

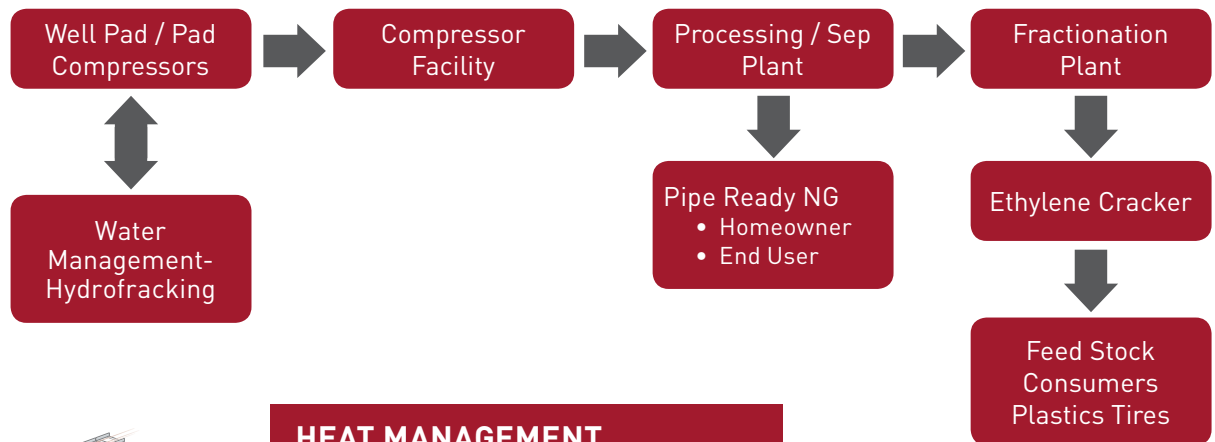
# SHALE GAS INDUSTRY HEAT MANAGEMENT SYSTEM



Shale gas production has been rapidly growing due to advances in technology for horizontal drilling and hydraulic fracturing. Pentair Industrial Heat Tracing Solutions is a solutions provider of Heat Management Systems to the shale gas marketplace. We have provided expertise in the design, material supply, and installation of thousands of feet of thermally protected pipe and process equipment to this industry.

Pentair has partnered with some of the largest energy companies in the marketplace to offer various levels of expertise and support in managing their heating needs.

## SHALE GAS – WELL PAD TO MARKET



## HEAT MANAGEMENT APPLICATIONS

Pentair offers freeze protection and process heating as a complete heat management system for a variety of operations related to the production of shale gas.

### Well Pads and Pad Compressors

- Hydrofrac process requires an average of 4.5 million gallons of water per well
- Impound hydrants—frac water reservoir—“frac ponds”
- Source hydrants—water source—rivers, streams
- Pad compressors—water “dehy” drain lines, glycol lines, and lube oil

### Midstream Compressor Facilities

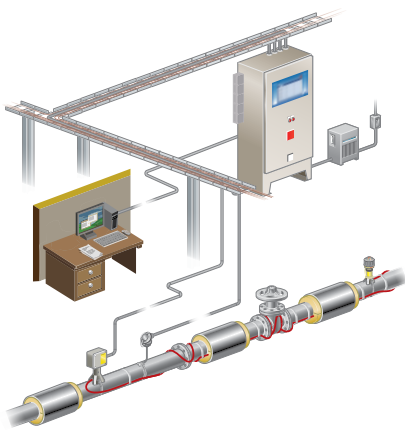
- 10-40 mile intervals along pipeline
- Freeze protection of “dehy” drain lines, scrubbers, fuel oils, LP/HP liquid drains
- Average booster compressor facility has a need for 4,000’-5,000’ of EHT and insulation
- Separation process removes water and hydrocarbons—“dehydes”, scrubbers, and filters

### Processing / Fractionation Plants

- Dehydration—remove water from gas stream using agent—glycol absorption
- Separation and fractionation
- Absorption process—oil bonds in absorption tower
- Cryogenic process—condense the NGLs at -120°F while methane remains gas

### Ethylene Plants

- Ethane from Frac plant gets made into ethylene and polyethylene which is a feed stock for many industries—plastics, tires, pipe etc.



Integration of Heat Management System consists of:

- Engineered Systems
- Heating Source
- Utility distribution
- Control and Monitoring
- Thermal Insulation
- Testing commissioning and Start-up Support



#### NORTH AMERICA

Tel: +1.800.545.6258  
 Fax: +1.800.527.5703  
 Tel: +1.650.216.1526  
 Fax: +1.650.474.7711  
 thermal.info@pentair.com

#### EUROPE, MIDDLE EAST, AFRICA

Tel: +32.16.213.511  
 Fax: +32.16.213.603  
 thermal.info@pentair.com

#### ASIA PACIFIC

Tel: +86.21.2412.1688  
 Fax: +86.21.5426.2937  
 cn.thermal.info@pentair.com

#### LATIN AMERICA

Tel: +1.713.868.4800  
 Fax: +1.713.868.2333  
 thermal.info@pentair.com

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