

Competitive Operation of Gas and Electric Compressor Stations

February, 2009

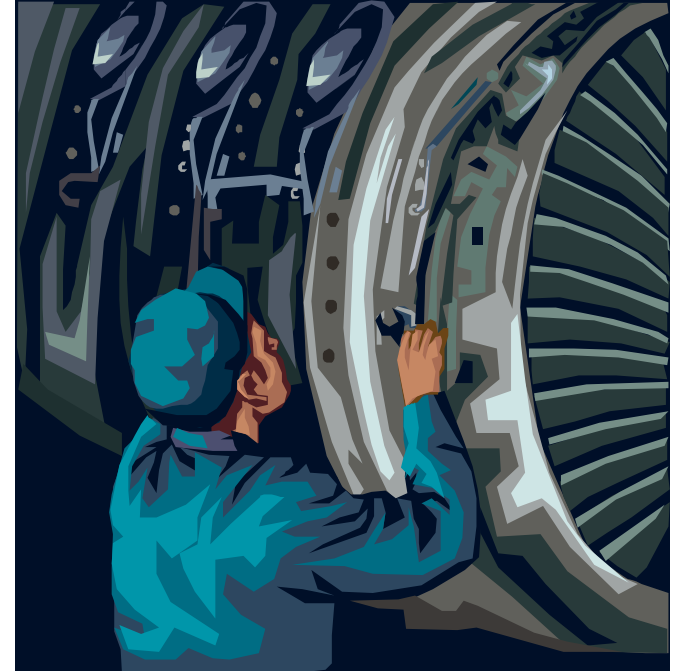
Larry Bowden, Williams Gas Pipelines

Summary of topics to be discussed...

- Differentiation of mainline and booster compressor stations
- Characteristics of gas versus electric compressor operation depending on the compressor station type
- Favorable types of electric contracts for electric compressors based on the operating compression characteristics
- Considerations of operating gas versus electric compression based on station characteristics



- Mainline
 - Larger horsepower available
 - Operate as first on last off
- Booster
 - Provide incremental horsepower
 - Operate as last on and first off
- Others
 - Lateral, storage, and alternate compression will not be discussed in this presentation



- **Mainline Stations**
 - Infrequently shutdown completely
 - Designed as the main compression source
 - Frequently these stations require employees to be onsite 24/7
- **Booster Stations**
 - Frequently shutdown and started up
 - Often easier and faster to startup than mainline stations
 - Designed as incremental horsepower
 - Often designed to not require an onsite employee available 24/7



■ Mainline Stations

- Compressors operate throughout the year
- Compression favors fixed price contracts to reduce the risk of operating during high electric prices
 - Compressors may speed up or slow down during periods of high and low energy prices if they are on a index price contract

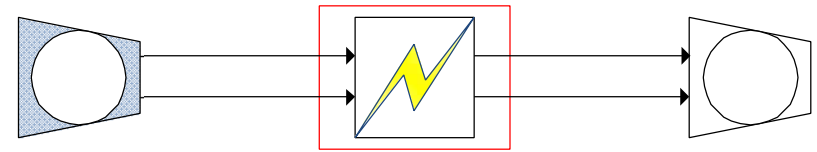
■ Booster Stations

- Operate sporadically to assist mainline compression
- Favors index pricing contracts when compression can offset mainline compression during off peak hours
- Favors fixed pricing contracts when compression runs primarily during peak hours

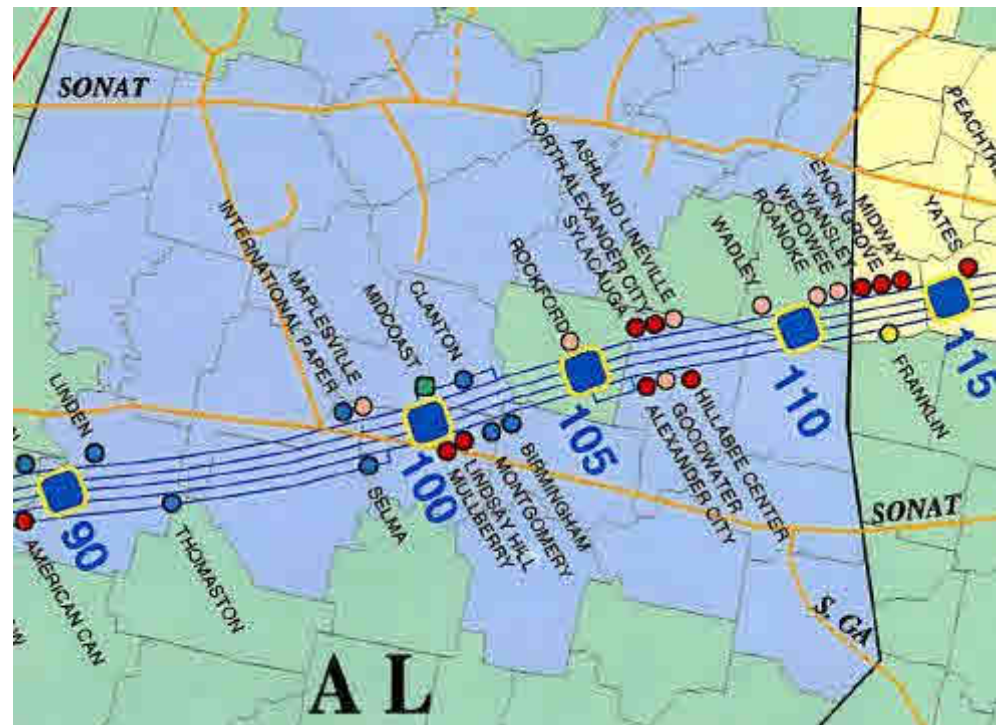


Mainline Station Electric Compression Profiles

- Best profile for index price contracts
 - Energy can be reduced by increasing compression elsewhere during peak pricing periods

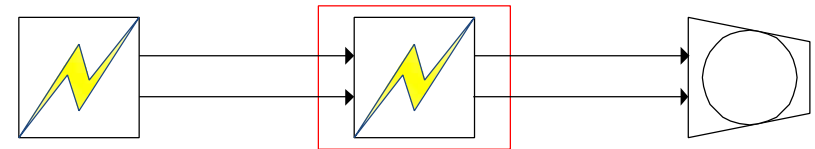


- Example Station 100
 - 14,000 HP
 - 8,000 peak kW
 - \$50,000 Estimated Annual Tracker Savings

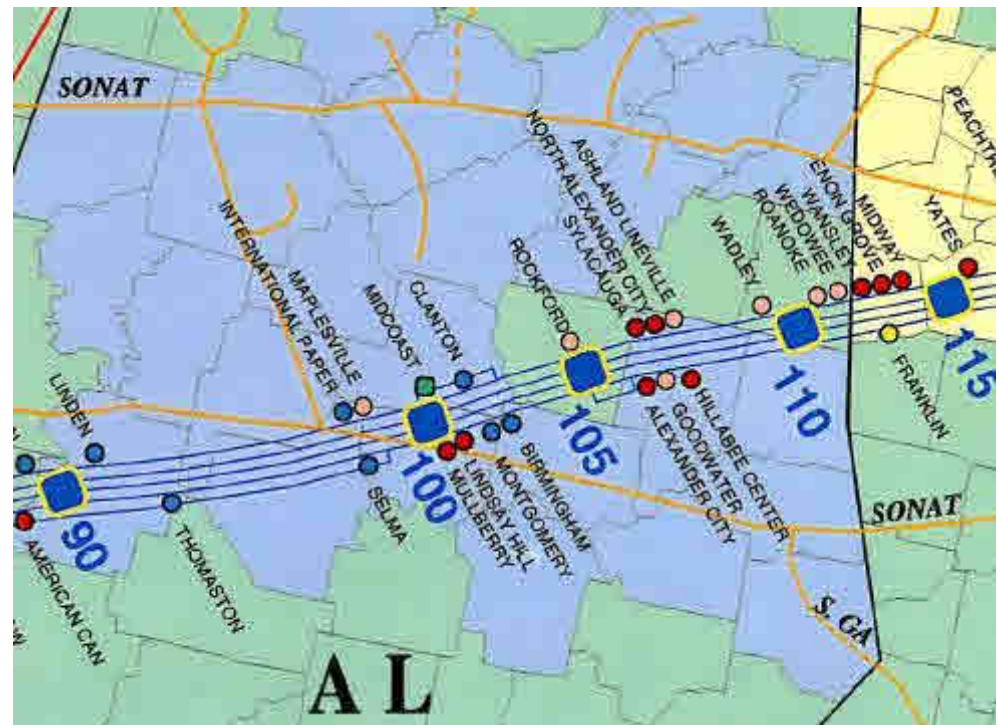


Mainline Station Electric Compression Profiles

- Best profile for fixed price contracts
 - Energy cannot be reduced by increasing compression elsewhere, or compression must run during peak hours



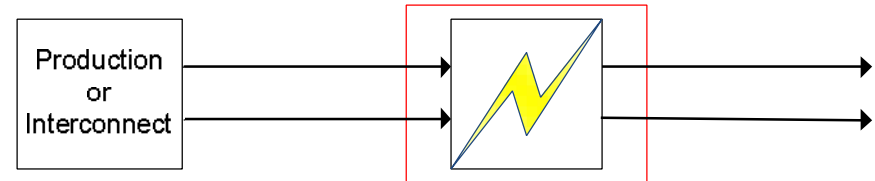
- Example Station 100
 - 53,200 HP (FERC Filed)
 - 39,900 peak kW
 - \$770,000 Estimated Annual Tracker Savings



Booster Station Electric Compression Profiles

- Best profile for index price contracts

- Compression can be reduced during peak hours
- Either the pipeline can handle linepack swings or power can be reduced by increasing compression elsewhere



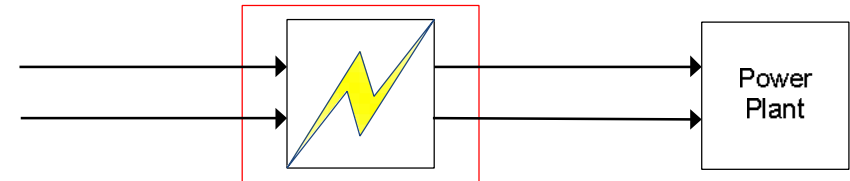
- Example Station 35

- 10,000 HP
- 14,900 peak kW
- \$75,000 Estimated Annual Tracker Savings

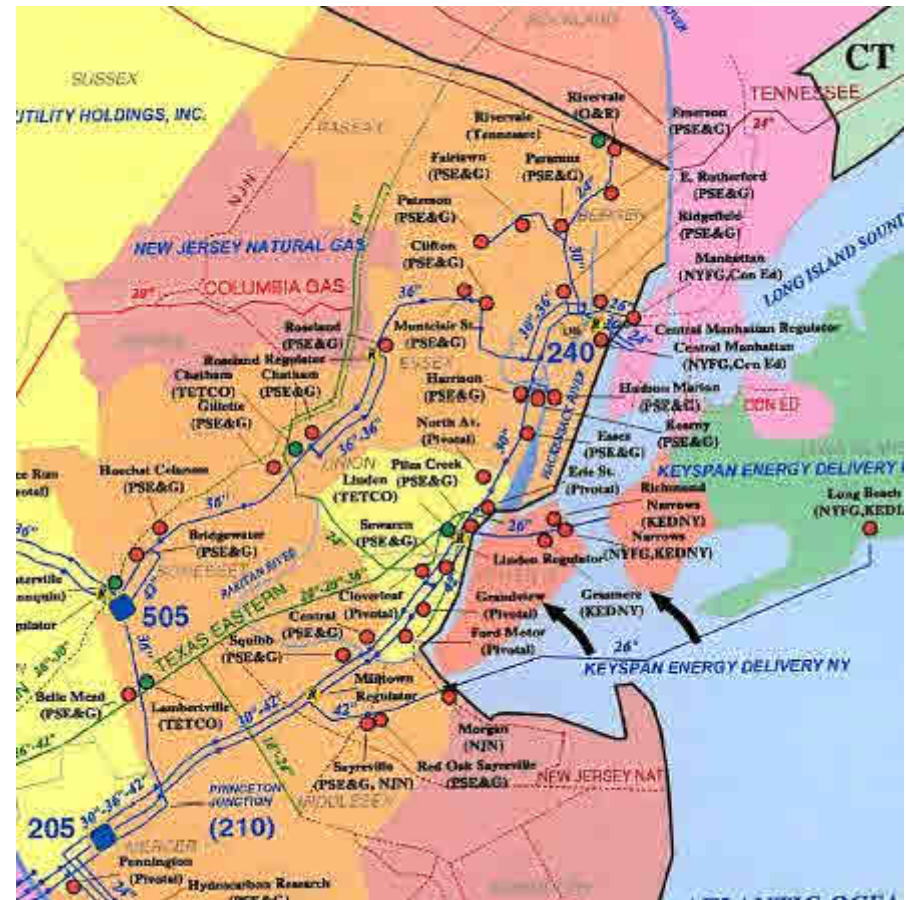


Booster Station Electric Compression Profiles

- Best for fixed price contracts
 - Compression tends to operate mainly during peak hours
 - No ability to reduce energy by increasing compression elsewhere



- Example Station 205
 - 30,000 HP
 - 23,500 peak kW
 - \$105,000 Estimated Annual Tracker Savings



■ Gas Compression

- If backup generators are available, check to see if your electric service provider offers any type of load curtailment program
- Consider automated activation of backup generation from your electric service provider

■ Electric Compression

- Consider enrolling in Emergency Interruptible Load type programs if the compression is not essential for 24 / 7 pipeline operation
 - Be sure to consider any consequences of shutting down electric compression for the maximum contract period



Any questions or
comments?

