

# Electric Compression Project Experience

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# Timeline

- ❖ 2008 – sought electric compression technology to meet emissions and noise constraints
- ❖ 2009 – completed installation of (2) compressors
- ❖ 2010 – additional (6) compressors installed
- ❖ 63,000HP electric compression in service by year end



# Alliance Project

- 69 acre site
- (6) 7,000HP Compressors
- 300MMCFD Compression and treating capacity
- 40,000KW max demand



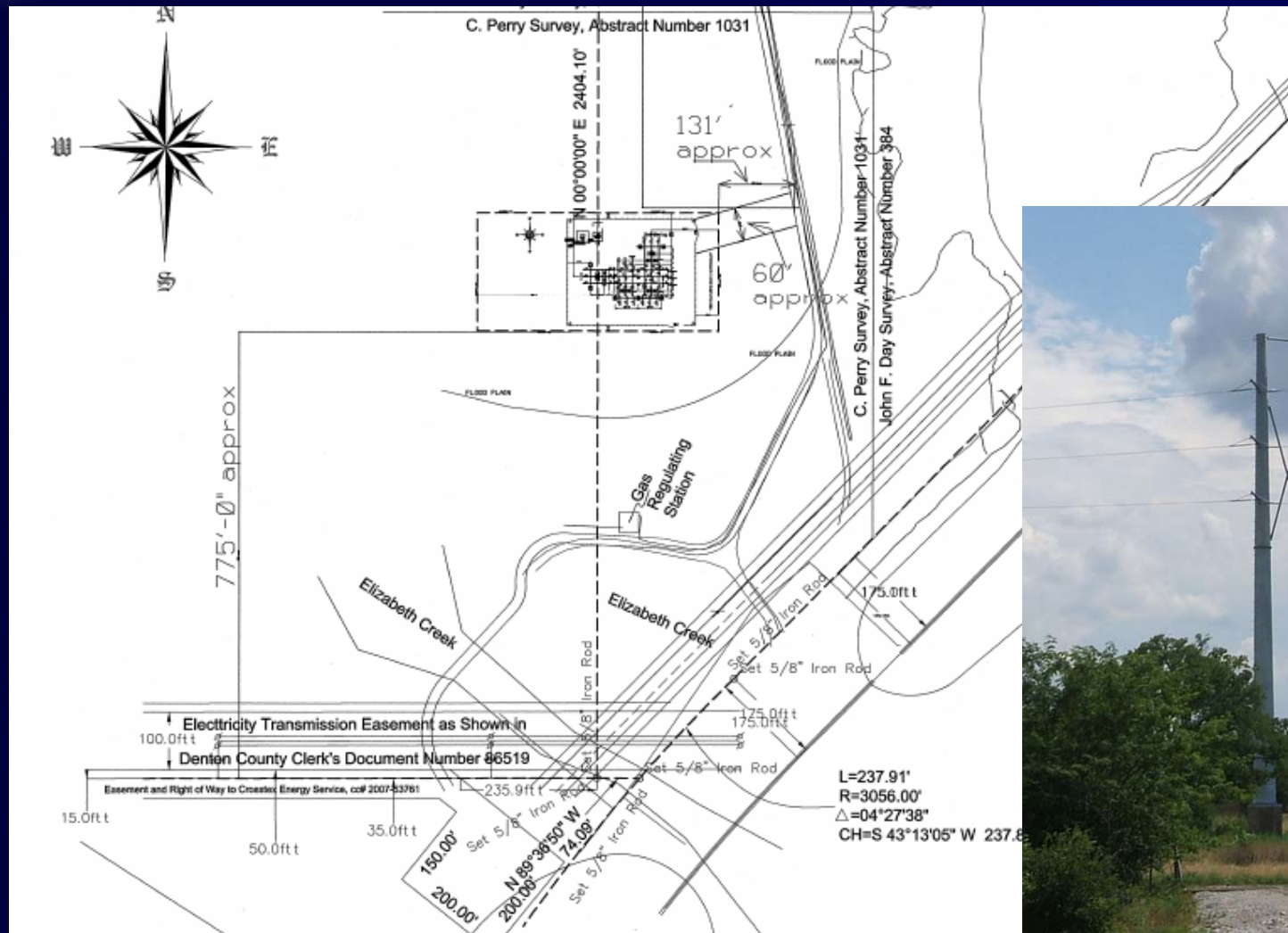
# Site Planning

- Electrical distribution was integral overall site plan
- Met with utility provider early
- Challenging transmission line tie-in
- Need for temporary power during initial phase of project



# Transmission Line Access

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# Temporary Power

- Coop distribution line adjacent to property had spare capacity for (1) electric compressor
- (4) Gas-fired compressors supplemented capacity
- Enabled 1<sup>st</sup> phase of construction (93MMCFD) to enter service 6 months ahead of substation startup
- Coordinated startup of major equipment with coop to insure service reliability



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# Substation



# Electrical Project Scope

- Segment load list by process area
- One line drawing
- Protection scheme
- Procurement
- Substation design
- Distribution plan
- Construction
- Commissioning
- Transfer to Operations (incl. maintenance)





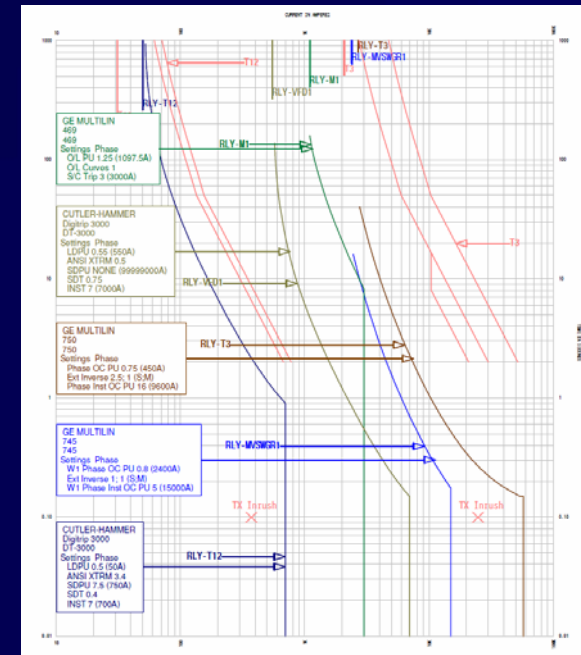
# Equipment Layout

- Access
- Conductor options
  - Poles
  - Bus
  - Cable tray
  - Conduit
- Voltage drop
- Electrical area classification
- Insurance Reqt's



# Protection Scheme

- Critical part of plant design
- Layer protection by voltage level
- Differential relay protection in substation improved operational/maintenance flexibility
- Verified with current simulators (amp buckets)





# Commissioning

- NETA – National Electric Testing Association
  - Standard procedures for verifying suitability to energize power equipment
  - Covers conductors, switchgear, protective relays, transformers, etc
- Use 3<sup>rd</sup> party testing contractors certify equipment
- Track completion of all test reports for final review and approval by construction team
- Commission equipment in segments to reduce complexity
  - Substation (by isolated section)
  - Medium Voltage
  - Motor trains (uncoupled, coupled, loaded)

# Safety

- Hold tailgate meetings prior to startup of each equipment train to communicate hazards
- Label equipment prior to energizing
- Manage startup activities to minimize exposure of personnel



## **WARNING**

### **Arc Flash and Shock Hazard Appropriate PPE Required**

#### **FLASH PROTECTION**

Flash Hazard at 36 in.  
Min. Arc Rating: 4.9 cal/cm<sup>2</sup>  
Flash Protection Boundary: 120 in.  
Glove Class: 1  
Clothing Category: Category 2  
Cotton Underwear + FR Shirt & Pants

#### **SHOCK PROTECTION**

Shock Hazard when cover is removed 4160 VAC  
Limited Approach 60 in.  
Restricted Approach 26 in.  
Prohibited Approach 7 in.

**MV-SWGR1**

# Key Points

- Discuss electric load with the utility provider as early as possible
- Carefully plan equipment layout for current and future needs
- More equipment/complexity with electric compression – detailed commissioning will pay for itself

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