



Enbridge Operations In Northern Michigan Line 5



Enbridge: A Vital Link to Energy Supply



- Enbridge Energy has been delivering energy reliably **since 1949** on what was originally referred to as the Lakehead System.

About **15% of total U.S. petroleum imports** arrives via Enbridge's Lakehead System.

- Enbridge meets **more than 50%** of crude oil needs of all Great Lakes refineries.

Liquids Pipelines in Michigan

Line 6B:

Griffith, IN to Marysville, MI

- 235 miles in MI
- 30-36-inch pipe
- Capacity 500,000 bpd
- Medium & heavy crude

Line 79:

Stockbridge to Romulus, MI

- 64 miles in MI
- 16-20-inch pipe
- Capacity 80,000 bpd
- Light & heavy crude

Line 17:

Stockbridge, MI to Toledo, OH

- 77 miles in MI
- 16-inch pipe
- Capacity 100,000 bpd
- Heavy crude

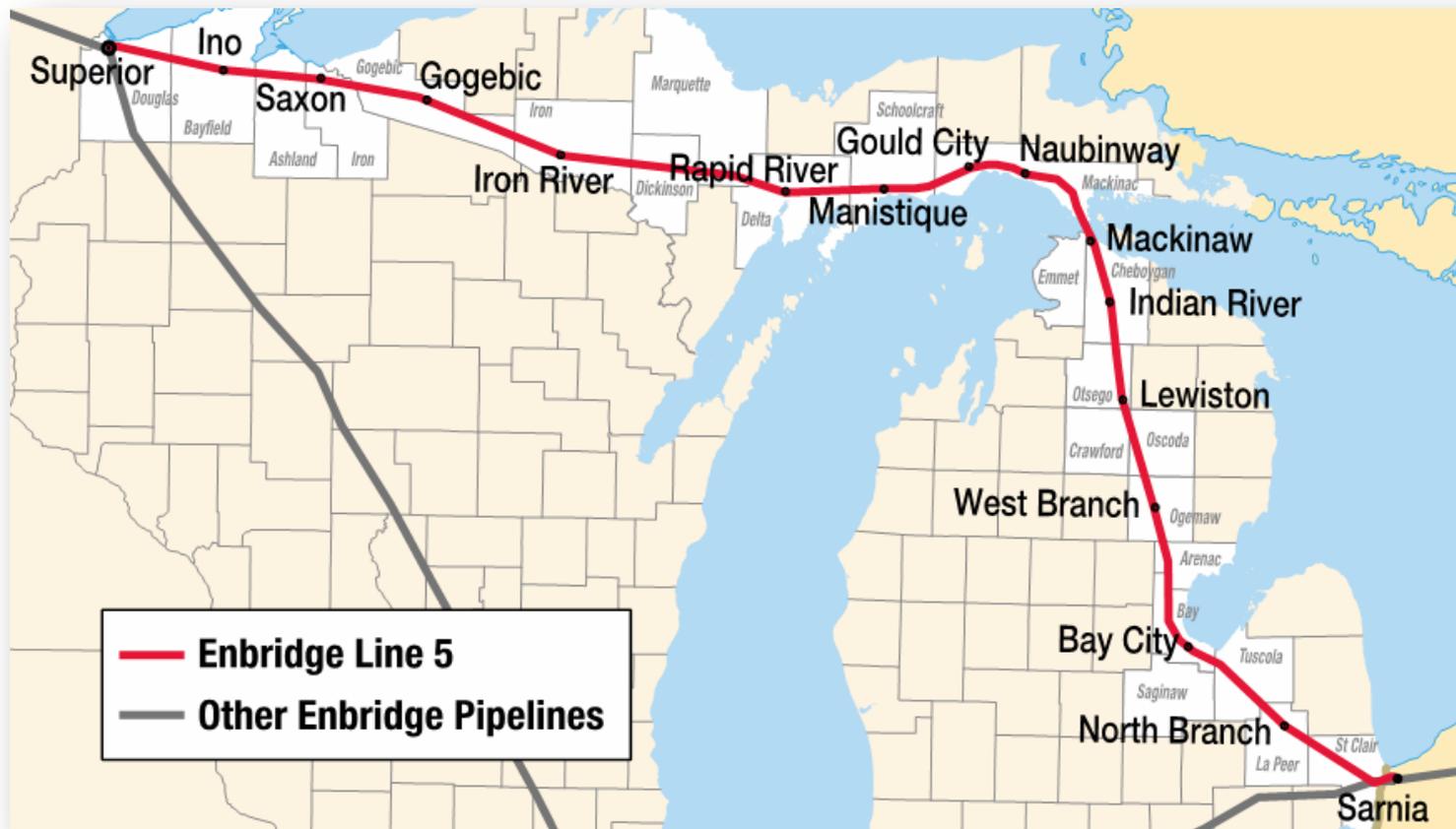


Line 5:

Superior, WI to Sarnia, ON, Canada

- 554 miles in MI

Line 5



Line 5: Superior, WI to Sarnia, ON, Canada

- 645 miles (554 miles in MI)
- Capacity 540,000 bpd
- 30-inch pipe (2, 20-inch heavy-walled and seamless pipelines under Straits)
- Well functioning coating
- Light crude (also NGL & others)

Safety is the Cornerstone of our Business



- Number 1 priority is to operate **safely and reliably**
 - No incident is ever considered acceptable.
- Since 2012, invested **\$4.4 billion** in new technologies and training to further enhance pipelines and facilities.
- During the past 10 years, delivered nearly **13 billion barrels** of crude oil and liquids.



Goal to build and maintain pipelines with ZERO releases.

Safely Transported

- Engineering **design**
- Integrity **management** & pipeline operations
- **Control Center Operations**: computerized pressure monitoring and control
- Routine aerial **patrols**
- Internal pipeline **inspections**
- On-going emergency response **training** & live drills
- Straits-specific **response plans**



Safety in the Straits of Mackinac

- Design
- Inspections
- Automatic shut-off valves
- Remotely operated Isolation Valves
- New leak detection equipment
- Electric back-up generator
- Valve yard containment system





- Comprehensive maintenance and **integrity program**, including visual inspections.



Continuous Safety Improvements



Improvements since 2010:

- Pipeline and Facility Integrity
- Leak Detection
- Pipeline and Control Center Operations
- Public Awareness
- Emergency Response
- Safety Culture



Internal Inspections

Sophisticated electronic vehicles move inside the pipe along with the oil to obtain detailed measurements of the pipe condition including:

- internal corrosion
- external corrosion
- dents, buckles, gouges



External Inspections

- Frequent Underwater Autonomous Vehicle and Remote Operated Vehicle inspections.
- Routine aerial and right-of-way patrols are conducted for buried pipelines.
- Visually patrolled at least 26 times a year.



Supporting Michigan's Economy

In 2013, Enbridge paid nearly **\$21 million** in state property, sales, use and income taxes.

Employ approximately **250 employees & contractors** in **24 locations** – average annual salary: **\$82,000**



Emergency Responder Education



- **FREE** Pipeline Emergency online training
- Basics of gas and liquids pipeline operations
- Pipeline Emergency response tactics
- Providing responders with resources they need



www.mypipelinetraining.com

Community Investment

Grants approximately **\$750-\$1,500** but may vary from year to year based on annual program budget.

Contributed approximately **\$70,000 in 2013** to Michigan applicants including:

- City of St. Ignace Police Department
- Mackinaw City Police Department
- Delta County Sheriff Department
- Mackinac Island Fire Department
- Cheboygan County Sheriffs Department
- Michigan State Police Department



Conclusion



Thank You
www.enbridge.com

