

Enbridge Energy Partners, L.P.

Environment, Health & Safety



Optical Imaging to Detect
Gas Leaks in Gas Gathering
& Transmission Pipelines

Who is Enbridge?



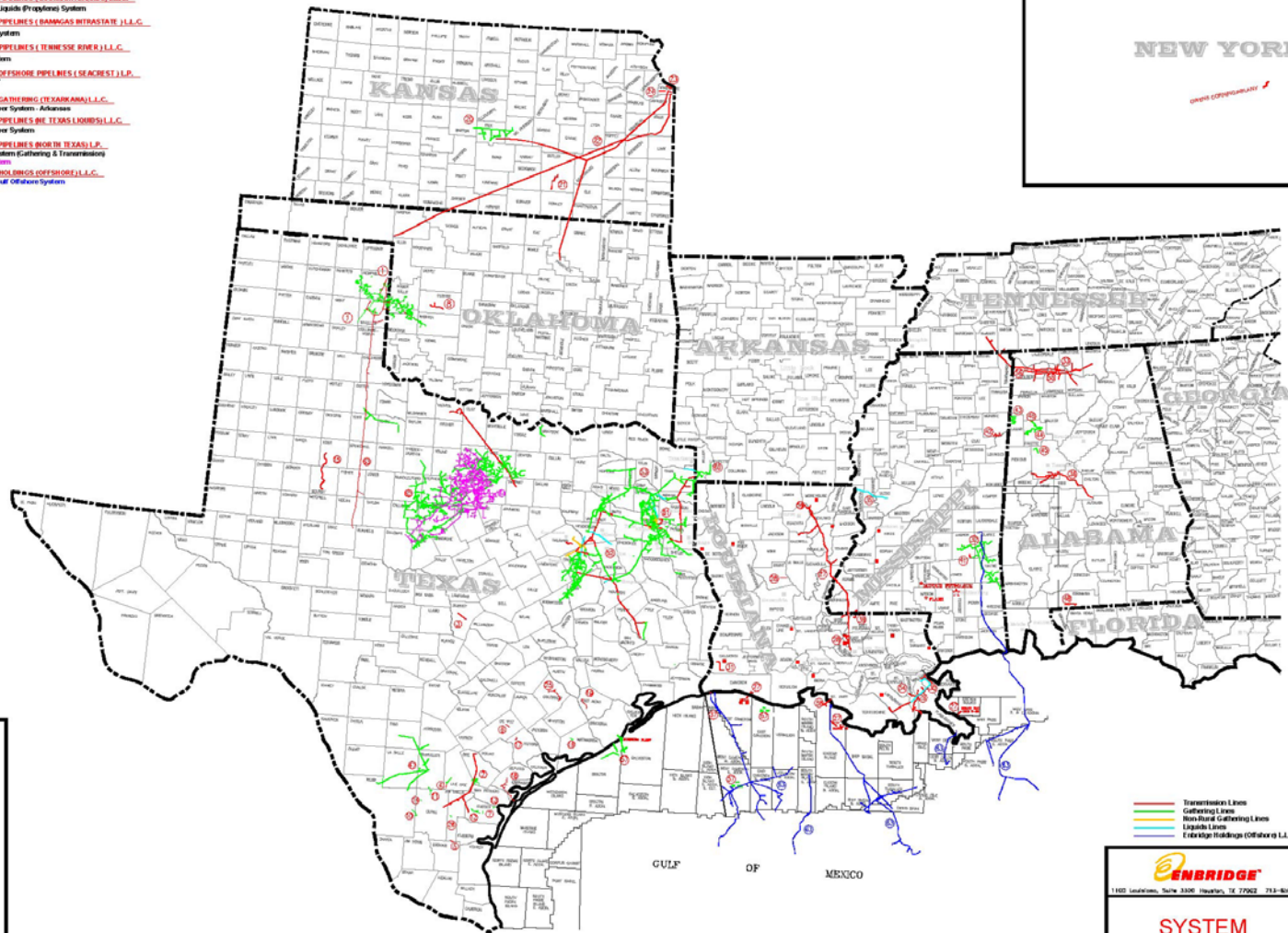
- Canadian based company
- Longest Liquid Line in World
- Natural Gas Assets in Southern US
 - 13,000 Miles of Pipeline
 - 34 Processing and/or Treating Plants
 - 100 Compressor Stations
 - 500,000 hp of gas fired compression

System Map



ENBRIDGE - TRANSPORTATION SOUTH

- ENBRIDGE PIPELINES (TEXAS INTRASTATE) L.P.
- 2 Brant System
- 3 Brant System
- 4 Chaparral System (Gathering & Transmission)
- 5 City of Ft. Worth System
- 6 Coon Plains System
- 9 Coon Plains System
- 11 Lone Star System
- 15 Salt Creek System
- 17 S. Forest Field System
- 19 Turkey Creek System
- 20 Colman, Coody System
- 23 Palo Duro System
- ENBRIDGE PIPELINES (TEXAS GATHERING) L.P.
- 1 Anadarko System (Gathering & Transmission)
- 7 E. Miraca Block System
- 8 Foss System
- 12 Miraca Block System
- 13 Post of Corpus Christi System
- 14 Swanton System
- 25 Malaparte System
- 26 Harbison System
- 47 Talton System
- 58 Cook Inlet System / Alaska
- TEXAS PIPELINE COMPANY
- 10 Texaco Gas Pipeline
- ENBRIDGE PIPELINES (EAST TEXAS) L.P.
- 62 Koch Midstream System (Gathering, Transmission & Liquids)
- 63 Odessa Eugene Island
- 64 Vantage Pipeline
- MIDCOAST HOLDINGS HO. ONE, L.L.C.
- 36 Raymond Gathering System
- City of Angeles System
- 23 BPI Odessa System
- 24 Combing / Kansas City
- 28 Woodbine System
- 30 Lobo River System
- 61 Owens Corning System / Albany N.Y.
- ENBRIDGE PROCESSING (MIDWESTERN) L.L.C.
- 32 Harmony System
- 41 Hockberg / In System
- 42 Chaparral System
- ENBRIDGE PIPELINES (ALABAMA GATHERING) L.L.C.
- 40 Detroit System
- 41 Fayette System
- 46 Moxie Bridge System
- 48 Happy Hills System
- ENBRIDGE PIPELINES (DPC)
- 22 Kansas Pipeline System
- ENBRIDGE PIPELINES (MBA) L.L.C.
- 27 Mba System
- MEL (LOUISIANA GAS TRANSMISSION) L.L.C.
- 38 Mba Gas Transmission Co System
- ENBRIDGE PIPELINES (LOUISIANA INTRASTATE) L.L.C.
- 29 Glala System
- ENBRIDGE PIPELINES (GASCO INTRASTATE) L.L.C.
- 30 Chalmette System
- 59 Sterling System
- ENBRIDGE PIPELINES (ALABAMA) L.L.C.
- 31 MT System
- DIPOCO DE TROISISM L.P.
- 35 Trinity System
- ENBRIDGE PIPELINES (ALABAMA INTRASTATE) L.L.C.
- 34 Magnolia System
- ENBRIDGE OFFSHORE PIPELINES (ETOS) L.L.C.
- 37 U-TOS System
- HOV PIPELINES, L.L.C.
- 41 H. & W. Pipeline System
- ENBRIDGE PIPELINES (ONE TEXAS) L.P.
- 63 Sulphur River System



NEW YORK
ENBRIDGE CORPORATION

- Transmission Lines
- Gathering Lines
- Non-Retail Gathering Lines
- Liquids Lines
- Enbridge Holdings (Offshore) L.L.C.



SYSTEM MAP

ALASKA

COOK INLET SYSTEM

GULF OF MEXICO

EPA Natural Gas Star Program



- Enbridge joined in December 2003
- Environmental Stewardship in our US Operations
- Program benefits the Environment and Enbridge
- Enbridge wanted to immediately have an impact.



Aerial Optical Imaging Project



- Identified several pipelines in our North Texas Assets with high lost and unaccounted for gas
- Contracted Leak Surveys, Inc. to perform pilot project
- Pilot project was very successful
 - 160 miles of pipeline in two days
 - 22 leaks were found
 - 1.4 mmcf/day
- Conducted three more surveys for totals of:
 - 603 miles of pipeline
 - 30 leaks
 - 2.3 mmcf/day

Monthly Surveys



- **Budgeted in 2005 to conduct monthly surveys**
- **Eight separate surveys**
 - Flown 480 miles of gathering and transmissions lines
 - Detected and repaired 25 leaks
 - Estimated 2.74 mmcf/day of natural gas
 - Or 2.12 mmcf/day of methane

3.7 mcf/hr Leak Rate



7.0 mcf/hr Leak Rate



3.4 mcf/hr Leak Rate



7.7 mcf/hr Leak Rate



4.0 mcf/hr Leak Rate



4.0 mcf/hr Leak Rate



4.0 mcf/hr Leak Rate



Future Plans



- **Continue monthly aerial surveys**
- **Pilot Project for leak detection and repair at a Plant and a Compressor Station**
 - **Scheduled for November 2005**
 - **Evaluate success of pilot project**
 - **Leak Measurement**

Summary



Optical Imaging is a cost effective method of performing leak surveys which can supplement or replace traditional pipeline leak survey methods. Enbridge will continue to utilize this technology throughout our operations to locate sources of gas loss on pipeline systems.