

"BLASTING ON THE IROQUOIS TRAIL"

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Rare indeed has a major cross country natural gas pipeline met and surmounted such obstacle as the Iroquois Gas Transmission Line from Canada to Long Island, New York. Of the 370 miles long length a fair estimate has been that 1/3 or 122 miles were across rock country. Spread One, Four and Five were particularly difficult. It is estimated that over 75% of the required blasting was on those three spreads. The term "spread" goes back to the old term of describing a ranch.

On Slide number 1 the lengths rare given of the six main line spreads (those on land) and the distance across Long Island Sound.

Spread One	74.3 miles
Spread Two	76.8 miles
Spread Three	78.7 miles
Spread Four	56.0 miles
Spread Five	50.0 miles
Spread Six	9.0 miles
Long Island Sound	20.3 miles

Slide 2 provides some statistics. There was a recognized need for natural gas in the entire New England area to decrease its dependence on imported oil. For example, the gas will replace an energy equivalent of 30 million barrels of oil annually. Sulphur emissions will be reduced by 76,000 tons a year.

Of course, such a massive undertaking has a high price tag - in this case \$583 million dollars.

A map at this point shows the line's route from Canada down through the state of New York and Connecticut and across Long Island Sound onto Long Island, New York. A 75 ft. wide right of way (R/W) had to be blasted to grade before any attempt was made to drill and shoot the ditch line. In most instances the ditch (payJ measured 4 ft. wide by 7 ft deep. Whenever possible dirt was emplaced by back hoe to control fly rock. At highway crossings and where close to homes or other structures rubber blasting mats were used as well.

Heavily wooded areas throughout the line's route concealed hard to frill and blast rock formations. Drill patterns and explosive loading were established for the right of way

blasting and for the ditch line shooting. The hydraulic drills were hard pressed to stay on the rough terrain and still maintain reasonable drill patterns. The hard granite gneiss that predominated in the first 70 miles of the Iroquois line tested the metal of the drillers.

A good part of the line was shot with a two row ditch, (two feet subdrill). At any bend (combination of side bend and vertical bend) the familiar diamond pattern was used; this in effect is actually a three row ditch. The wider ditch is required in these cases because the pipe as bent describes an arc rather than a sharp angle.

Drill patterns were established also for the right of way blasting.

On some portions of Spread 4 and 5 the line occupied the same R/W as high voltage transmission lines. That imposed rigid blasting controls since in many instances the R/W was graded on a bi-level, (in pipeline jargon a two toned R/W). To a lesser extent the power lines posed a problem on the other spreads.

The Iroquois line passed by land fill, struck across golf courses and went underneath inter-state highway. The contractors utilized equipment and personnel and were able to successfully meet their production schedule.

Contractors involved:

Spread One:	Murphy Brothers, East Moline, Illinois
Spread Two:	Latex Construction Company, Conyer, Georgia
Spread Three:	Southeast Pipeline, Scottsdale, Arizona
Spread Four:	Murphy Brothers, East Moline, Illinois
Spread Five:	Michael Curran, Otis Eastern Joint Ventures, Houston, Texas
Spread Six:	Michael Curran, Otis Eastern Joint Ventures, Houston, Texas
Long Island Sound:	Great Lakes Dredge and Dock, Staten Island, New York
St. Lawrence River:	Pentzien, Inc., Omaha, Nebraska
Hudson River:	Pentzien, Inc., Omaha, Nebraska
Mohawk River:	Pentzien, Inc., Omaha, Nebraska
Houstonic River:	Murphy Brothers, East Moline, Illinois

The major river crossings; St. Lawrence, Mohawk, Hudson and Houstonic, (directional drilled) were in many respects treated as spreads with their own specialized requirements of men and equipment.

Blasting vibrations were maintained at 2 in/sec (PPV) or less and where residents adjacent to the R/W had water wells, those wells were examined before any blasting activity for water flow and water quality. These tests were repeated after cessation of blasting.

In addition to crossing the St. Lawrence River, the line had other major river crossings, the Hudson, Mohawk and Houstonic Rivers. The line also crossed Long Island Sound for a distance of 20.3 miles.

Natural gas will be delivered to Iroquois customers throughout the system by November, 1992. A boon to all who have been dependent on imported oil for their energy requirements.