COP Efforts to Reduce Greenhouse Gas Emissions

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San Juan Business Unit

Health, Safety, and Environment

Agenda

- Compressor Optimization (CO_2)
- Energy Efficiency (CO_2)
- Venting Efficiency (CH_4)

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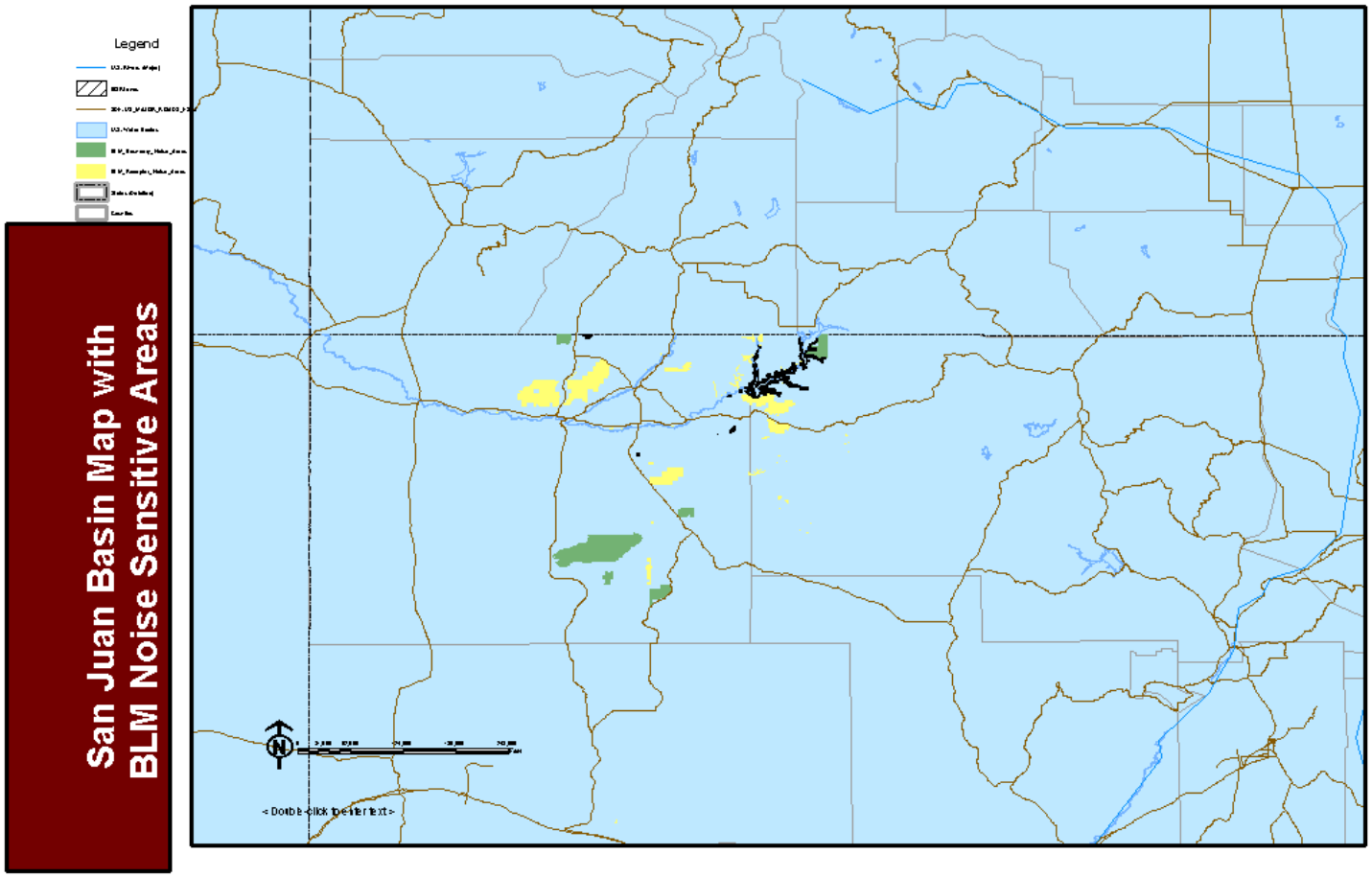
San Juan Basin Map with BLM Noise Sensitive Areas



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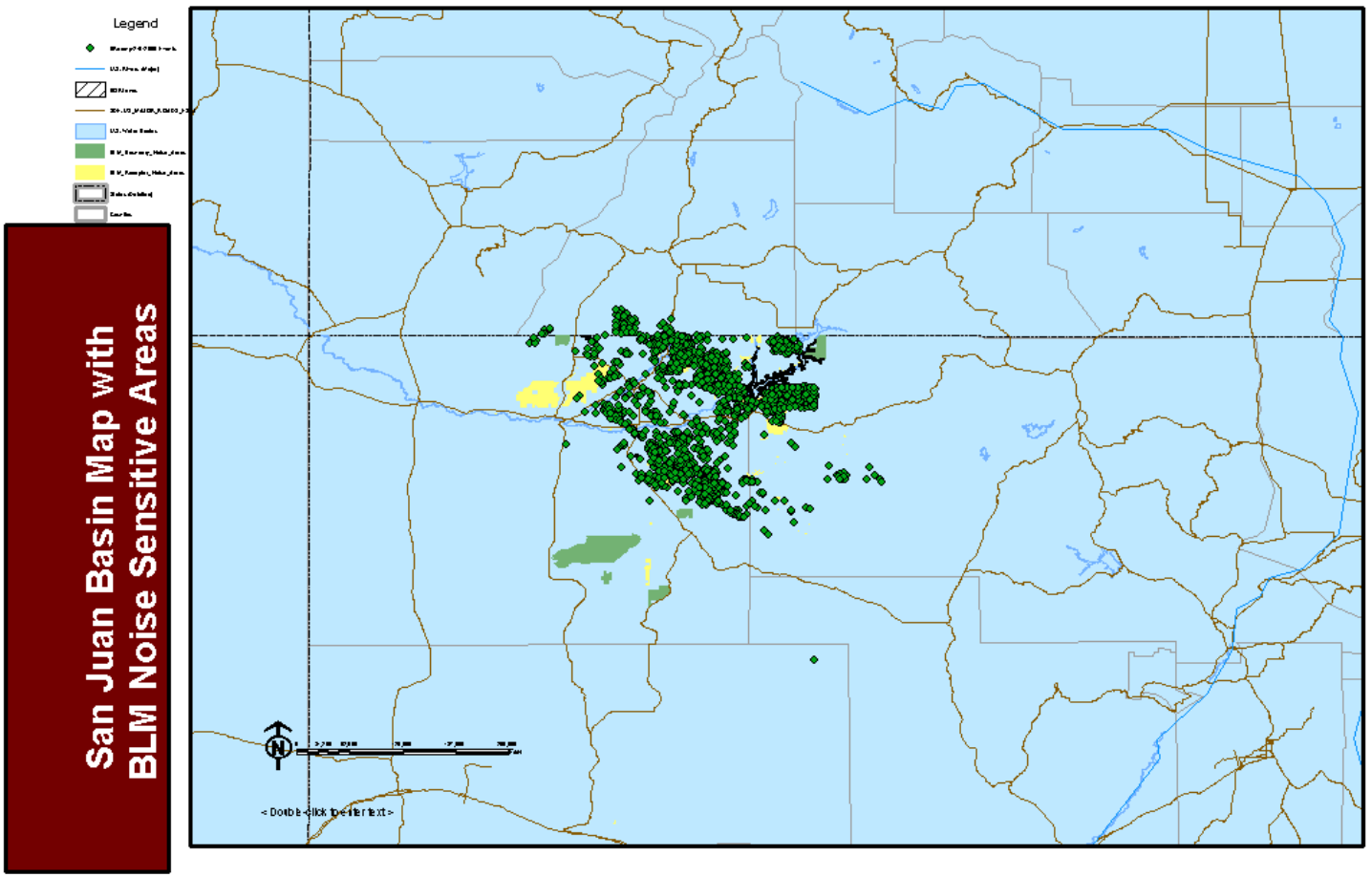

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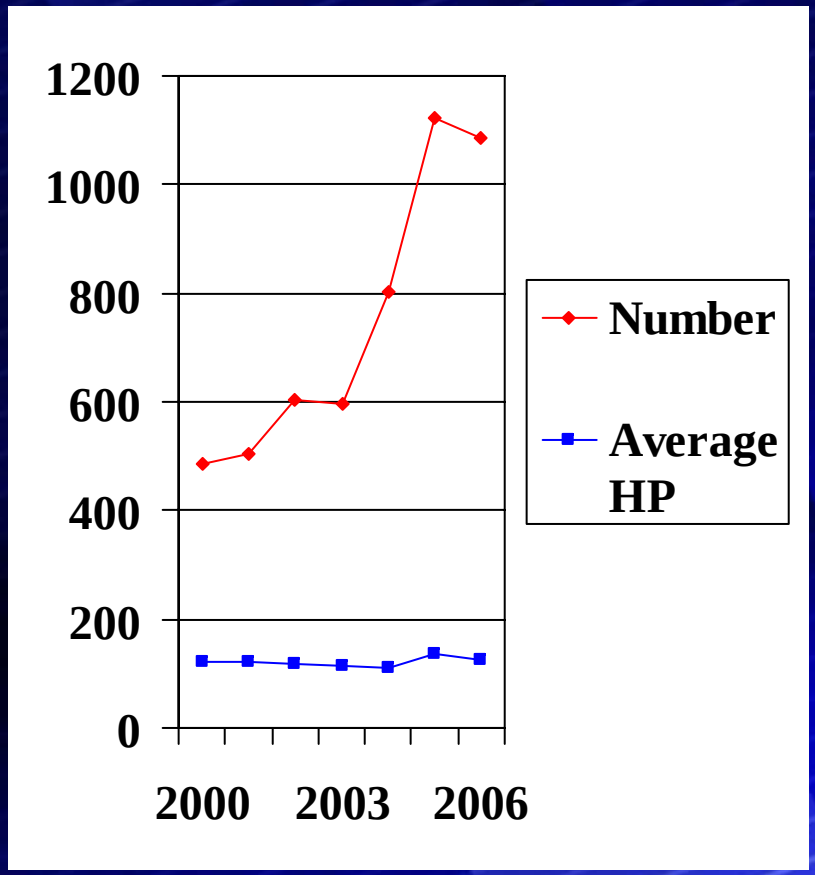
Compressor Optimization

- COP-Owned Compressors
  - In 2000 a COP subsidiary owned approximately 485 units with a mean horsepower of 122.69 bhp.
  - As of February 2006, that same COP subsidiary owned approximately 1087 units with a mean horsepower of 124.37.



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Energy Efficiency

- Estimated Fuel Usage 286 to 500 Bbl Tanks
  - 2.36 MMBtu/day (pilot and burner – assuming a 325,000 Btu/hr burner and 30% run time)
- Separators - 1.8 MMBtu/day (pilot and burner – assuming a 250,000 Btu/hr burner and 30% burner run time)
- Heating is typically required 150 days out of the year during the winter for most sites.
- Some sites require heat year around to avoid solidifying of paraffin.

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Work Performed to Date

The following sites have production equipment insulated:

- Negro Canyon #1 Tank Battery – Five Tanks
- Negro Canyon #2 Tank Battery – Three Tanks
- Cinder Gulch SWD Tank Battery – Five Tanks
- 29-7 #191 Well Location – One Separator
- Elliot Federal #22-1M Well Location – One Separator

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Negro Canyon #1 Tank Battery

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Negro Canyon #1 Tank Battery

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Field Measurement

- Install a connection between motor valve and back-pressure regulator to accommodate Coriolis meter
- Calibration of meter was needed
- Used Coriolis meter to measure the gas rates going through the vent line
- Data Logger collected second-by-second data
- Collected data for about 24 hours on each well
- Pilot group consisted of 4 wells

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Test Procedure – Coriolis Meter

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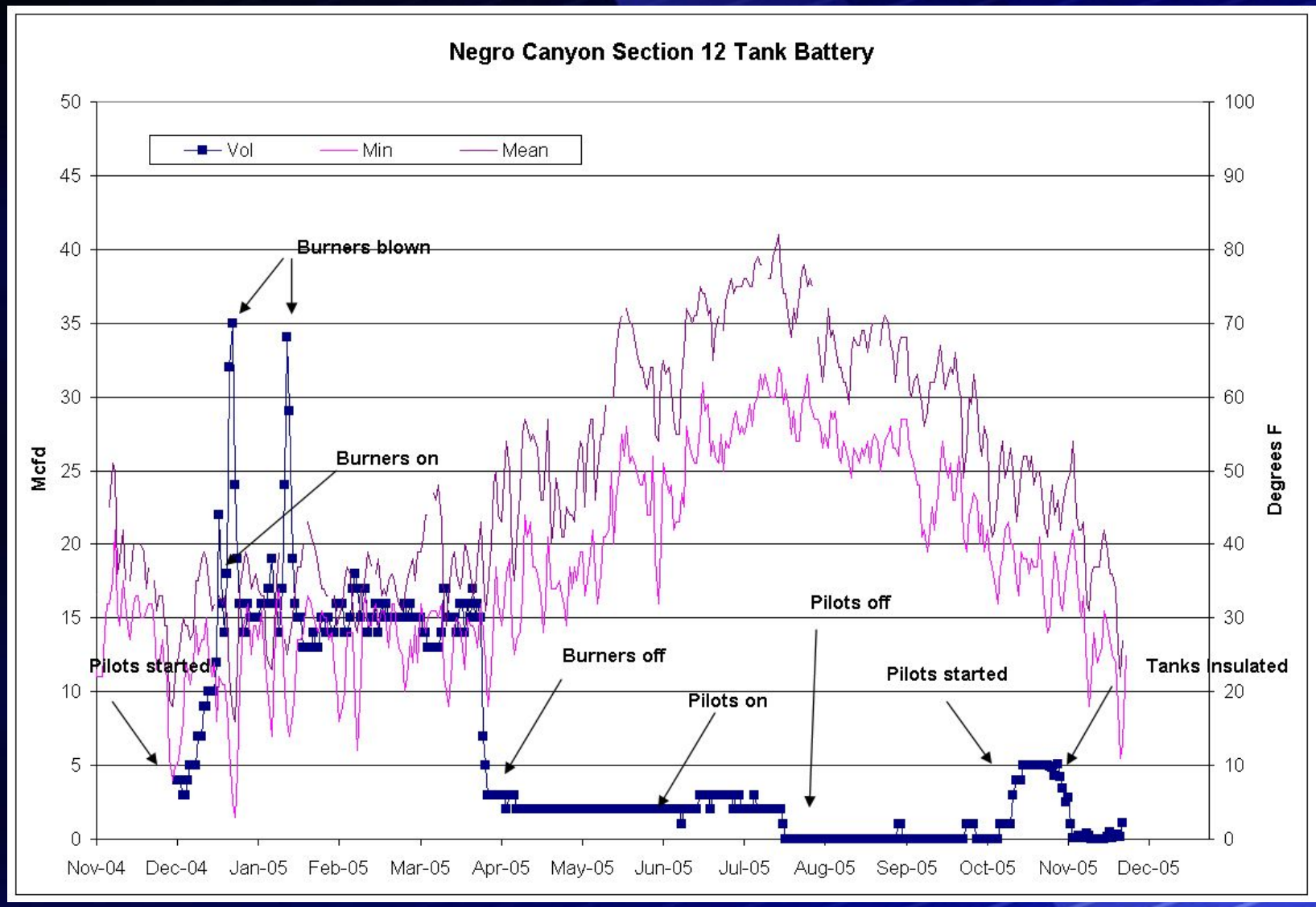

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Negro Canyon #1 Tank Battery

Emissions Reductions

Fuel Saved: 2.36 MMbtu/day per tank (total fuel savings for five tanks is 11.8 MMBtu/day = 1770 MMBtu per year

CO_2 Emissions Reductions: 1770 MMBtu/yr x 120 lb CO_2 /mmBtu = 212400 lbs CO_2/yr or 106 tpy

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Elliot Federal #22-1M

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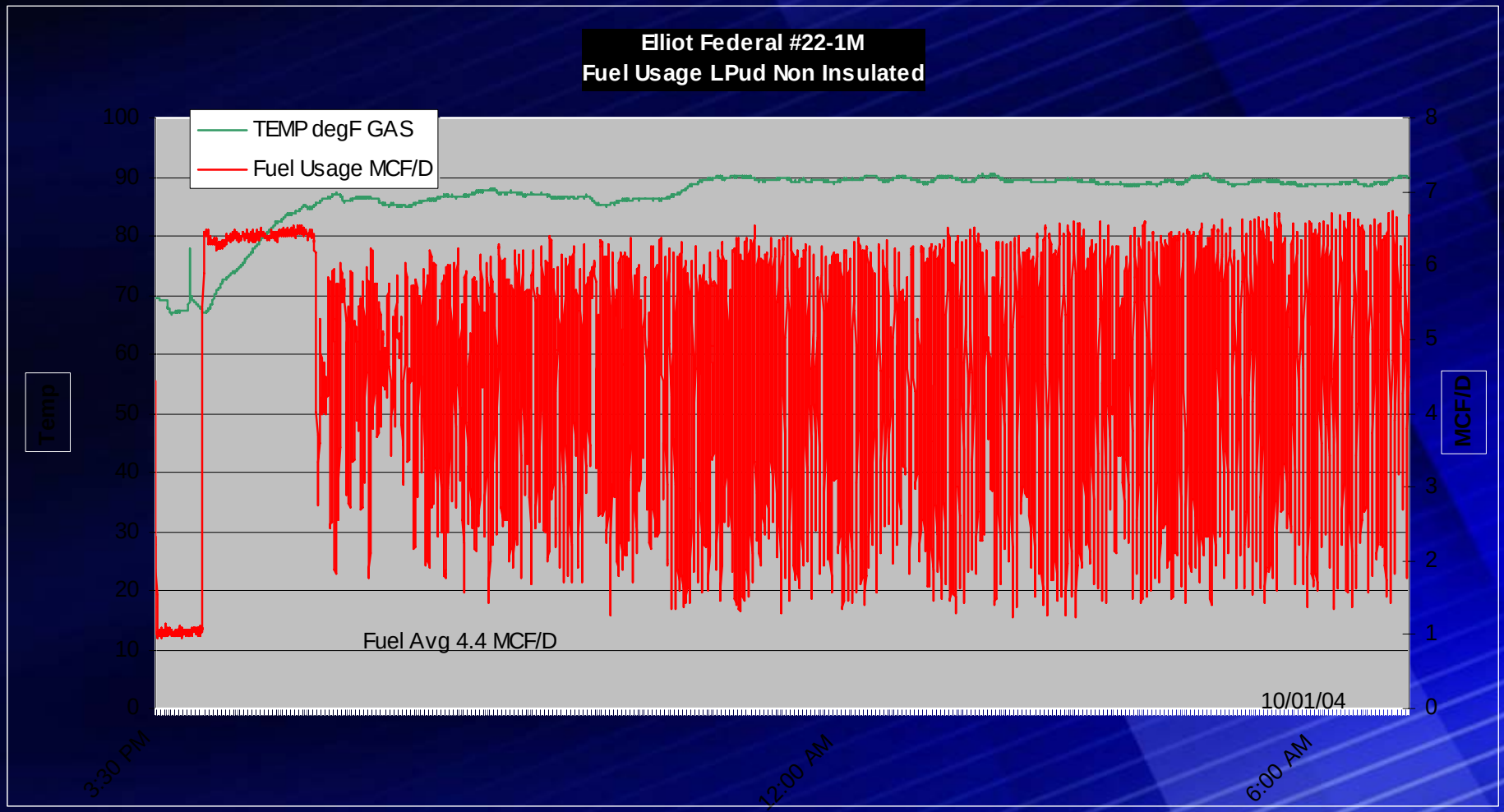
Elliot Federal #22-1M



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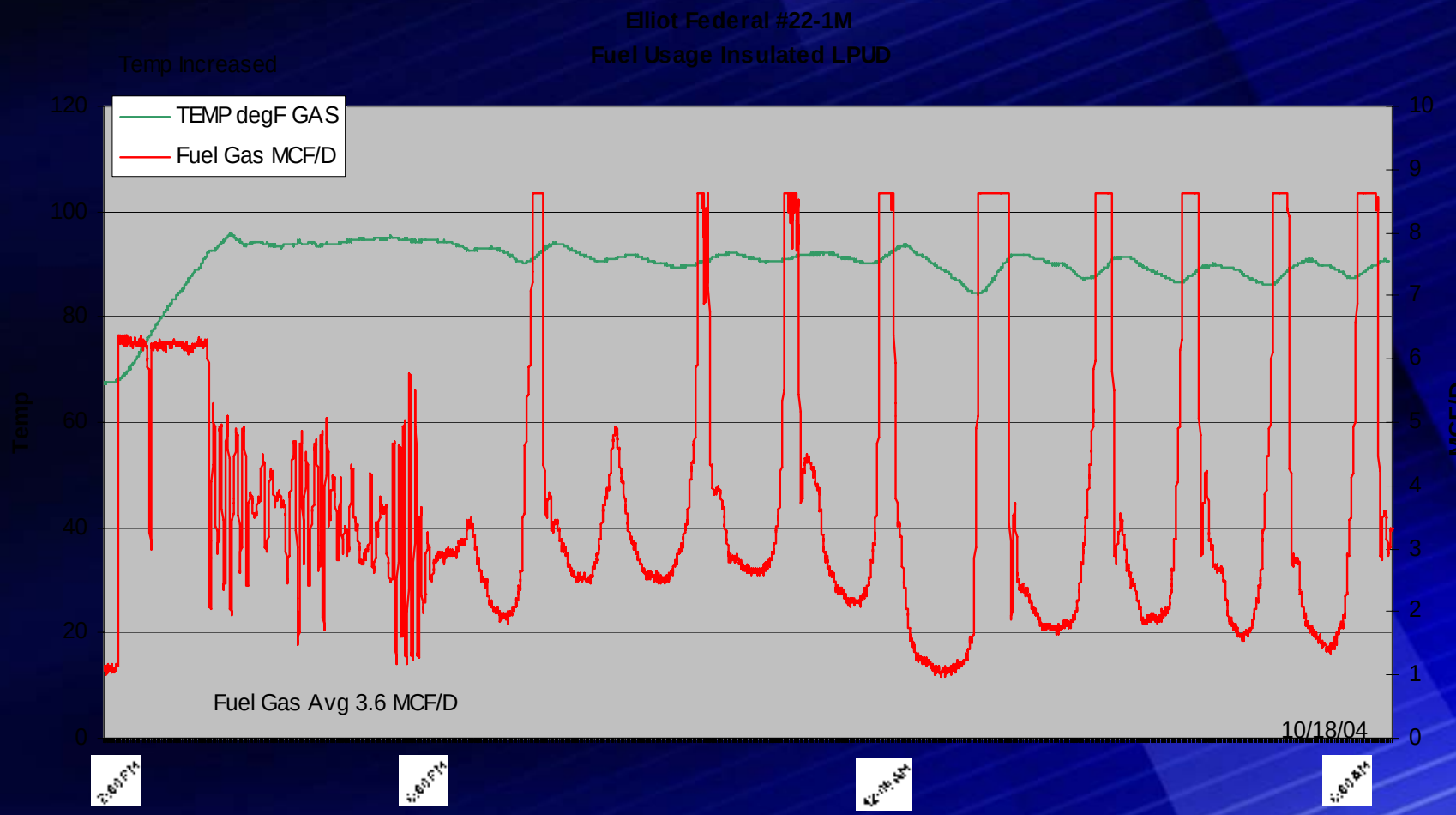
Elliot Federal #22-1M



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Elliot Federal #22-1M Emissions Reductions

Total Fuel Saved: 0.8 MMbtu/day (As shown on the attached graph) or 120 MMBtu/year

Emissions Reductions

CO_2 = 120 MMBtu/year 120 lbs CO_2 /MMBtu = 14400 lbs/year or 7.2 tpy.

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Typical Wellsite Emission Reductions

Assume Insulation of One Separator and One 286 Bbl Tank

Total Fuel Saved: 3.14 MMbtu/day (assuming pilots continue burning at a rate of 0.5 Mscf/day each) or 471 MMBtu/year

CO_2 Reduction = 471 MMBtu/year x 120 lbs CO_2 /MMBtu = 56520 lbs CO_2 /year per wellsite or 28.26 tpy

Assuming like-kind reductions across COP wellsites

10000 wellsites x 28.26 tpy = 282,600 tpy NOx reductions

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Plunger Lift Operations

- Over 3000 ConocoPhillips operated wells are incapable of continuous flow (<18 hrs daily).
  - 304 MMCFD

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Current Status - Observations

- Opening and closing both relate to liquid load (circular logic)
  - Flowing time determines liquid load
  - Liquid load determines shut-in time
- Optimum settings are difficult to translate basin-wide
- Pressure builds fast and then slow

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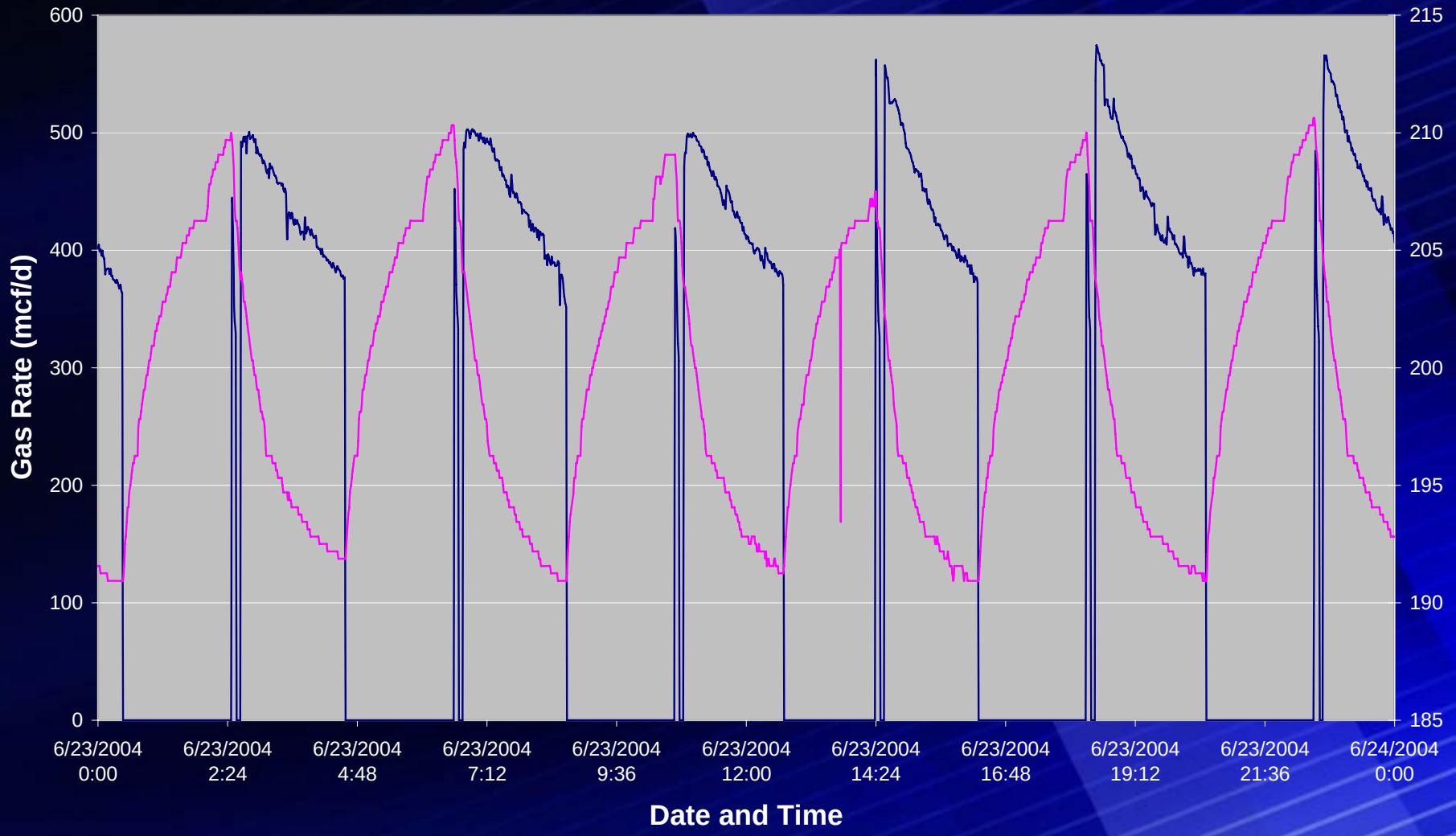
Typical Flow Cycle



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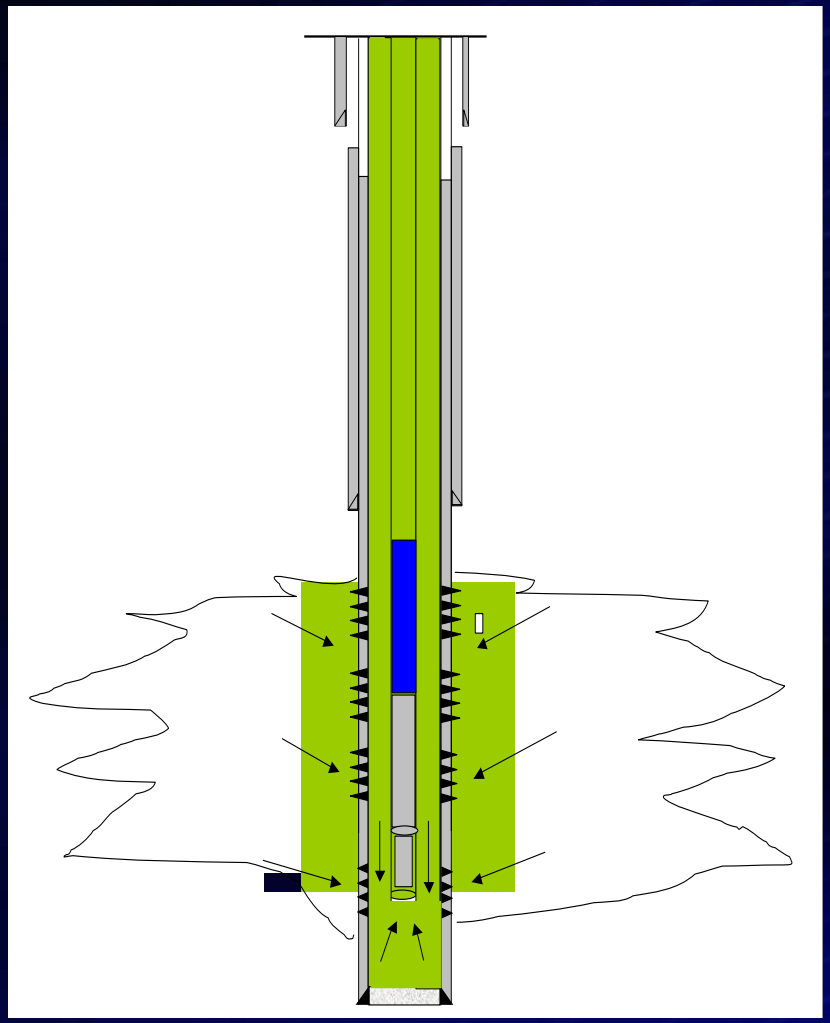
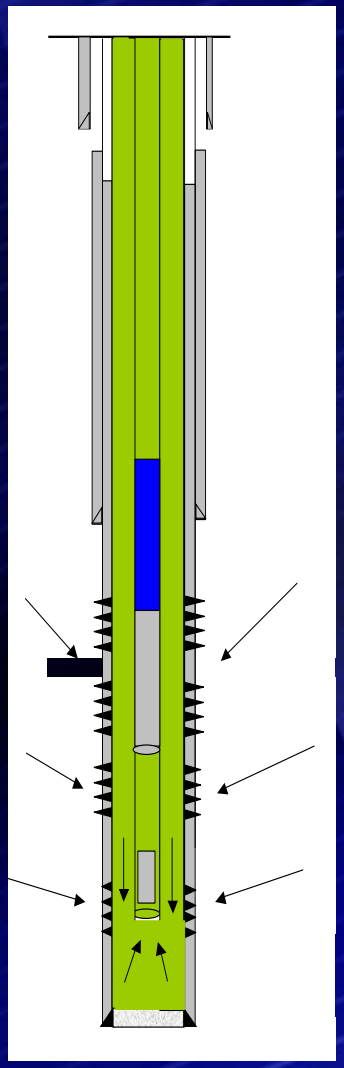
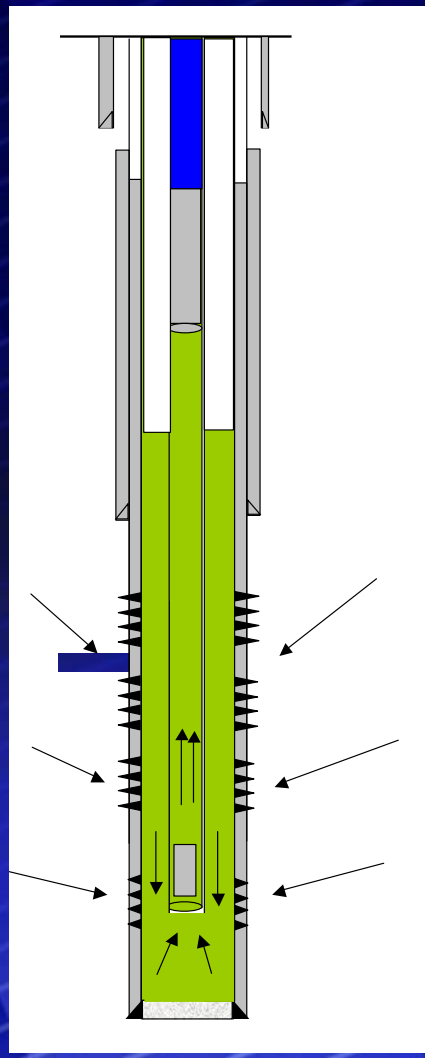
Plunger Lift Cycle Schematic







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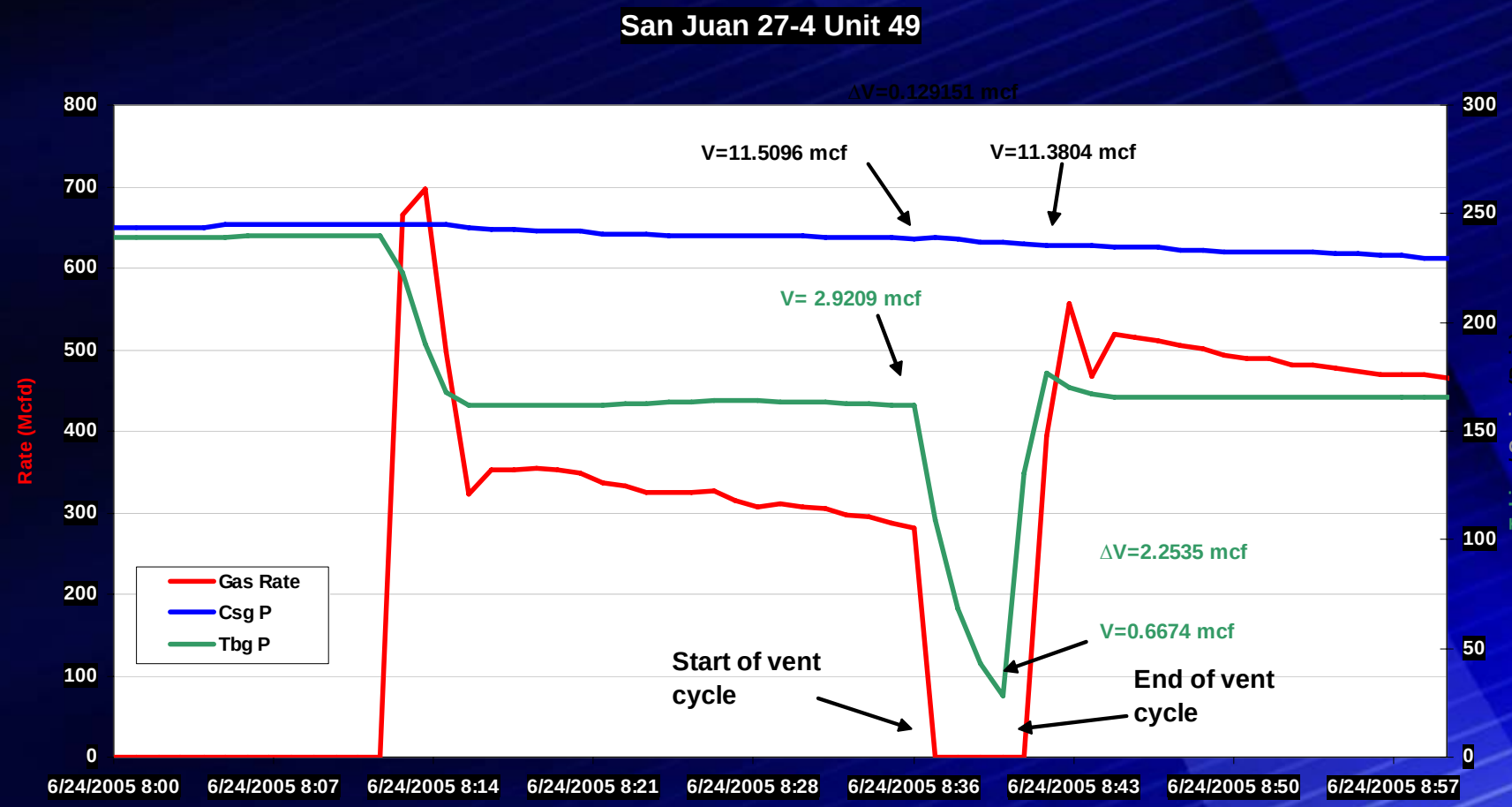
Current Status - Observations



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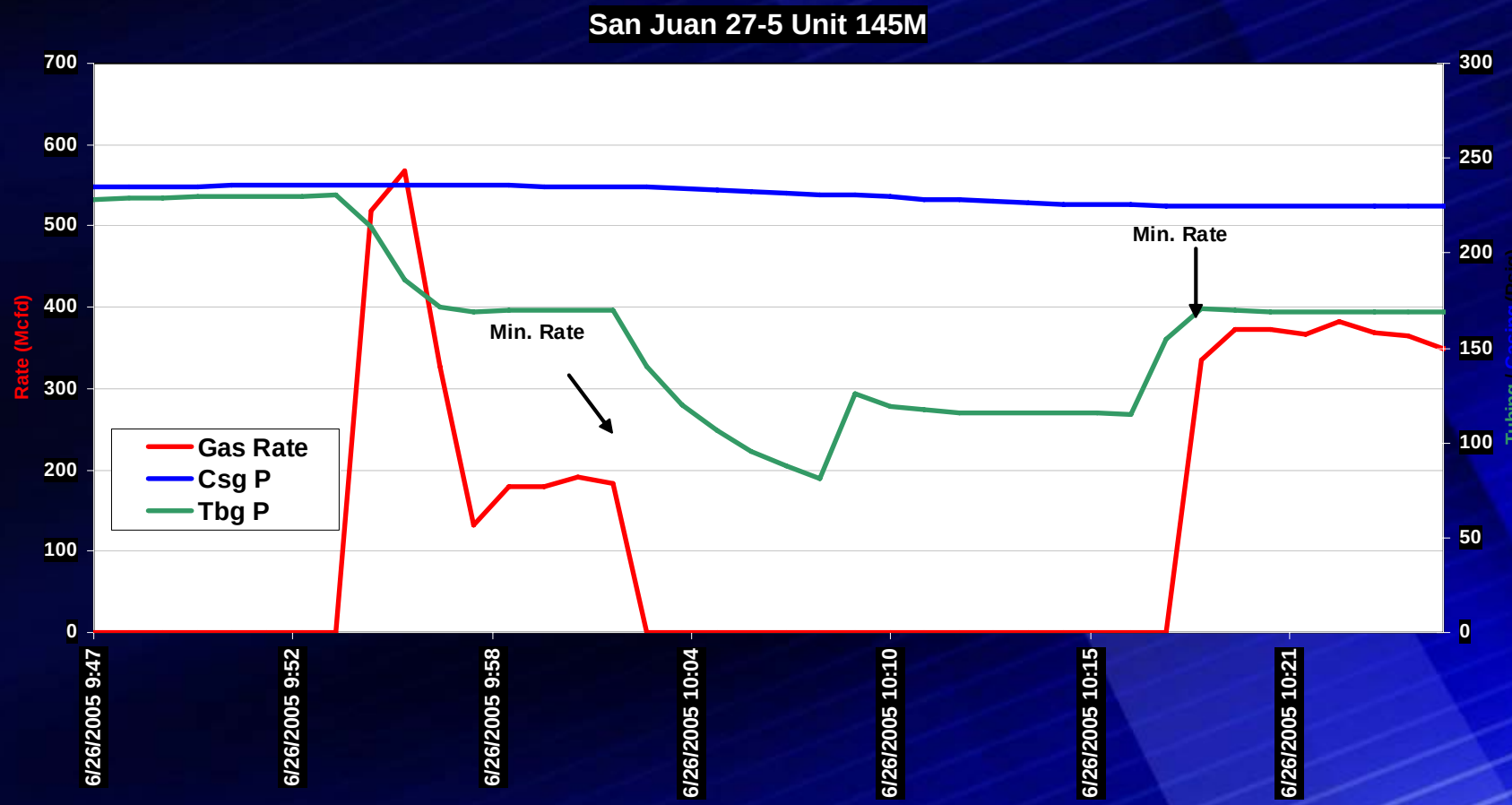

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Current Status - Observations

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San Juan 27-5 Unit 98E

	Before	After
Open Trigger	Shut-In Time Expired of 2 Hours	Casing Build of 3 psi in 30 minutes
Close Trigger	Critical Flow of 300 mcf/d	Critical Flow of 425 mcf/d
Flowing Time Per Day	16 hrs	12 hrs
Shut-In Time Per Day	8 hrs	12 hrs
Average Production	237 mcf	235 mcf
Average Line Pressure	162 psig	164 psig
Comments	Venting Every Cycle	Not Venting At All

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Coriolis Meter Data-Results

Well	San Juan 27-5 #145M	San Juan 27-5 #35	San Juan 27-5 #124M	San Juan 27-4 #49
Csg Depth	7769	5535	7644	8023
Tbg Depth	7649	5455	7518	7960
Avg. LP	177-179 psia	184-187 psia	182-184 psia	164-174 psia
D/P	(-5) to (-7) psig	68-69 psig	18-22 psig	(-1) to (-2) psig

VOC emission reductions = 54.3 mcfd x .15 x 365 days/year x 0.2 lbs/cf = 312 tpy

Methane emission reductions = 54.3 mcfd x .80 x 365 x .0434 lbs/cf = 344 tpy

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