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Pipeline Blowdowns - Distribution



Dennis Ruppert

11/10/16



Who is National Grid - UK

UK Electric



UK Gas

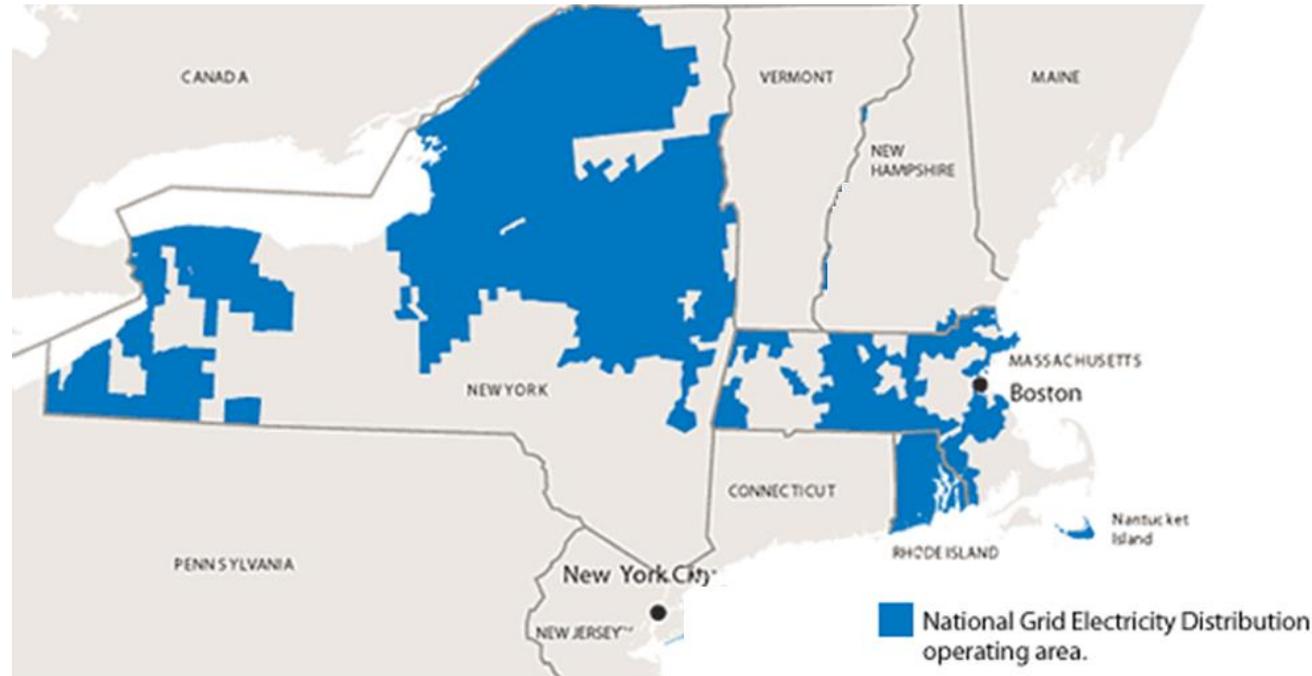


11 Million UK Customers



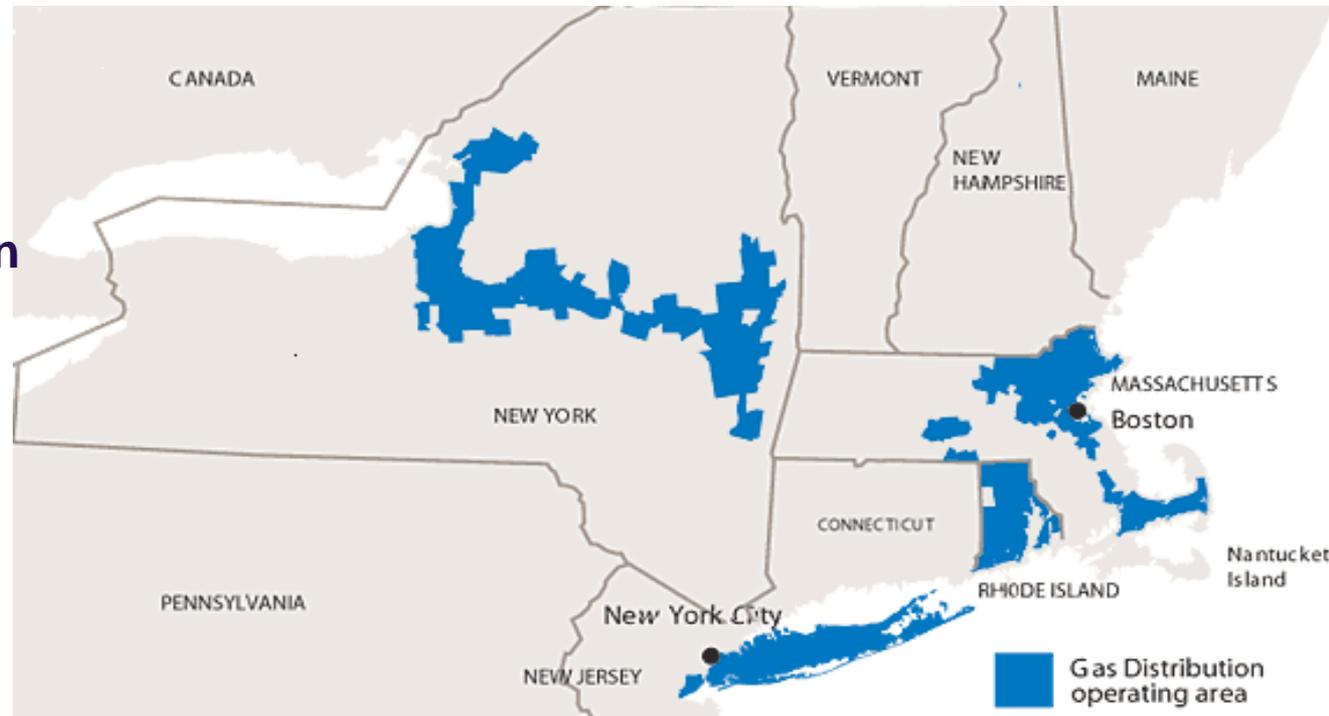
Who is National Grid - US

- **US Electric**
- Over 10,000 miles of electrical transmission network
- 680 substations
- 4.4 Million Electric Customers
- 122,000 miles of distribution network
- 6,650 MW of generation



Who is National Grid - US

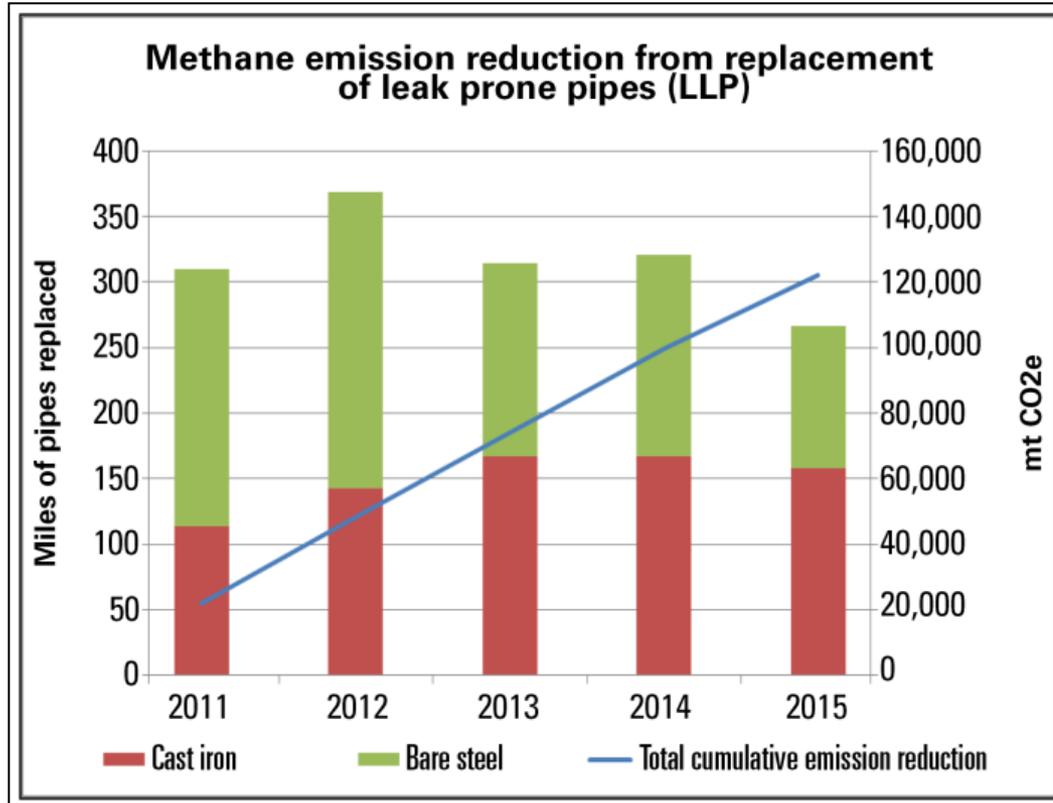
- US Gas Distribution
- 4,300 miles of high pressure transmission pipe
- Over 3.4 Million Customers
- 32,000 miles of main
- 7 Costal Terminals
- 26 Compressor Stations



Statement

National Grid is committed to promoting environmental sustainability by adopting best practices in resource management and implementing mitigation and adaptation measures. The company is committed to a target of reducing greenhouse gas (GHG) emissions from its operation by 80% by 2050, and reducing methane emissions is an integral component of that target and National Grid's overall climate change strategy.

Reduction from Main Replacement



Aging Infrastructure

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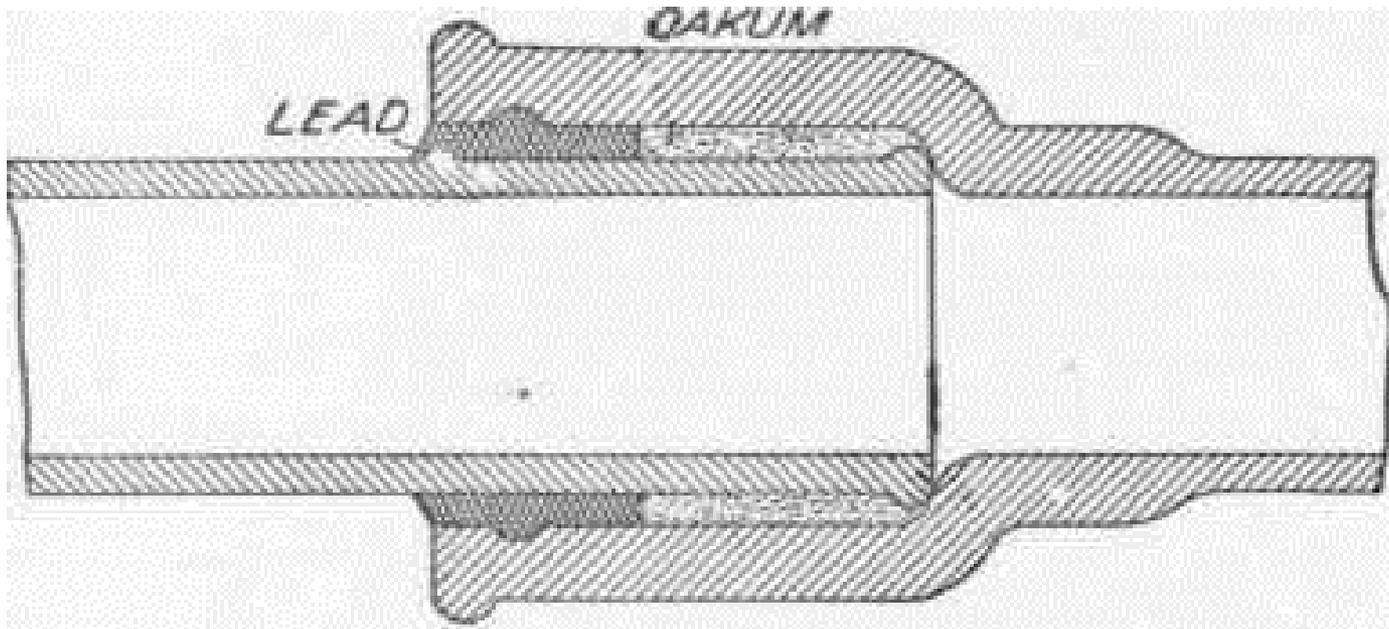


Aging Infrastructure

The company has committed to increasing the rate of leak prone pipe renewal to reduce methane emissions and the risk of leaks.



Joint Configuration



Technology Solutions

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Cast Iron Sealing Robot - CISBOT

CISBOT TOOL HEAD

FORWARD LIGHTS

EXTENSION ARM

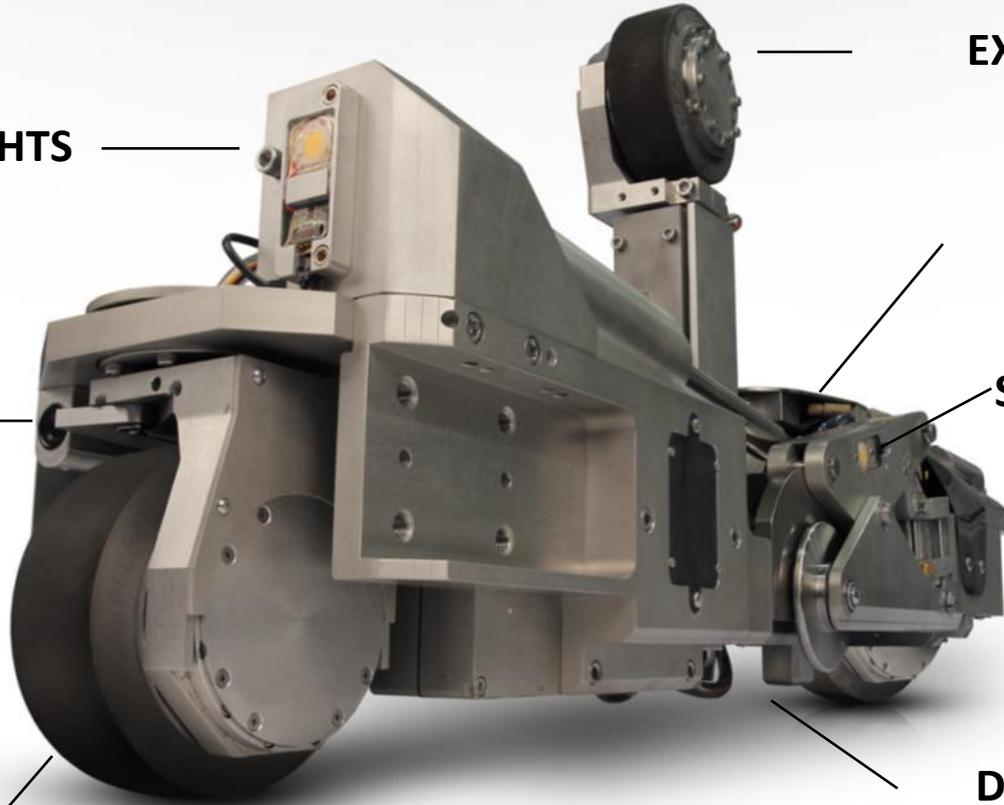
TOP LIGHTS/CAMERA

SIDE LIGHTS/CAMERA

FORWARD CAMERA

**DRILLING/INJECTION
ASSEMBLY**

**DRIVE WHEEL WITH
INTERNAL MOTOR**



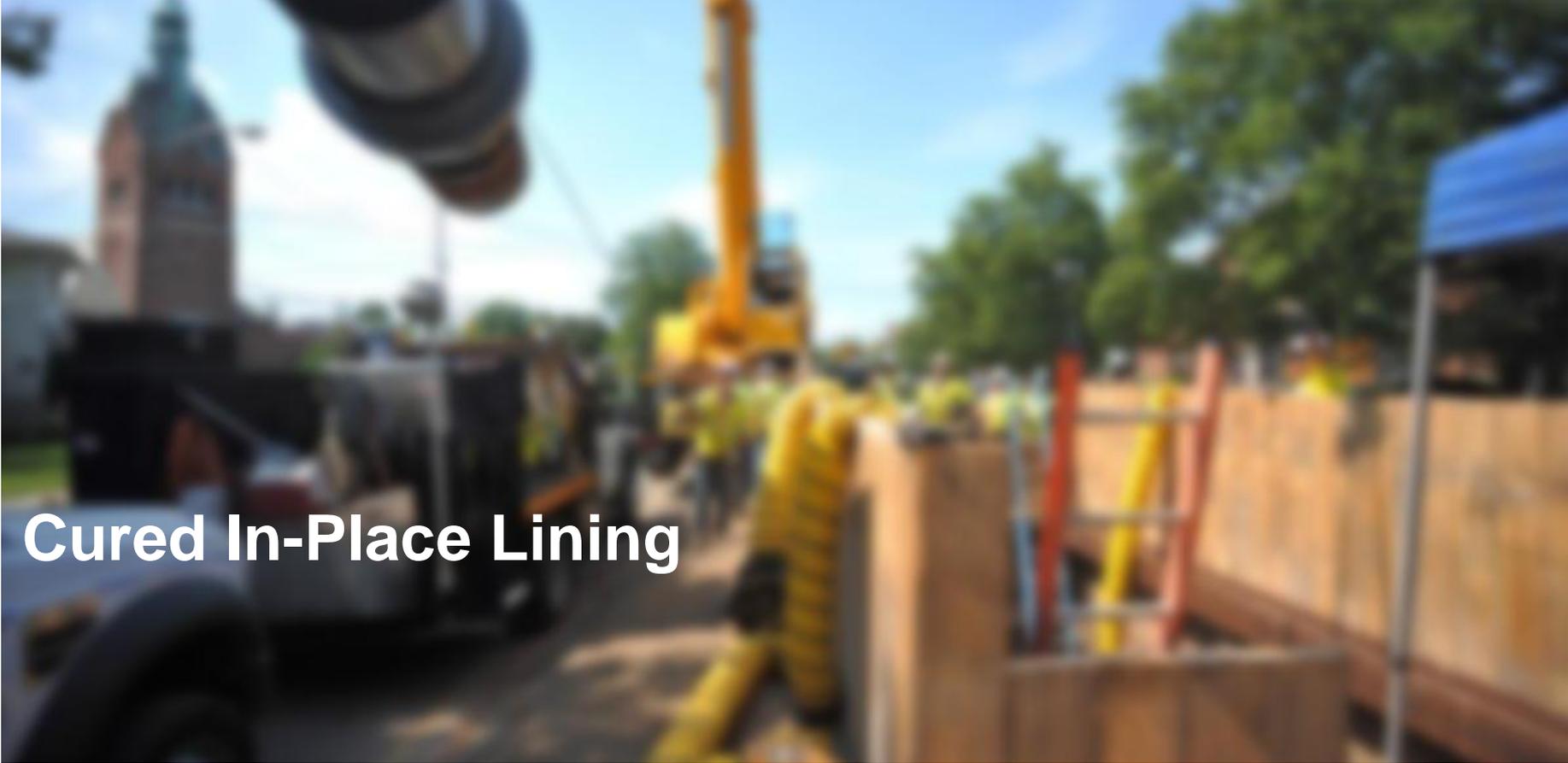
CISBOT

- Live Gas operation
- Small foot print - From one excavation it can seal 120 Joints
- Precise – monitored drill pressure and sealant flow rate
- Seal all the joints, including joints with existing leaks and prevents future leaks



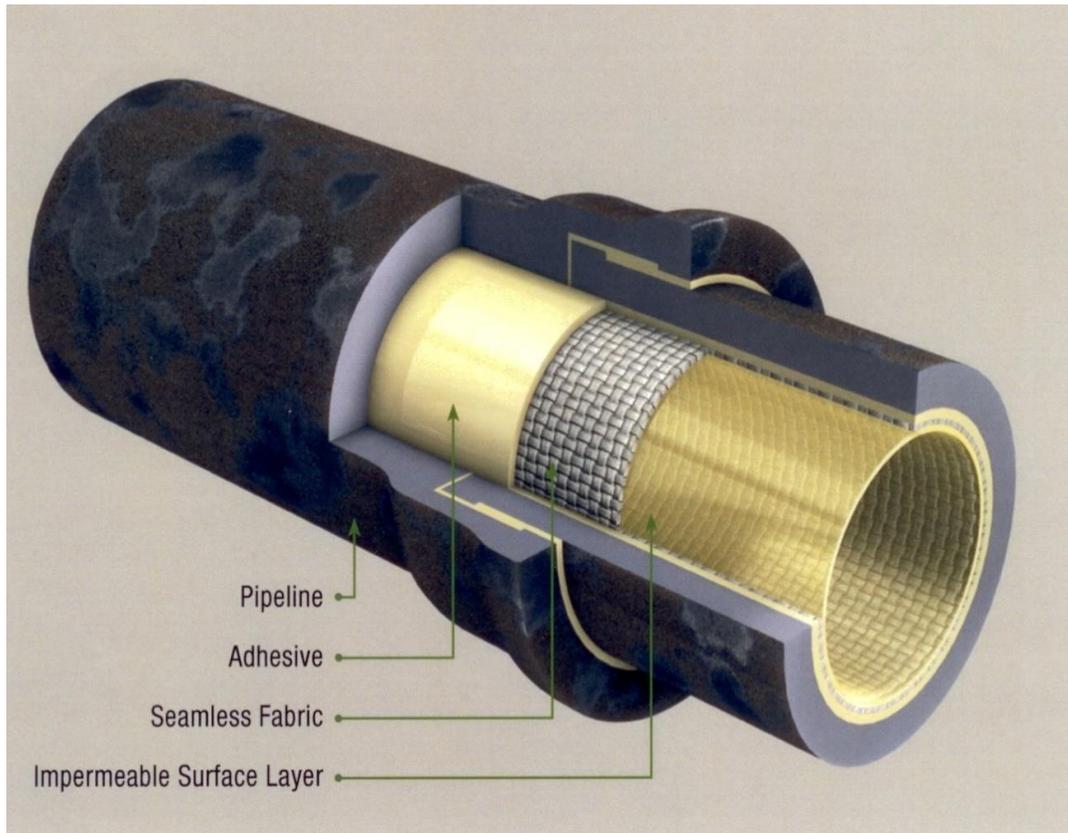
Technology Solutions

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Cured In-Place Lining

Cured In-Place - Starline 2000 Liner



The liner is a seamless/joint-less circular woven fabric-hose made of polyester yarns and a plastic coating (PU/PE) which is bonded as inner liner into the host pipe using a solvent-free two-component adhesive.

CIP - Starline 2000

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Drawdown Compressor

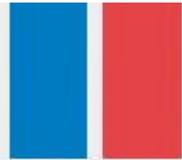
National Grid Process

- Original Process
 - Isolate pipelines
 - Blow gas off to the environment
- Current Process
 - Vent as little gas as possible
 - Isolate pipelines
 - Reduce pressure by feeding customers
 - Use the Grimmer Schmidt compressor to remove remaining gas

Grimmer Schmidt

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**GrimmerSchmidt
Compressors**

**MonoBlock Series
Model NGG 351-41
Natural Gas Well Booster**

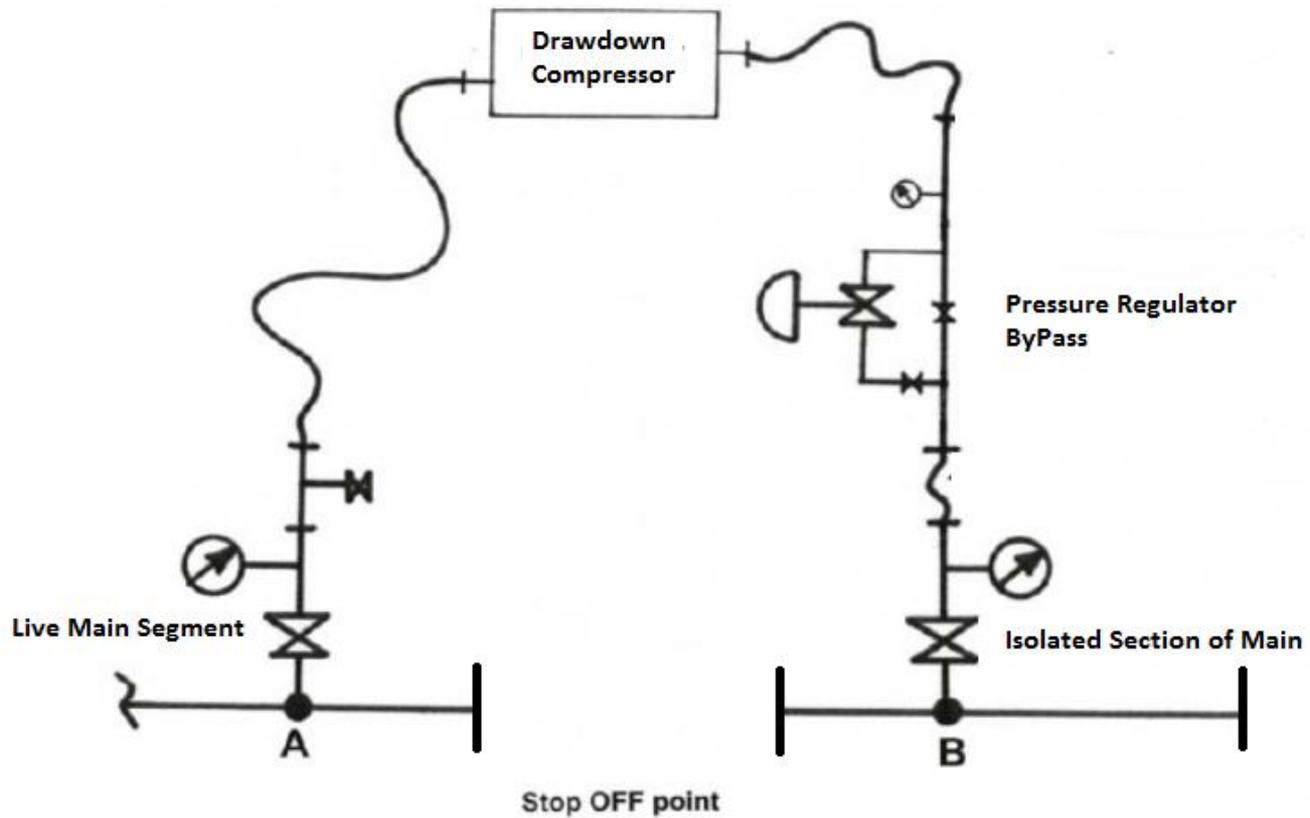


Grimmer Schmidt

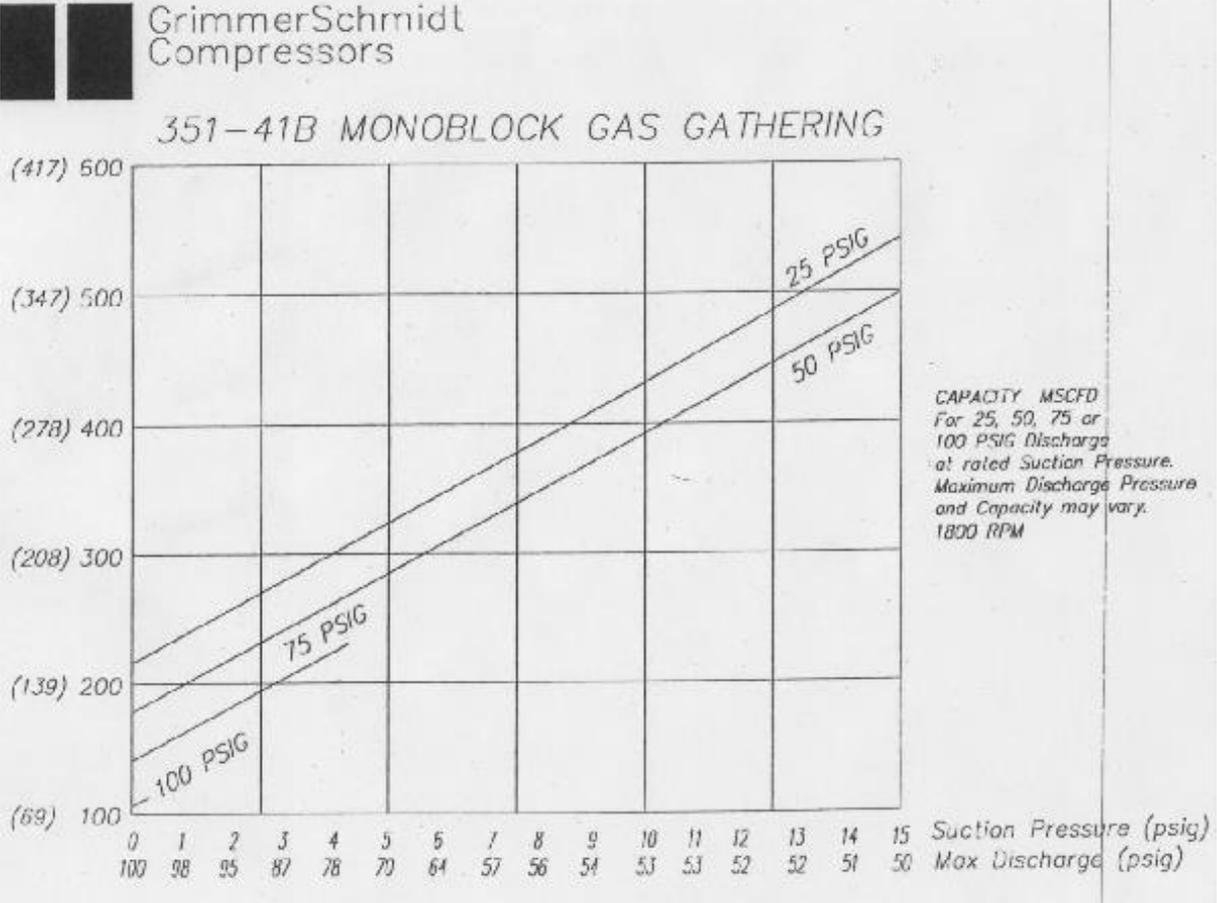
Suction Pressure From	0 psig to 15 psig
Discharge up to	100 psig
Gas Production Volumes to	575 MSCFD
Booster Type	Model NGG 351-41
	Single Stage
	4 Cylinders
	Reciprocating
Engine	Ford V351
Operating Range	1000-2400 RPM
Weight (Gross).....	1500 lbs.



Drawdown Compressor



Grimmer Schmidt



Program Status

- Grimmer Schmidt sold to Chicago Pneumatics in 2010
 - Looking for additions and replacement solutions
- Higher discharge pressure
 - Transmission pressure application with no lower pressure mains in the area
 - Ability to store gas in trailers

Questions

