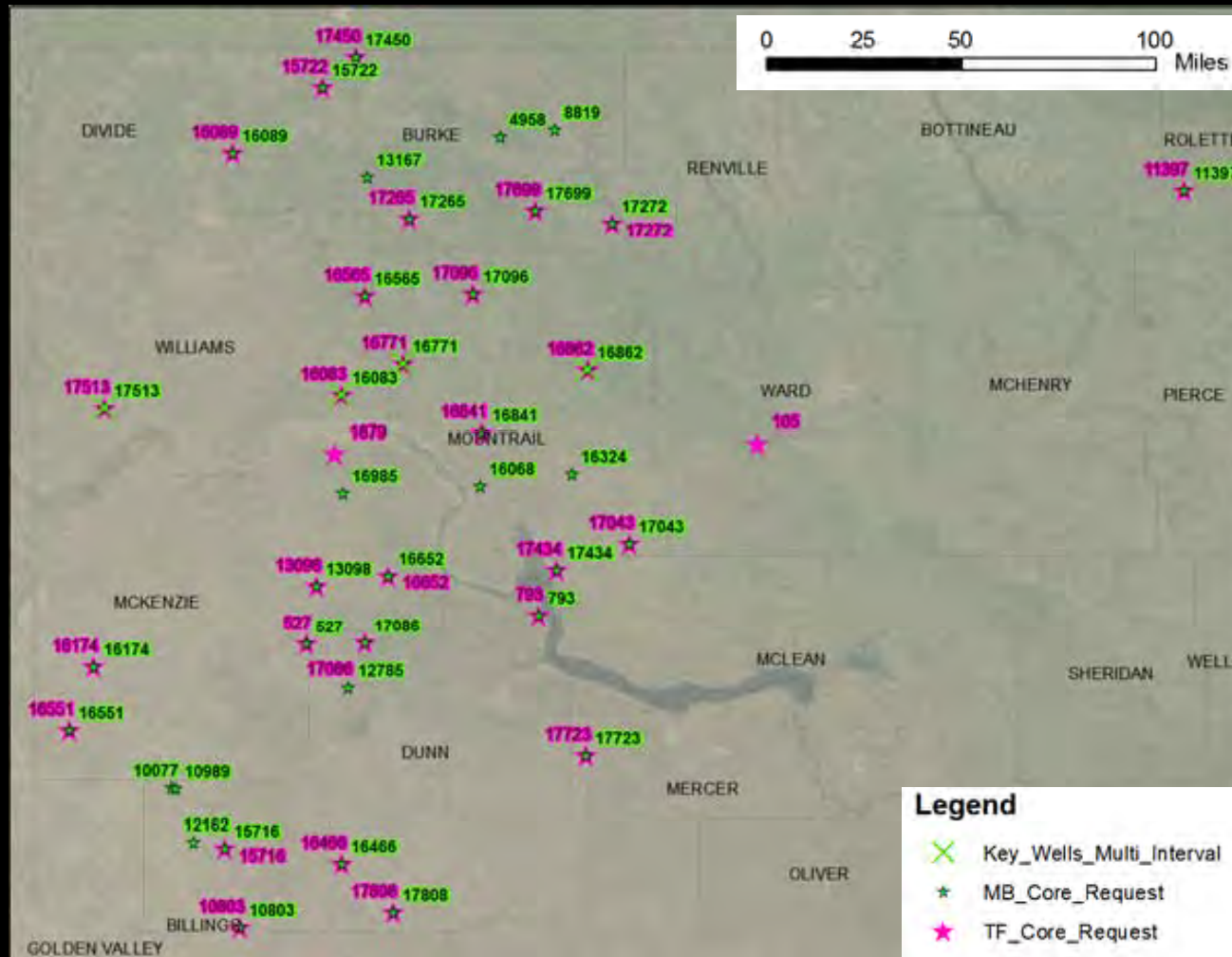
Darren D. Schmidt,
P.E.

Laboratory Studies

Water Opportunities

Environmental Services

Engineering Studies



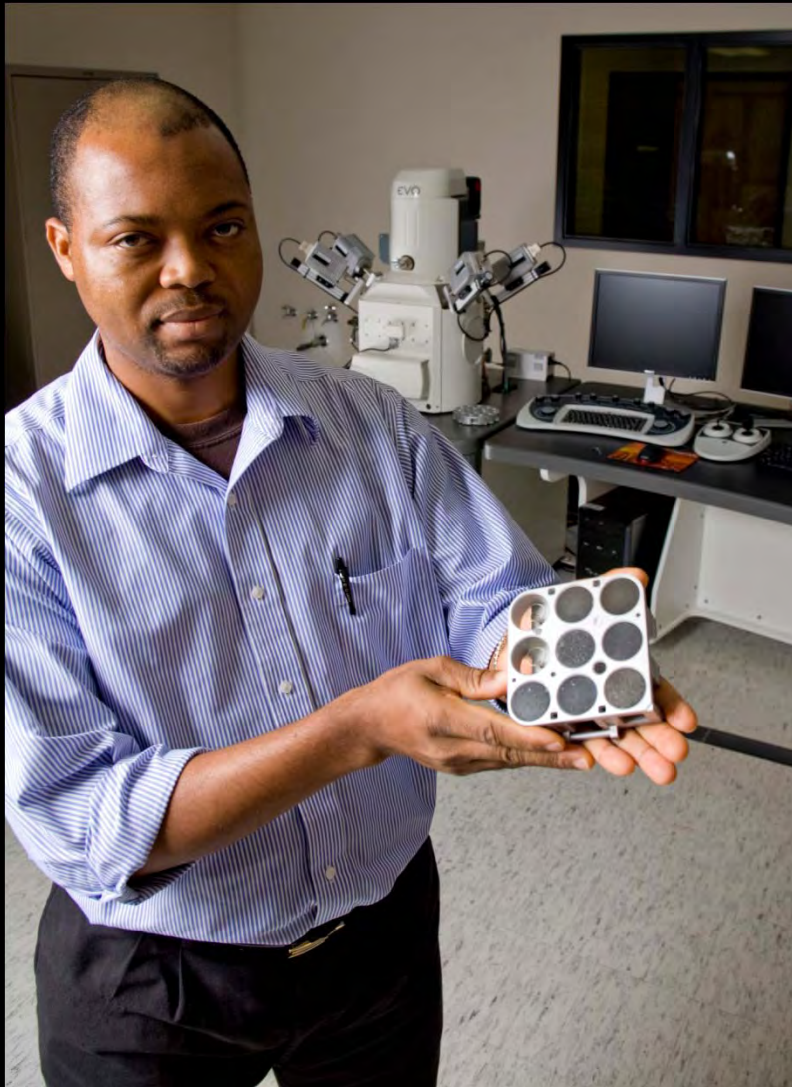
- Geomechanical characterization
- Investigation of formation souring
- Completion optimization

Laboratory
Studies

Water
Opportunities

Environmental
Services

Engineering
Studies



- Geomechanical characterization
- Investigation of formation souring
- Completion optimization

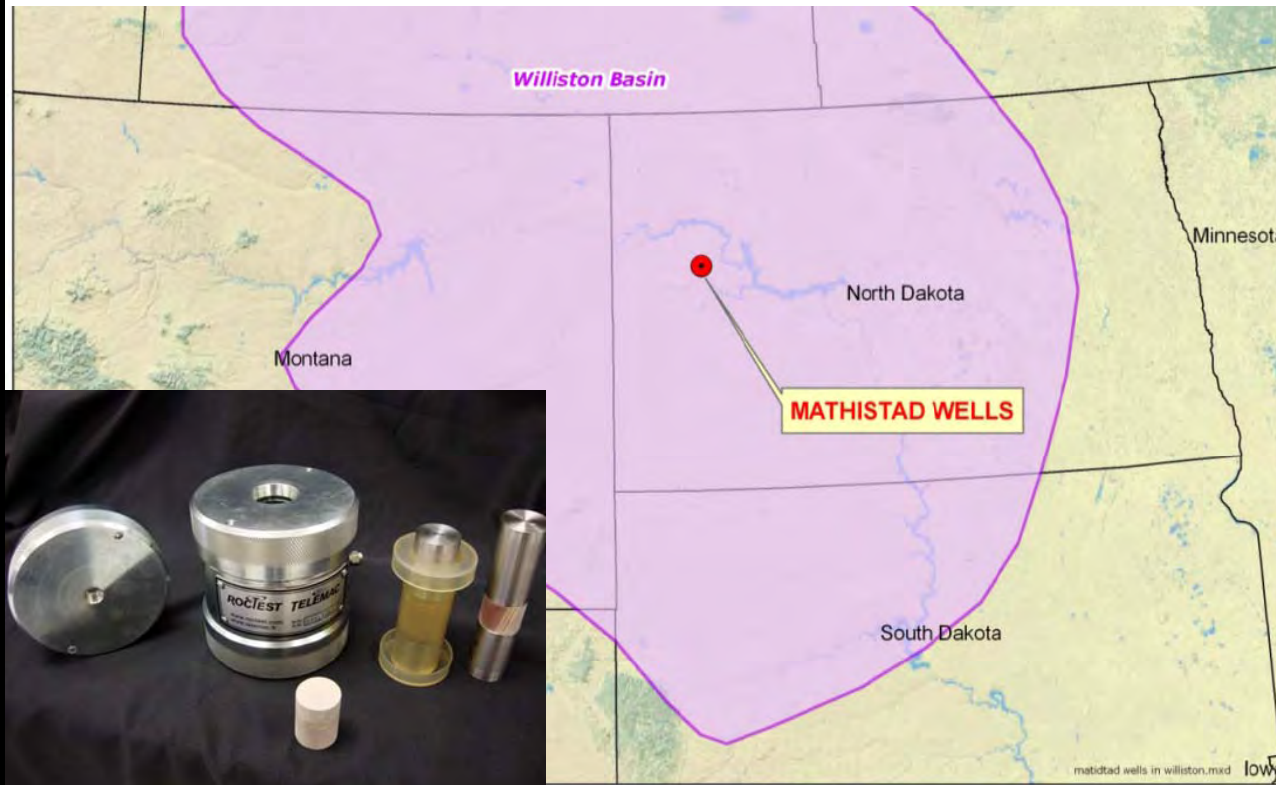
Laboratory
Studies

Water
Opportunities

Environmental
Services

Engineering
Studies

North Dakota Oil and Gas Research Council - G-018-039
“Determination of the Uniqueness of Reserves and Productivity
from the Middle Bakken and the Three Forks Sanish Zones”
Continental Resources Inc.



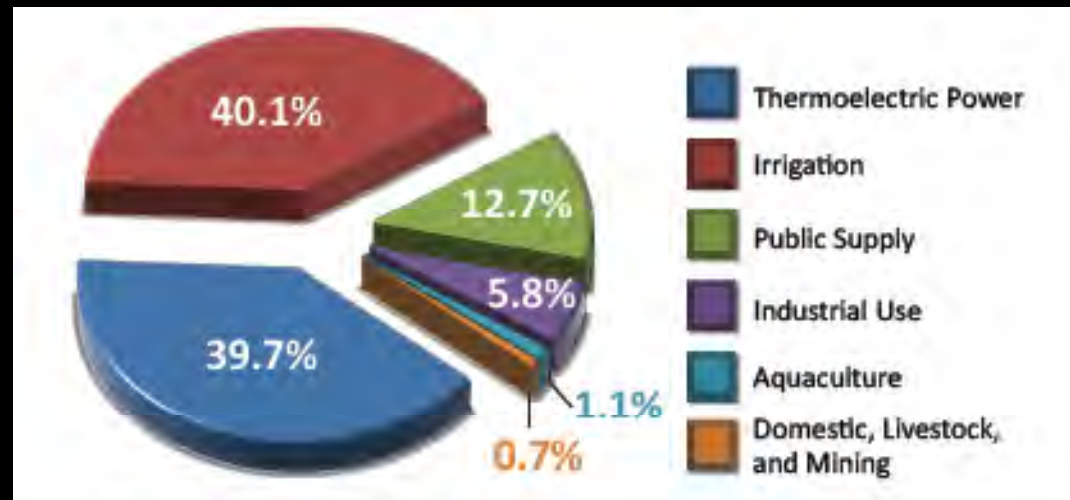
- Geomechanical characterization
- Investigation of formation souring
- **Completion optimization**

Laboratory
Studies

Water
Opportunities

Environmental
Services

Engineering
Studies



NGPWC – Fact Sheet, 2010



Northern Great Plains Water Consortium

Laboratory
Studies

Water
Opportunities

Environmental
Services

Engineering
Studies

1 Treatment

1 Day of Irrigation



=



- North Dakota Irrigation Association – 2008 – 267,046 acres = over 1500 pivot irrigators – **using 74 billion gallons per year** (ND State Water Commission ref. guide 2005)
- North Dakota Department of Mineral Resources – current 2011 projection – 1050 – 2700 wells/yr – estimated demand - **4 billion gallons per year** (Harms, R.; ND Water Resources Report, October 2010)
- Ground water resources limited.
- Most logical source of industrial water – Missouri River, Lake Sakakawea
- Arguing for federal allowance for 0.01% of daily flow

Laboratory
Studies

Water
Opportunities

Environmental
Services

Engineering
Studies



- Phase 1 – Assessment for Recycling Stimulation Fluid Flowback
- Phase 2 – Feasibility for Upgrading Brackish Groundwater

Laboratory
Studies

Water
Opportunities

Environmental
Services

Engineering
Studies

Water Use Comparisons

Use	gallons (millions)	barrels (thousands)	acre-feet	cubic meters
Typical Daily Use for a 50,000-Person Midwestern City	10	238.1	30.7	37,850
Daily Pumping Volume for a Center-Pivot Irrigator for 130 Acres (irrigated portion of ¼ section)	1.008	24	3.1	3815
Average Daily Water Withdrawal for Once-Through Cooling at a 400-MW Coal-Fired Power Plant	365	8691	1120	1,381,525
Water Used to Fracture the Formation for an Oil Well in the Bakken Formation (one-time use)	0.5–1.0	11.9–23.8	1.5–3.1	1893–3785
Proposed Maximum Daily Volume of Water Imported for the Red River Valley Water Supply Project	77.56	1,847	238	293,556

NGPWC – Fact Sheet, 2010




Laboratory
Studies

Water
Opportunities

Environmental
Services

Engineering
Studies

- November 30, 2010 – Mandatory reporting for greenhouse gases (GHGs).
- 25,000 metric tons/yr of CO₂ equivalent – within a geologic basin.
- Likely to be subject if greater than:
 - 10 wells contributing to flaring or venting.
 - 1000 Mcfd of gas combustion.
 - Stationary power generation of 4000 kW.
- GHG reporting for the year of 2011 is due March 31, 2012.

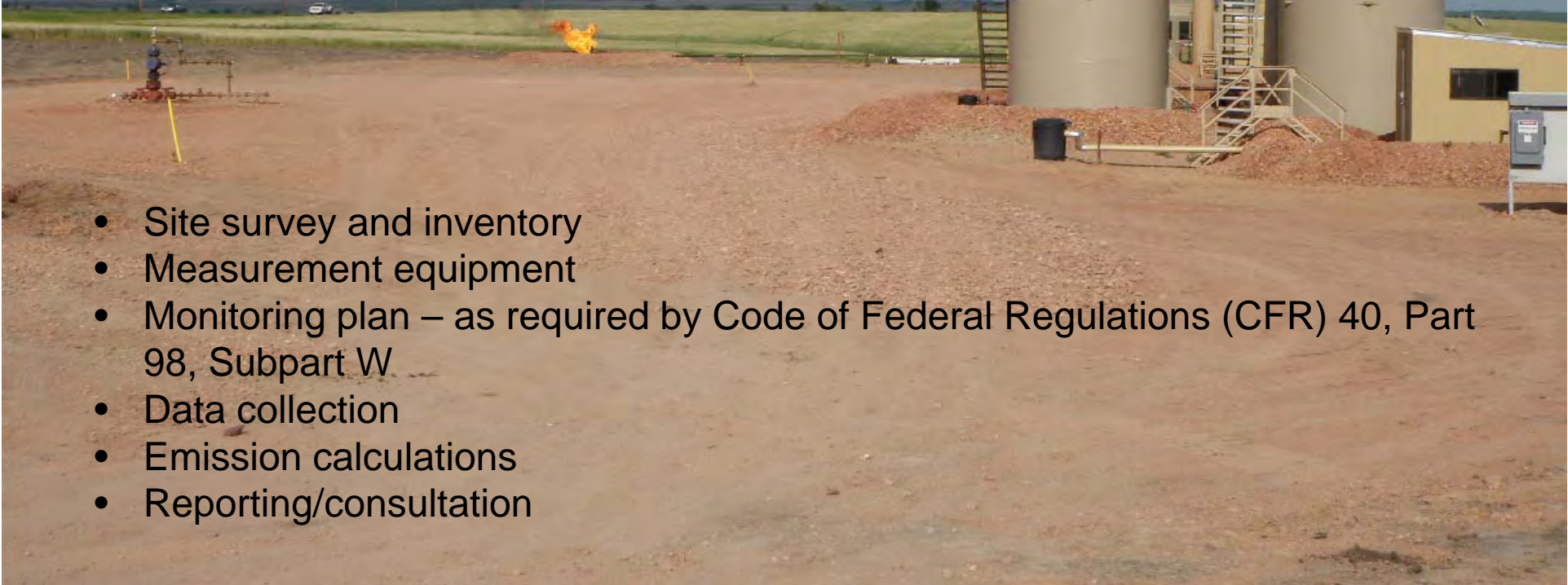


Laboratory
Studies

Water
Opportunities

Environmental
Services

Engineering
Studies

- 
- Site survey and inventory
 - Measurement equipment
 - Monitoring plan – as required by Code of Federal Regulations (CFR) 40, Part 98, Subpart W
 - Data collection
 - Emission calculations
 - Reporting/consultation

Laboratory
Studies

Water
Opportunities

Environmental
Services

Engineering
Studies

BDSS
BAKKEN DECISION SUPPORT SYSTEM

EERC
Energy & Environmental Research Center
Putting Research into Practice

NETL

About the EERC | Contact Us | Sponsors | Site Map | Home

Bakken Formation Geology | **Completion and Stimulation** | **Current Research Studies** | **Resource Toolbox**

Downloadable Resources
Obtain data regarding well locations, completion information, and production provided in convenient formats for conducting efficient analysis.
[LEARN MORE >](#)

Decision Support
Decision Support provides oil production and geologic data for the North Dakota portion of the Williston Basin. Explore production relative to geologic properties of the Bakken and Three Forks formations.
[LEARN MORE >](#)

Bakken News
• Kuwait on the Prairie (The New Yorker)
• Ness speaks at Horizon meeting (Williston Herald)
• The new Stanley - Planned projects are a leap forward (Williston Herald)
[LEARN MORE >](#)

NORTH DAKOTA PETROLEUM COUNCIL

NORTH DAKOTA DMR
Department of Mineral Resources

Interested in your company logo appearing here?
[For more information click here.](#)

EERC Bakken
Web site

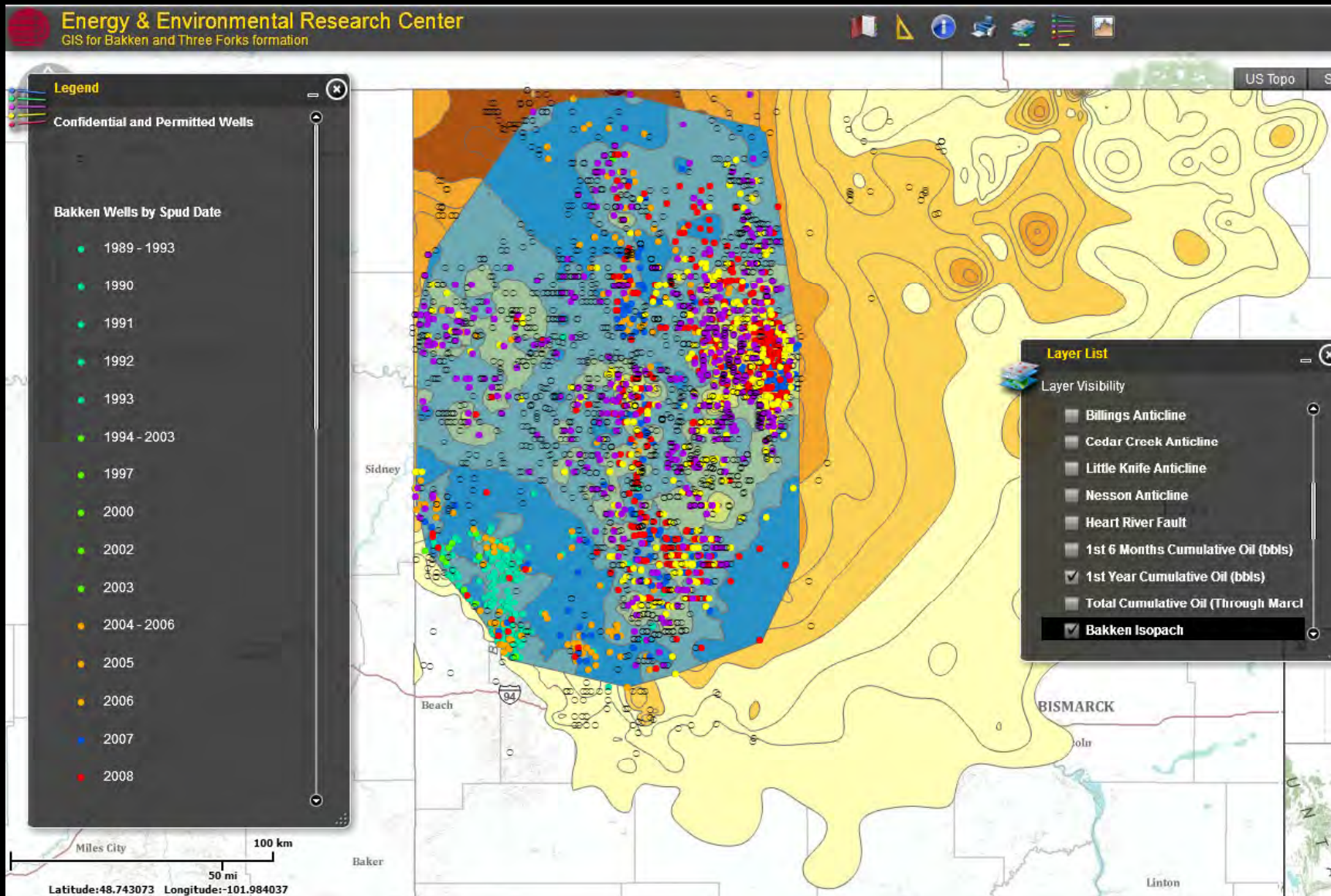
Launch planned
prior to May 30

Laboratory Studies

Water Opportunities

Environmental Services

Engineering Studies



Laboratory
Studies

Water
Opportunities

Environmental
Services

Engineering
Studies



Laboratory
Studies

Water
Opportunities

Environmental
Services

Engineering
Studies



Special Thanks to:

- North Dakota Petroleum Council
- North Dakota Industrial Commission
- U.S. Department of Energy National Energy Technology Laboratory
- And the many industrial partners playing significant roles in the development of the Williston Basin



EERC

Energy & Environmental Research Center[®]

Putting Research into Practice

1. Natural gas pneumatic device venting
2. Natural gas-driven pneumatic pump venting
3. Acid gas removal vent
4. Dehydrator vent
5. Well venting for liquids unloading
6. Gas well venting during completions and workovers with hydraulic fracturing
7. Gas well venting during completions and workovers without hydraulic fracturing
8. Blowdown vent stacks
9. Onshore production storage tanks
10. Well testing venting and flaring
11. Associated gas venting and flaring
12. Flare stacks
13. Centrifugal compressor venting
14. Reciprocating compressor rod packing venting
15. Other emissions from equipment leaks
16. Population count and emission factor
17. Enhanced oil recovery injection pump blowdown
18. Onshore petroleum and natural gas production and natural gas distribution combustion emissions