ConocoPhillips San Juan Business Unit Voluntary Efforts to Reduce Emissions

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Engineer

San Juan Business Unit

Agenda

- Compressor Optimization (NO_x, CO, CO_2)
- Energy Efficiency (NO_x, CO, CO_2)
- Venting Efficiency (CH_4, VOCs)
- Centralized Facilities(CO2, NO_x, CO)
- Green Completions (CH_4, CO_2)

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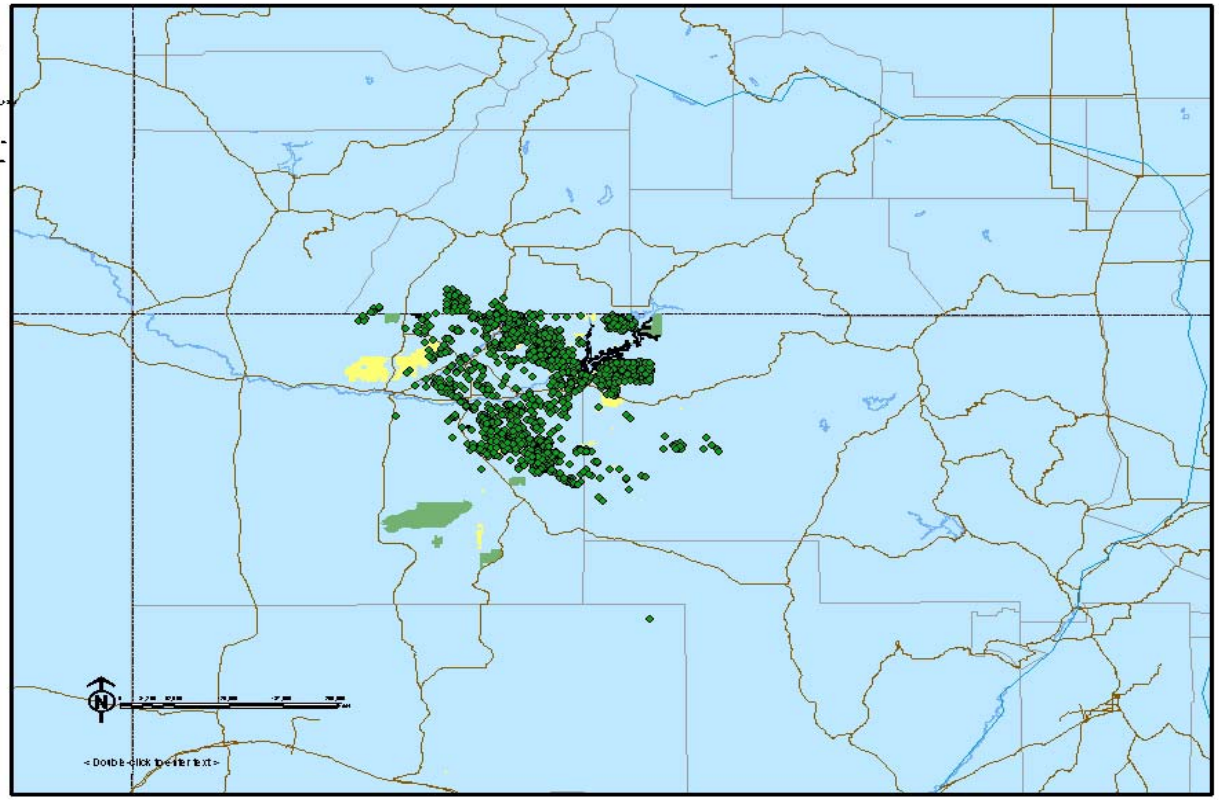
Compressor Optimization



San Juan Basin Map with BLM Noise Sensitive Areas

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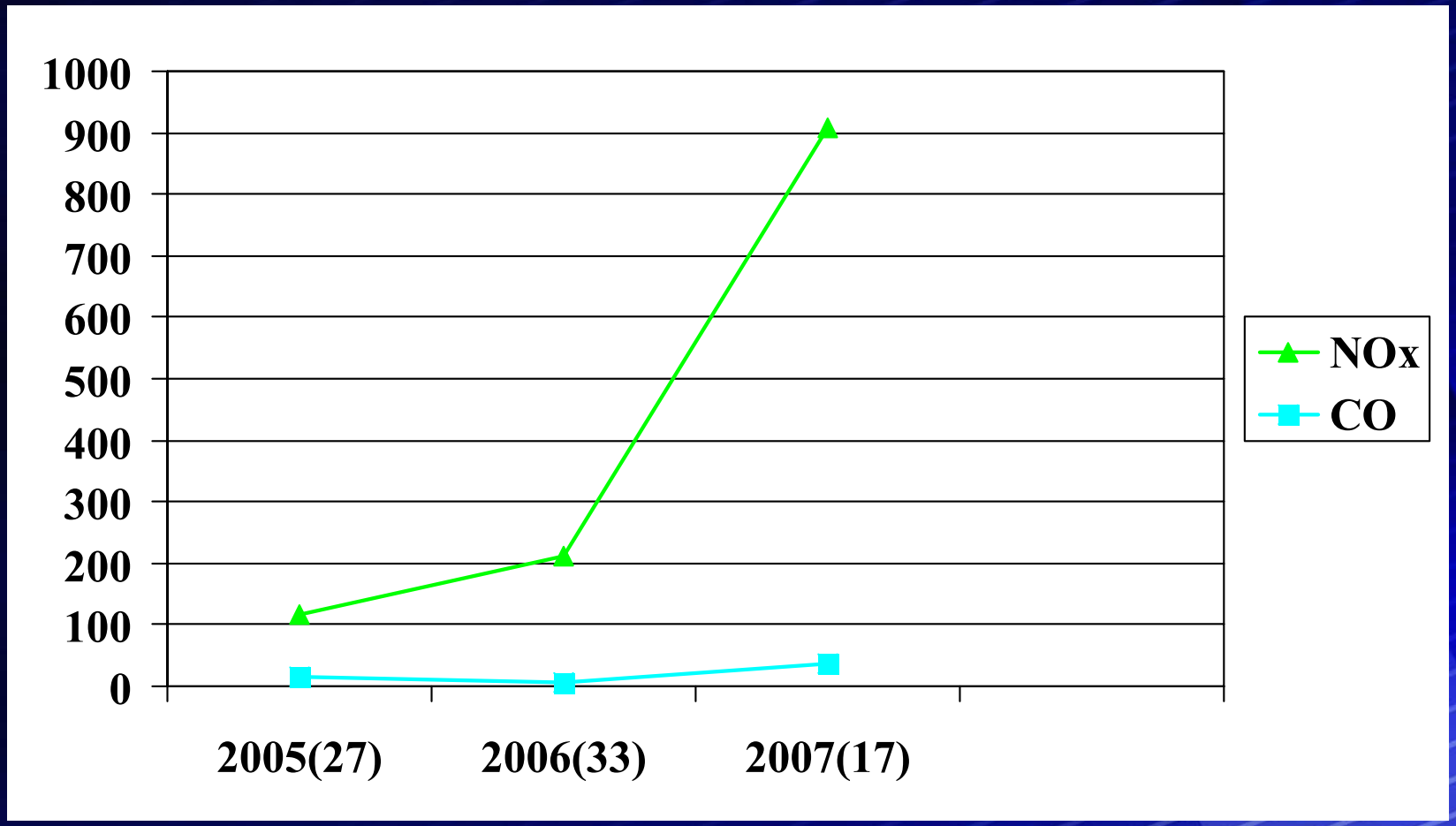
Compressor Optimization
Priority Pollutants (tons/year)



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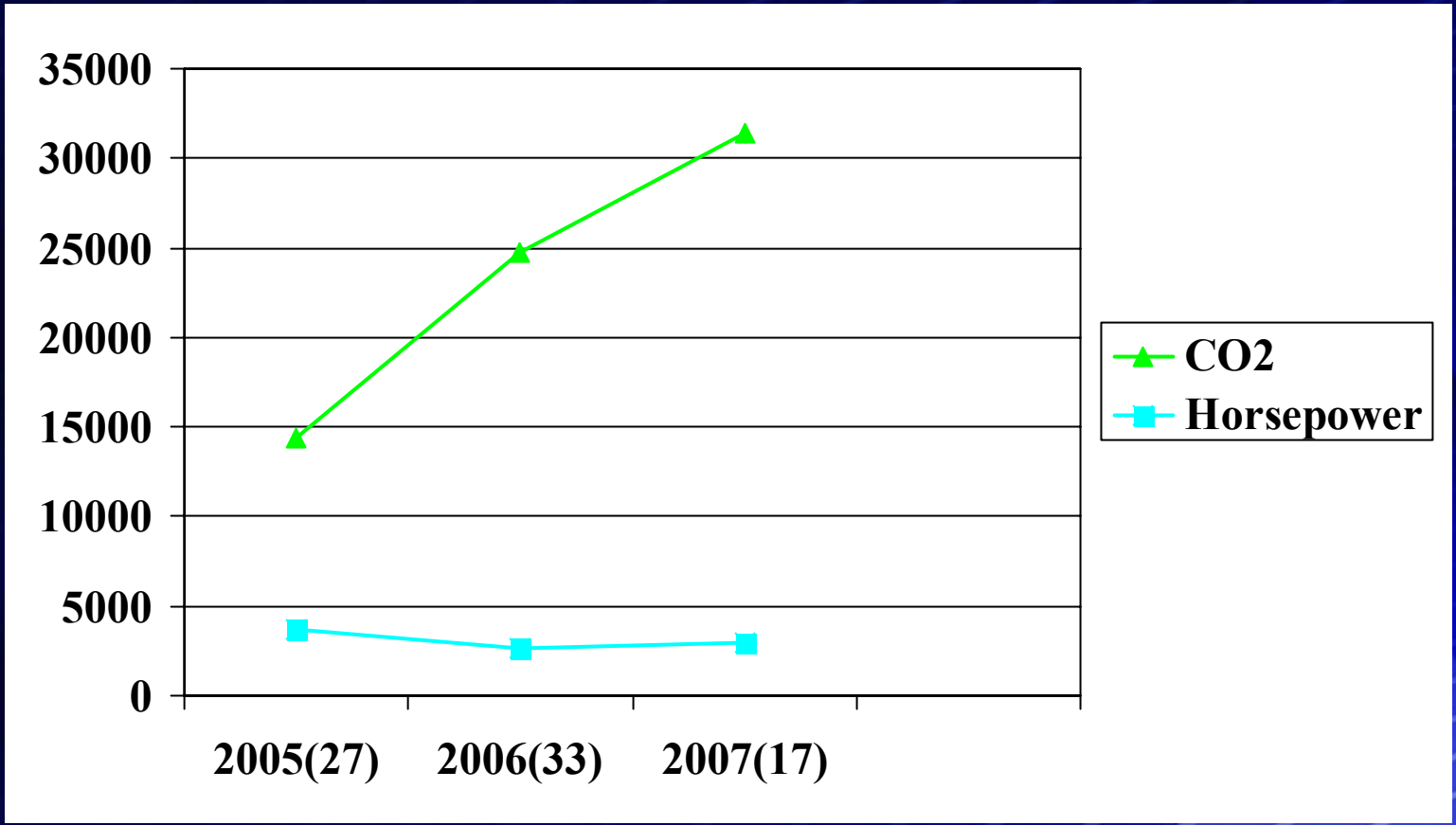
Compressor Optimization GHG Pollutants (tons/year) Horsepower (hp)



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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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Negro Canyon #1 Tank Battery

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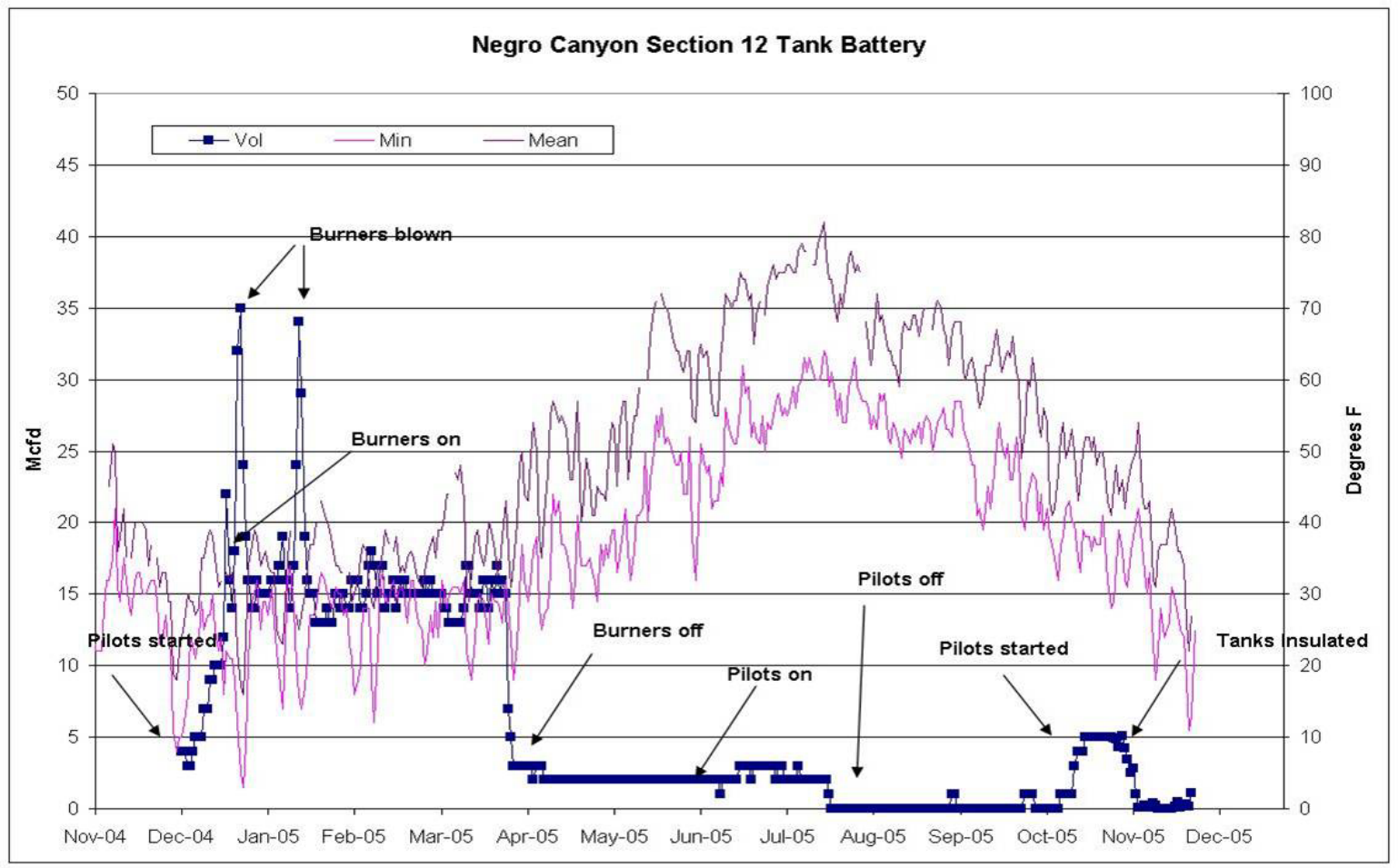
Energy Efficiency



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Elliot Federal #22-1M

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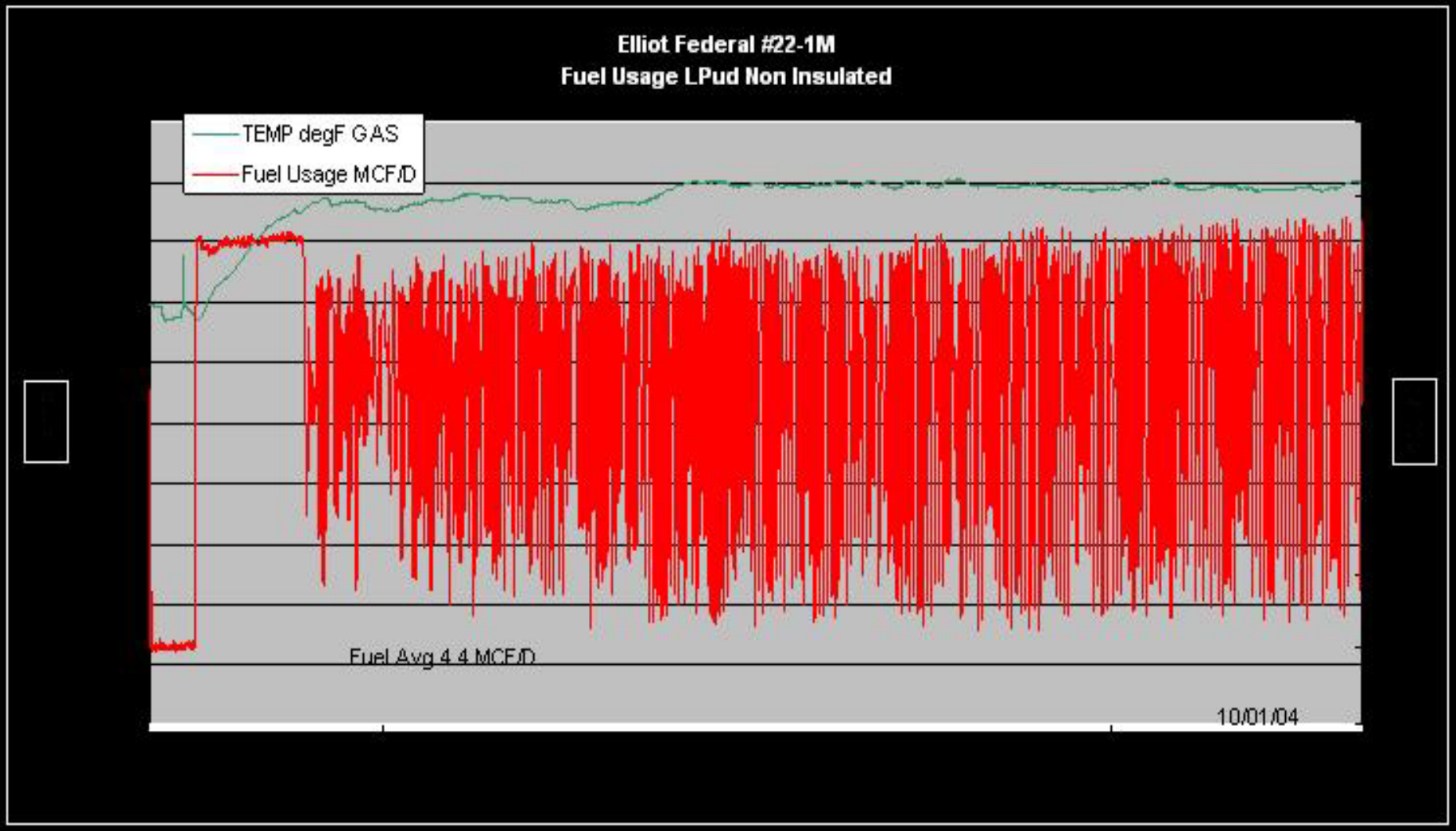
Elliot Federal #22-1M



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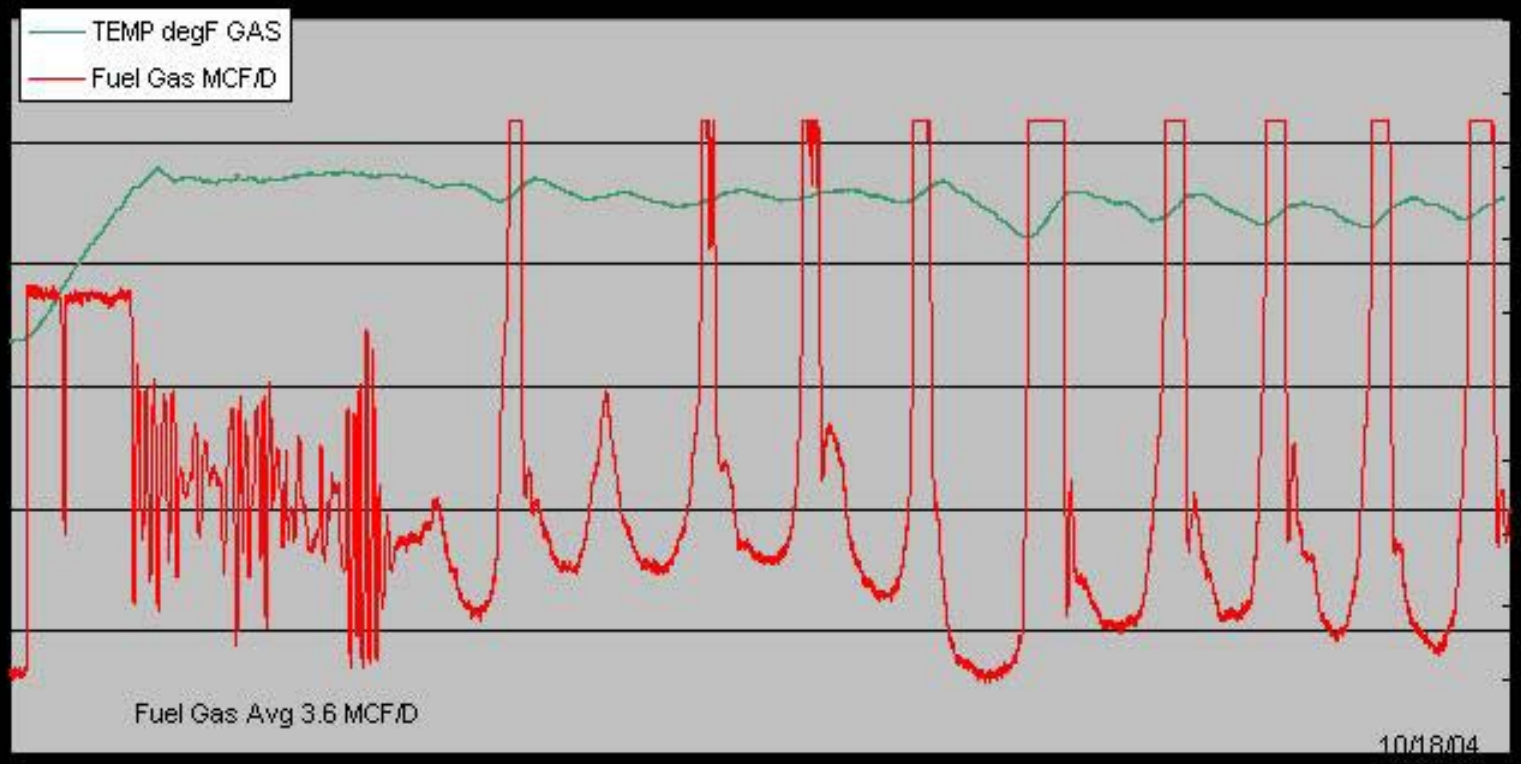

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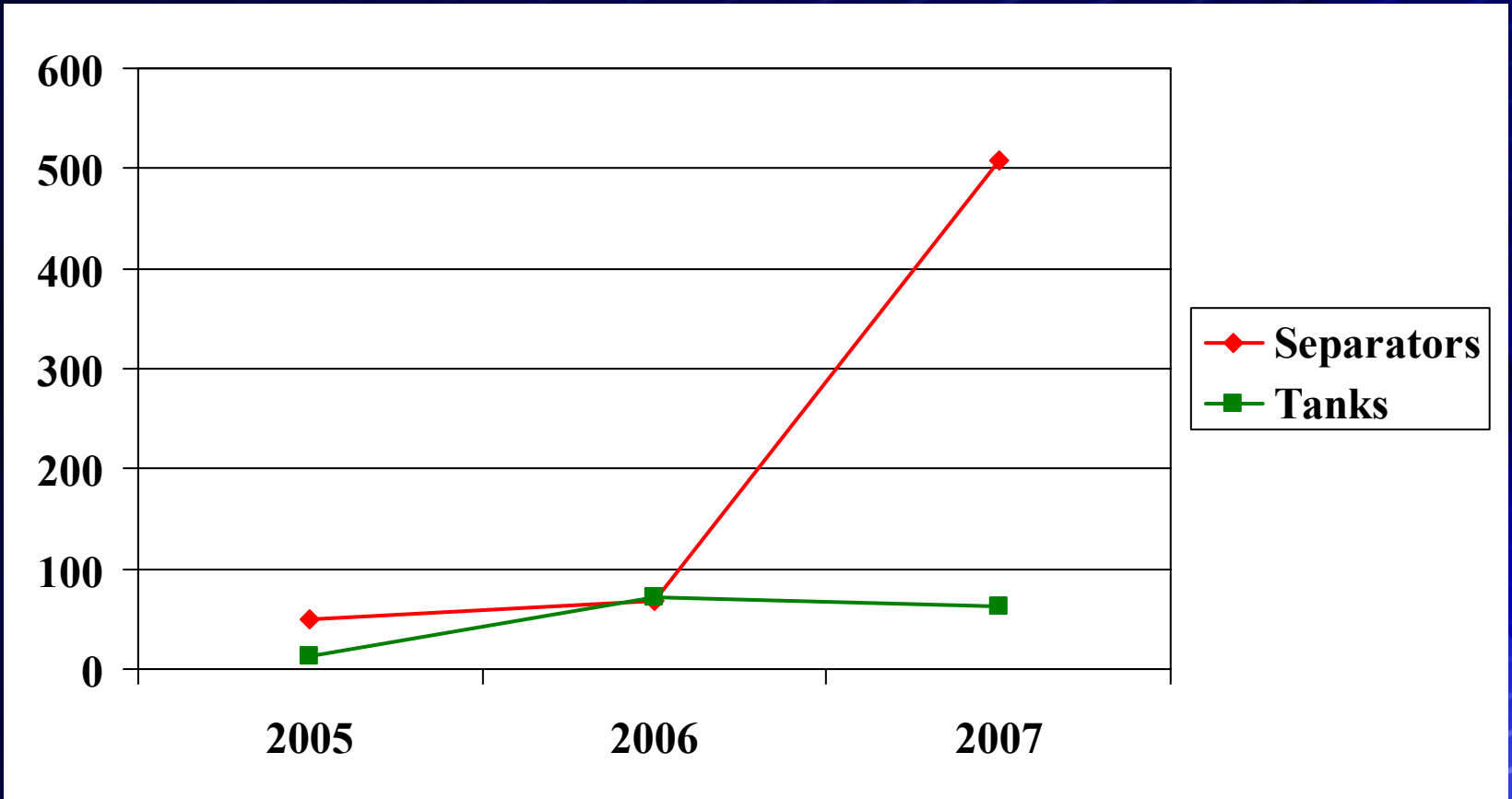
Vessel Insulation (vessels)



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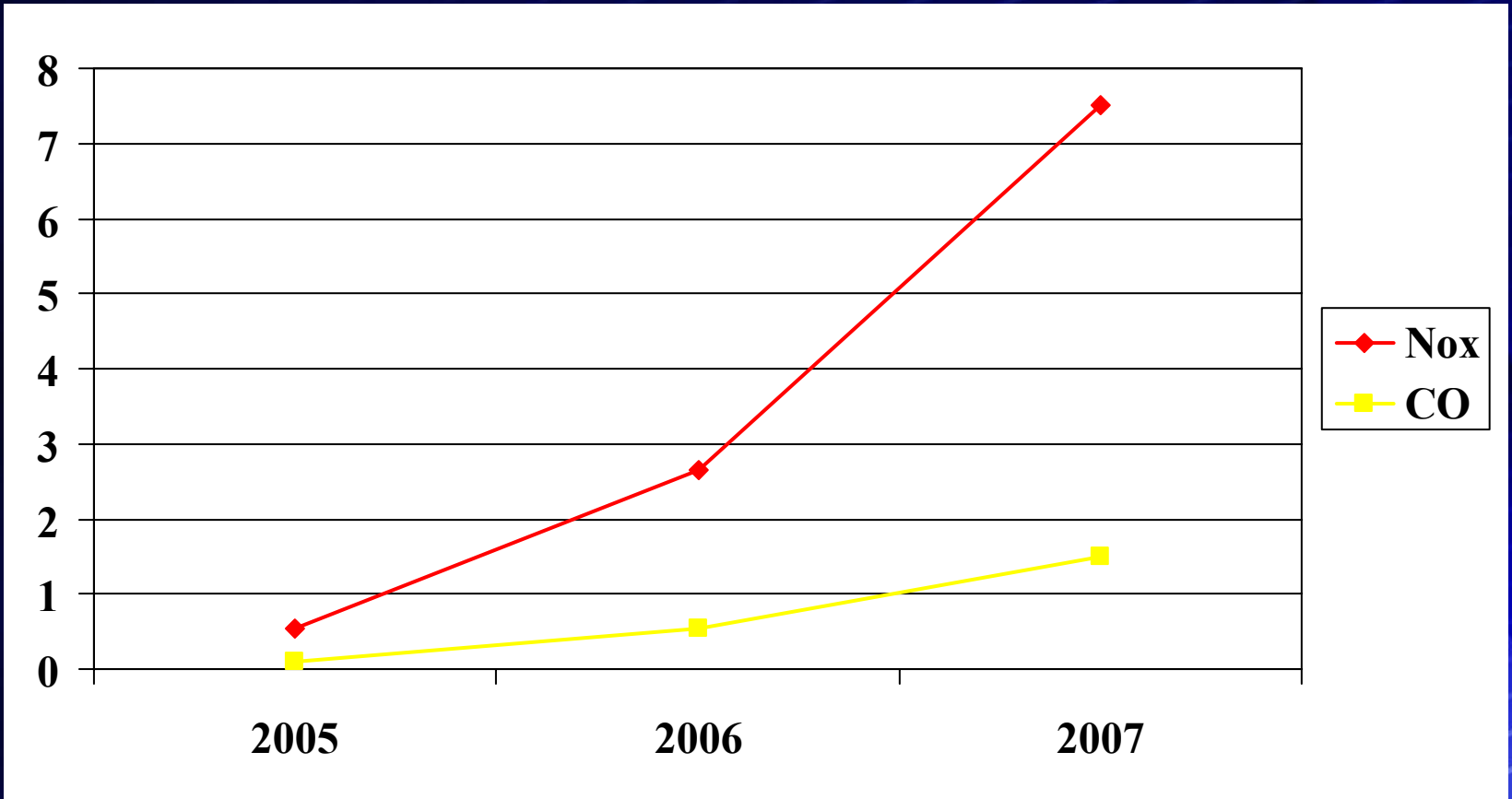
Vessel Insulation
Priority Pollutants (tons/year)



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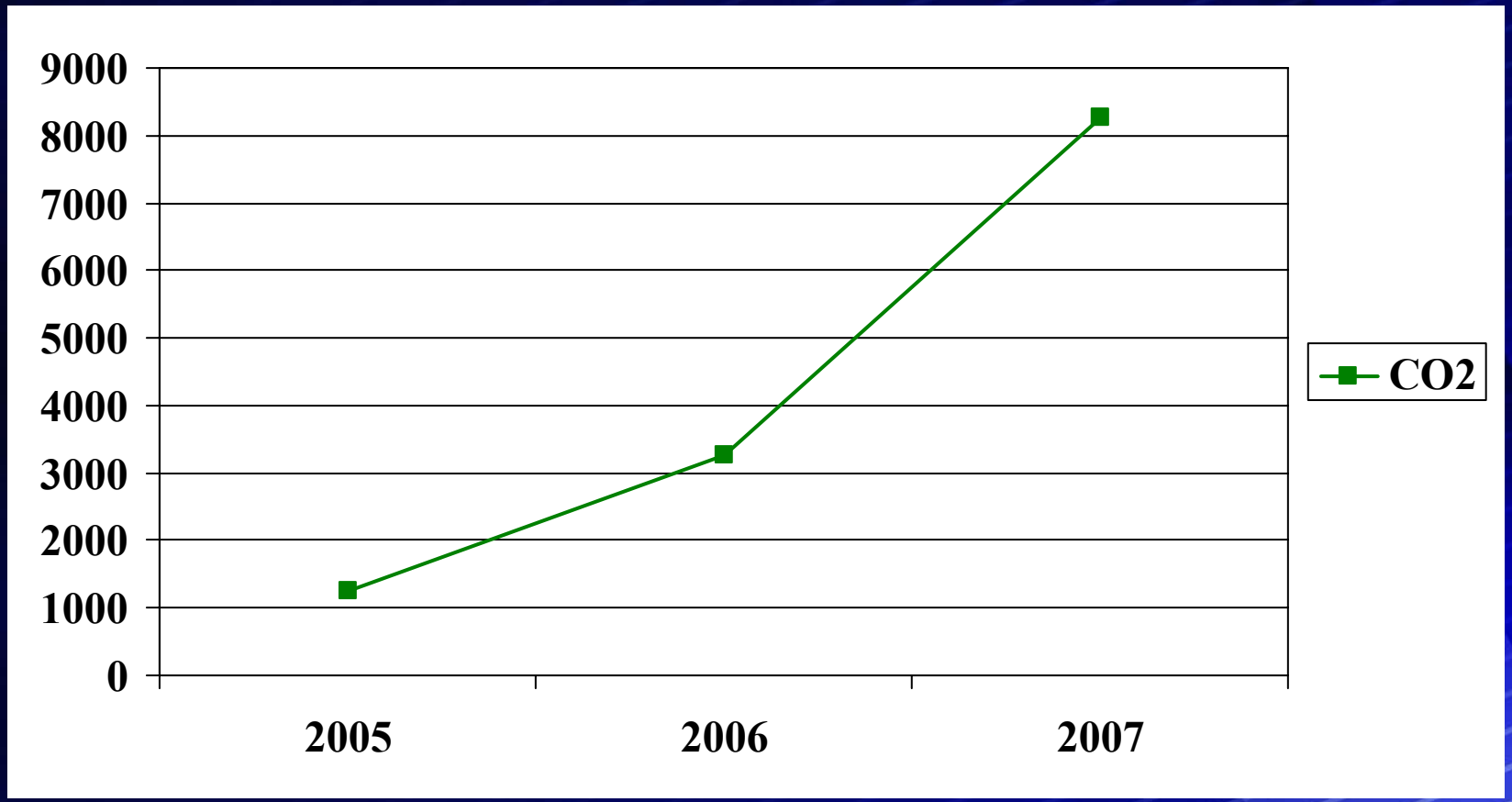
Vessel Insulation
GHG Pollutants (tons/year)



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Plunger Lift Operations

- Over 6000 ConocoPhillips operated wells are incapable of continuous flow

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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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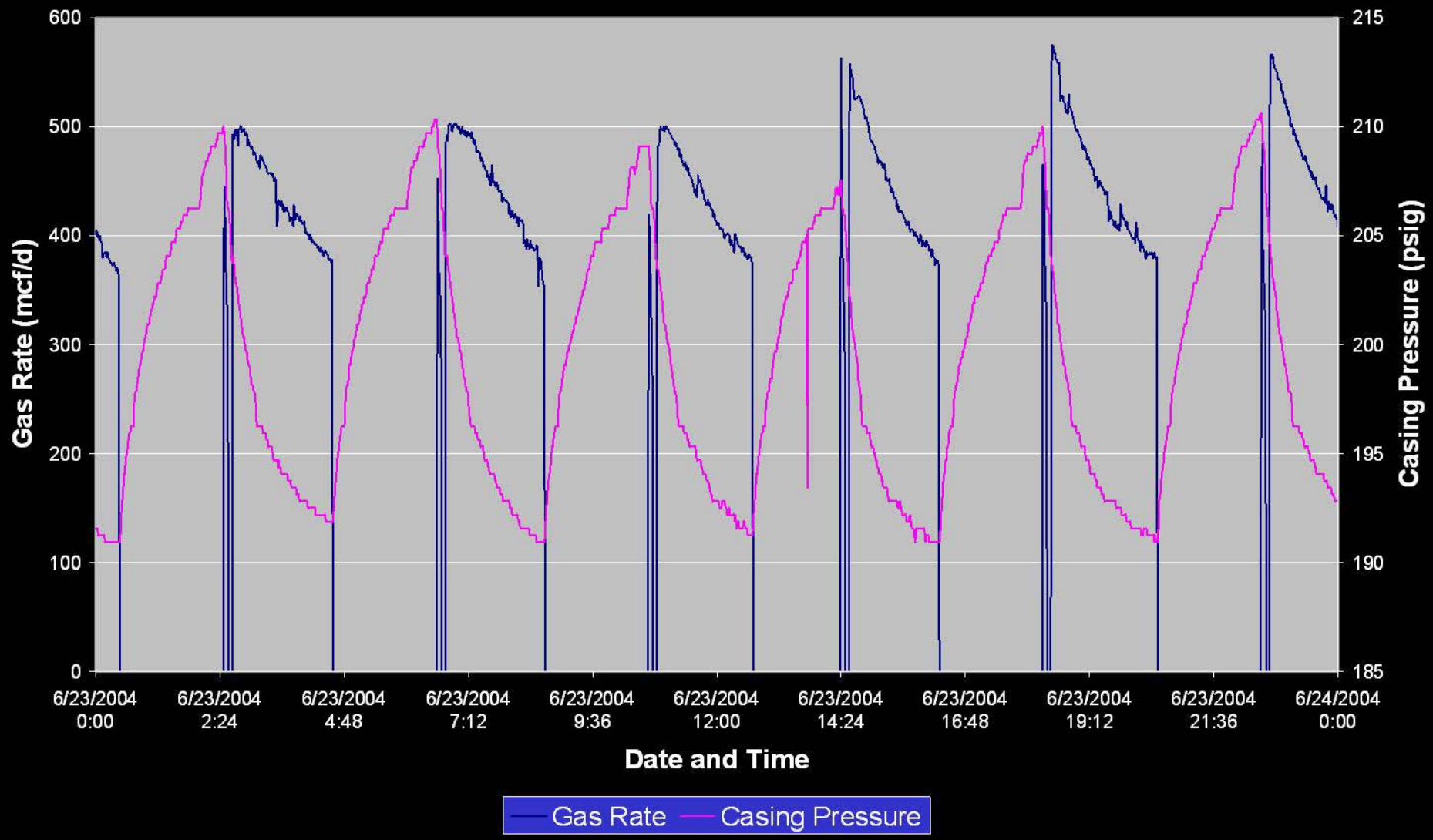
Typical Flow Cycle



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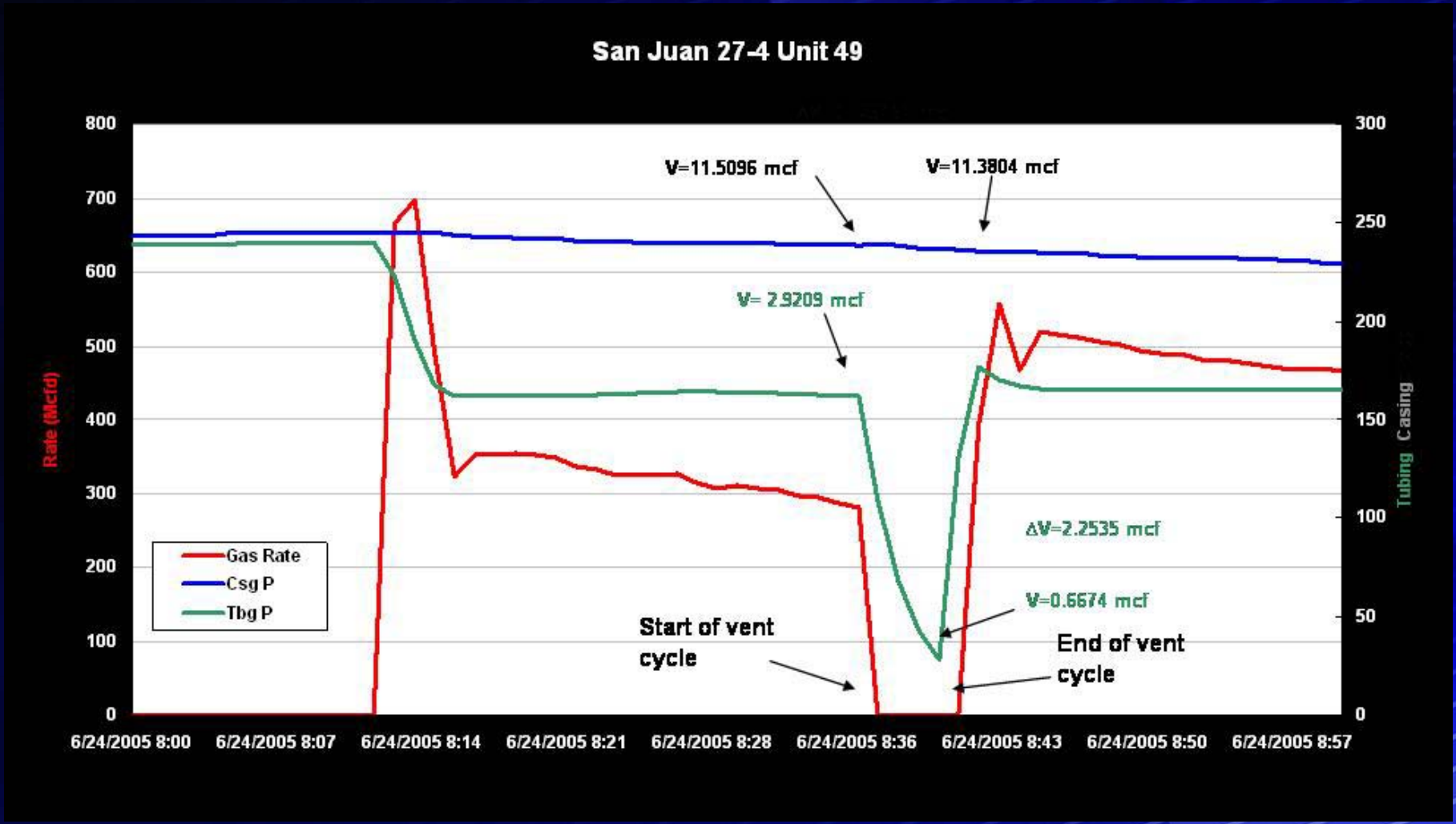
Current Status - Observations



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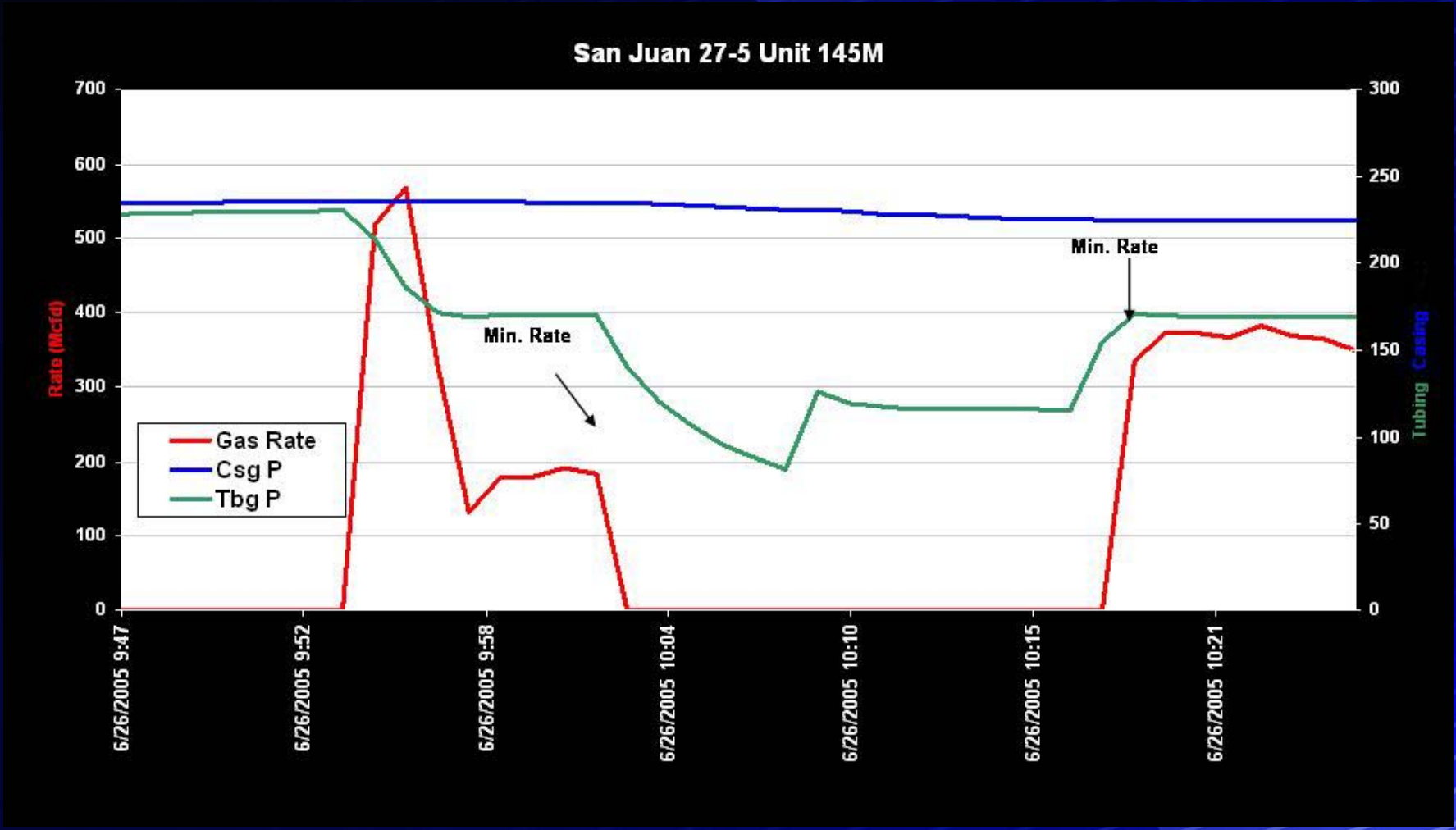

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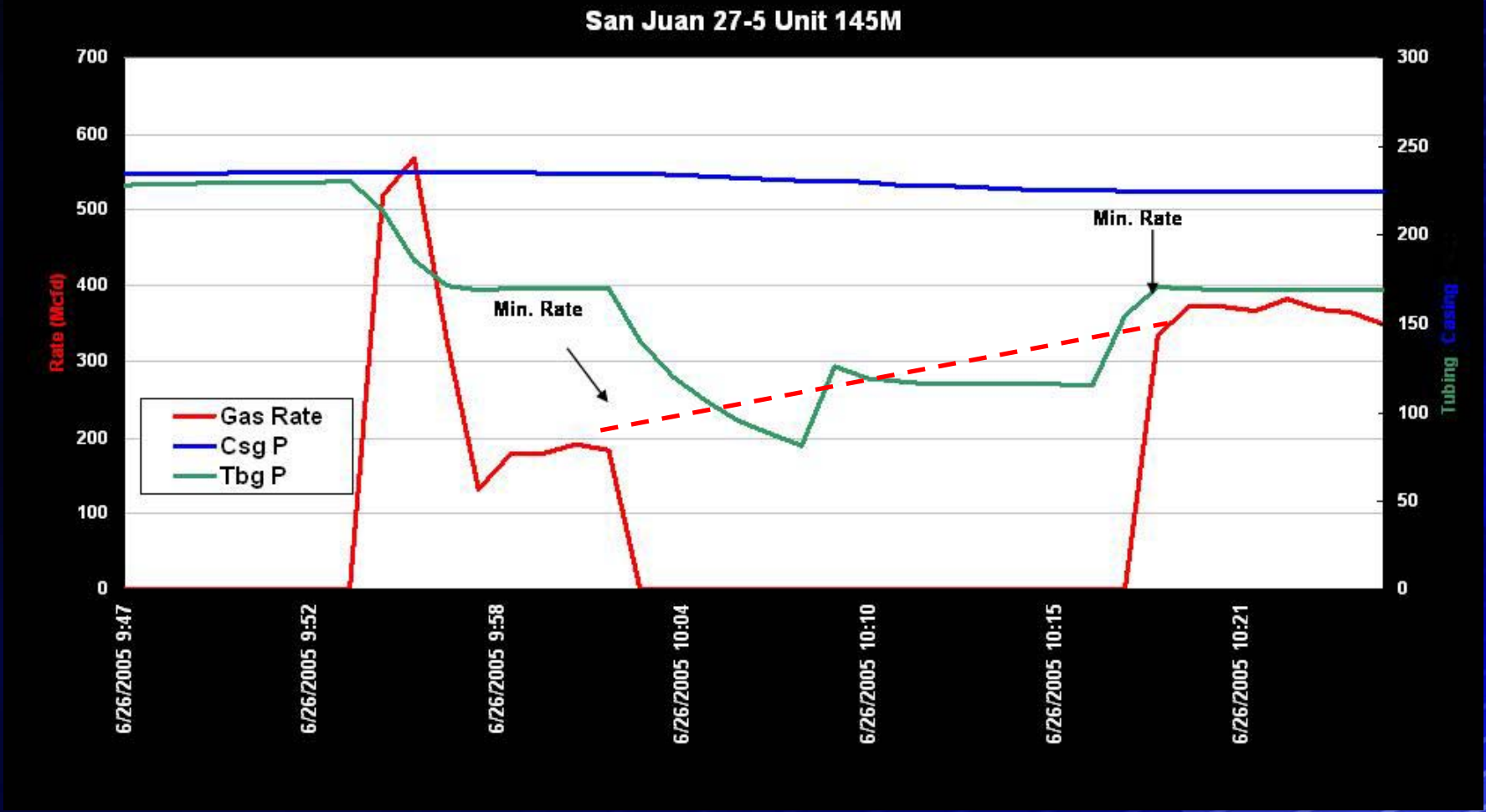
Current Status - Observations



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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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Centralized Facilities

- Centralizing water collection reduces truck mileage which is more energy efficient and creates less emissions

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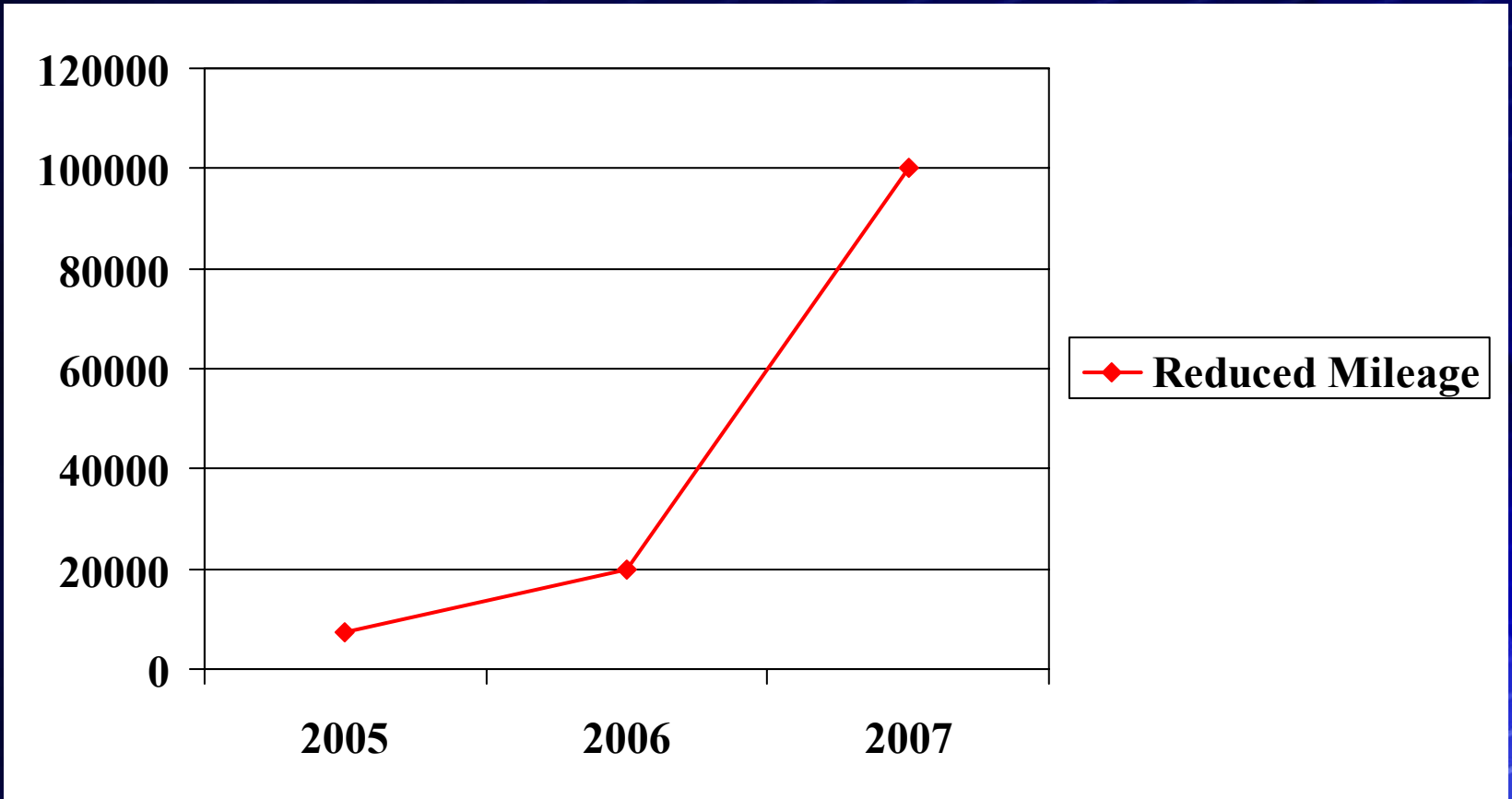
Centralized Facilities Mileage Reductions (miles)



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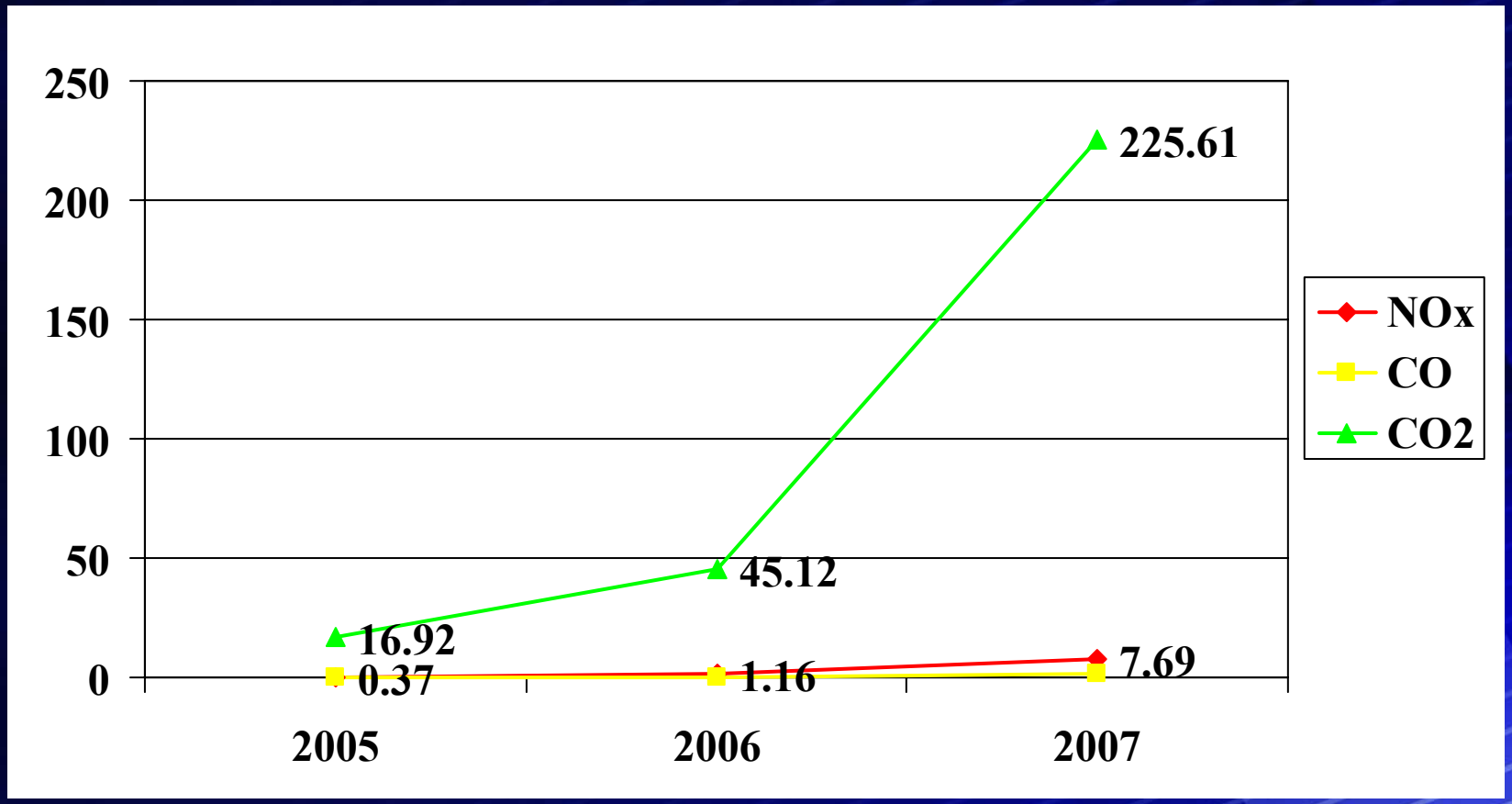
Centralized Facilities Emissions Reductions (tons/year)



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Green Completions

- Four wells were examined for green completions technology in 2007
- All utilized a commercial unit to gather and clean up potential vented gases, compressed the gases for pipeline delivery, and delivered to sales line
- 3 out of 4 wells completed using this technology had negative NPV

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Green Completions

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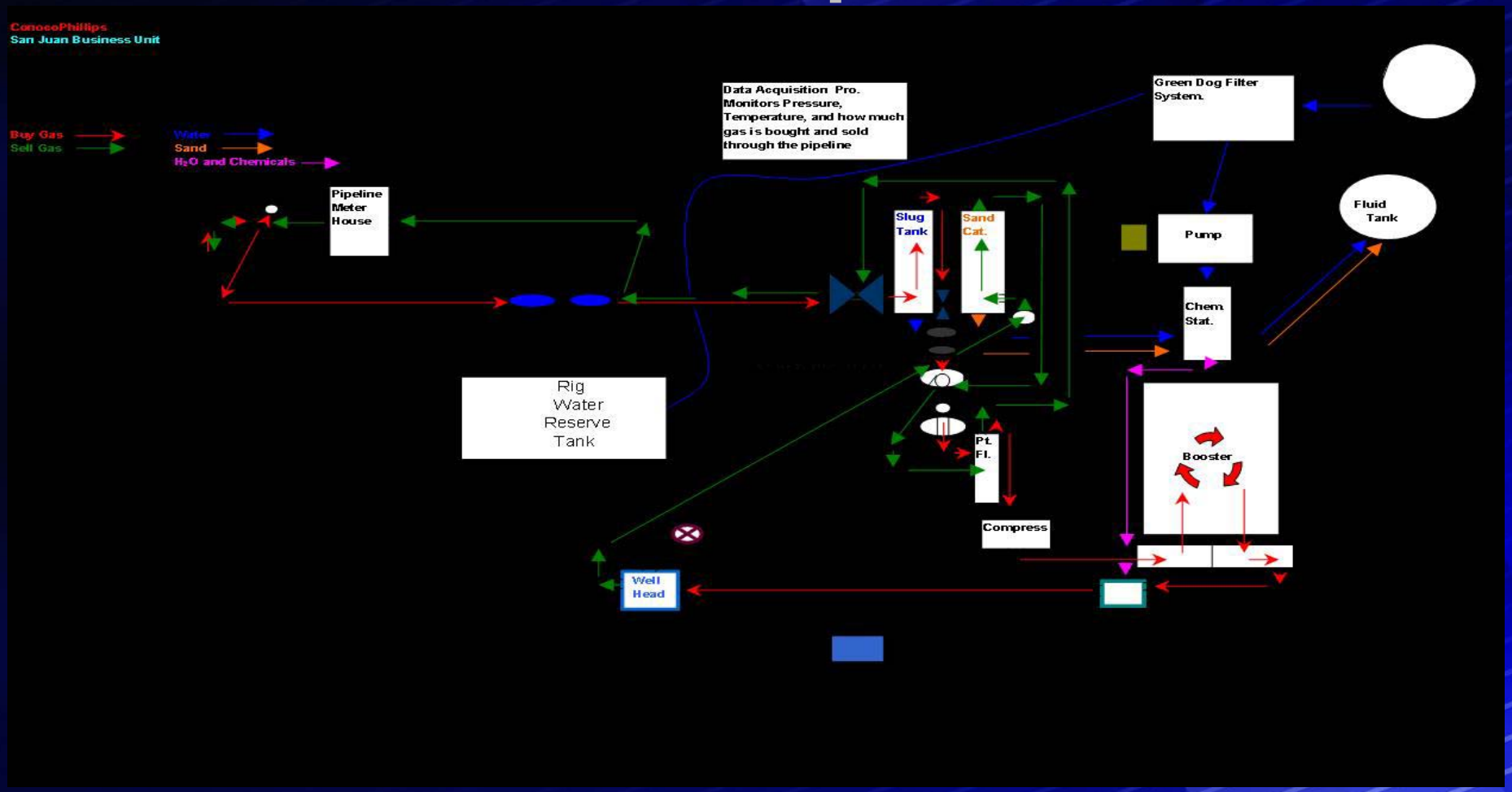
Green Completions



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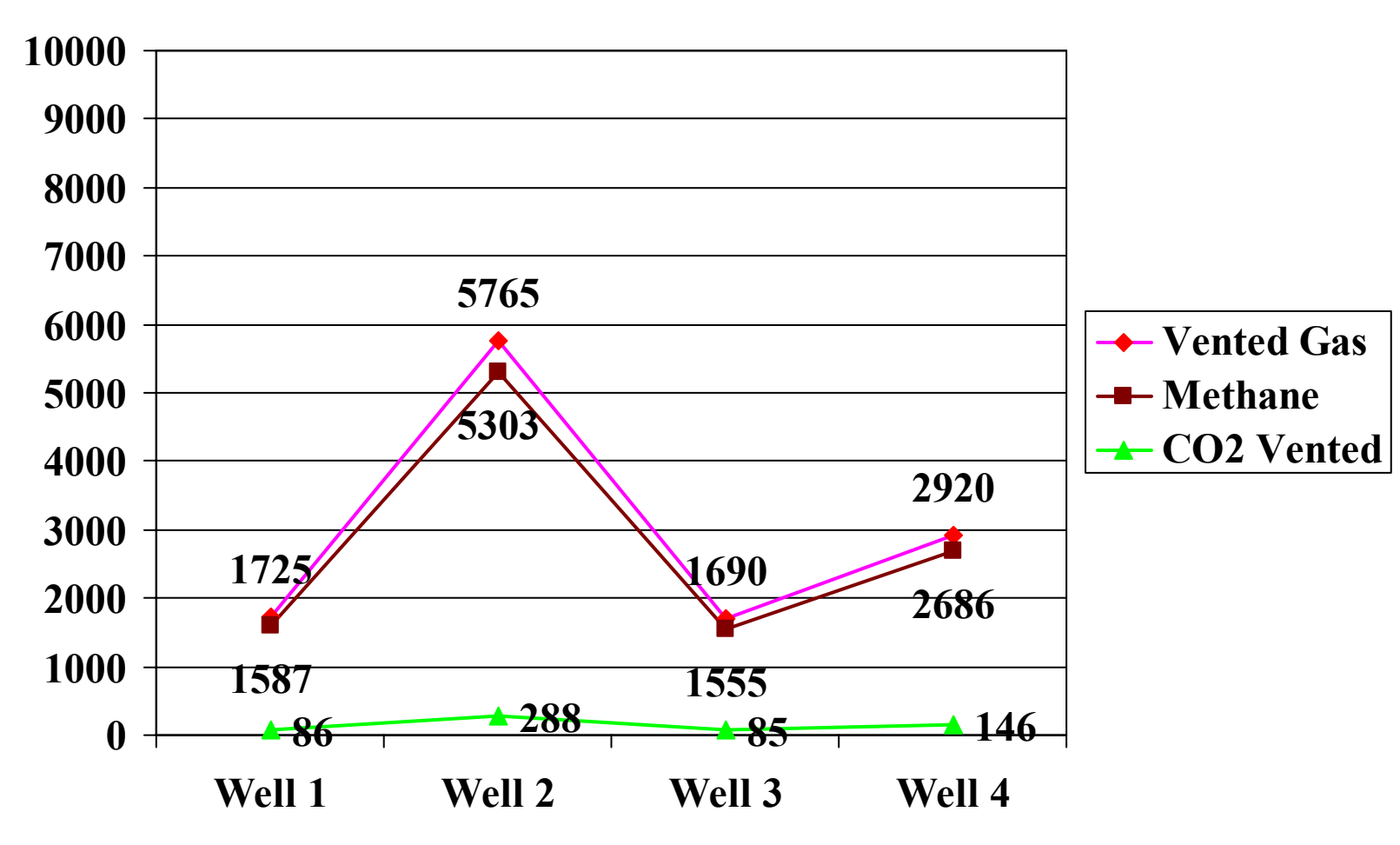
Green Completions Emissions Reductions (tons/year)



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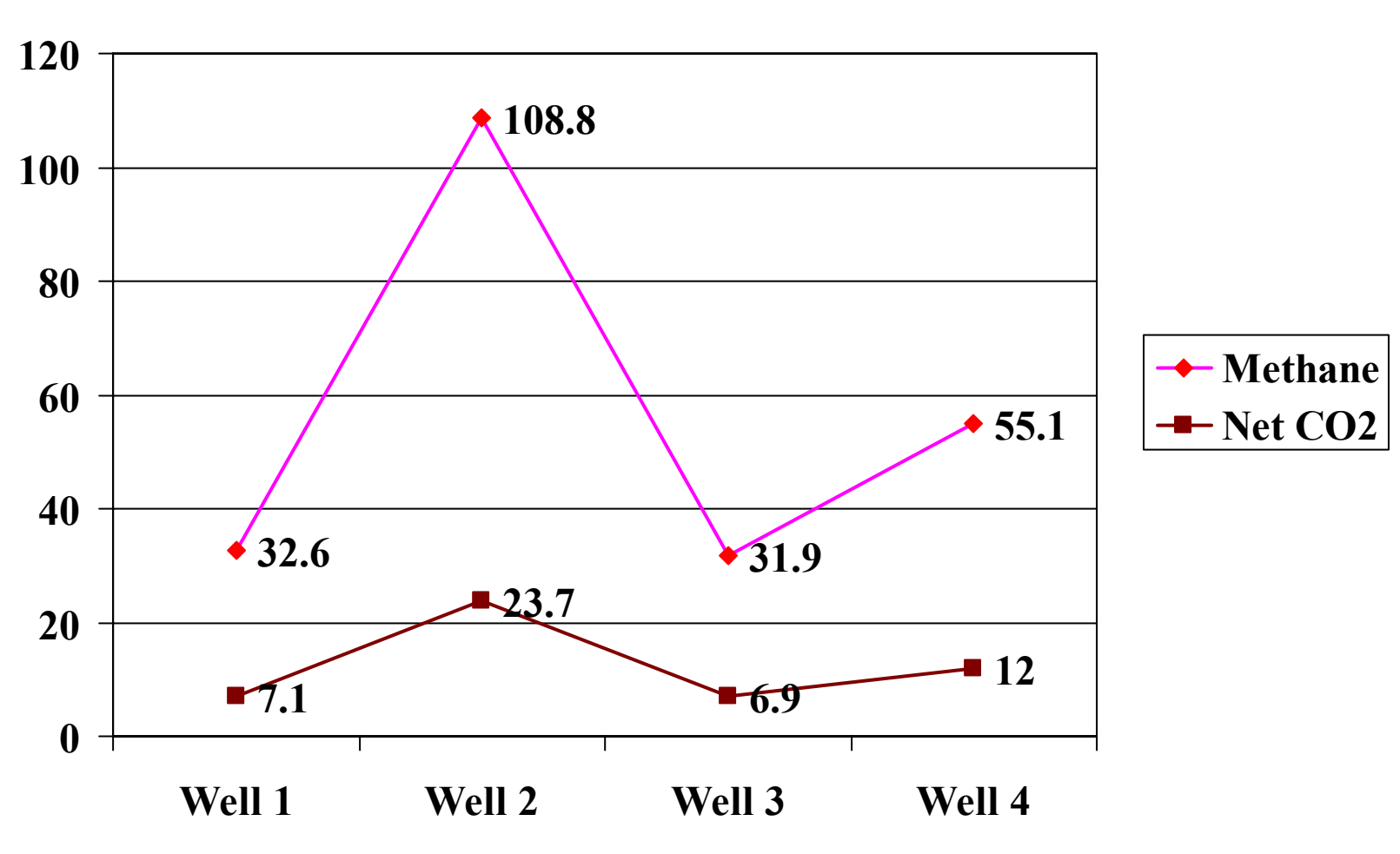
Green Completions Emissions Reductions (tons/year)



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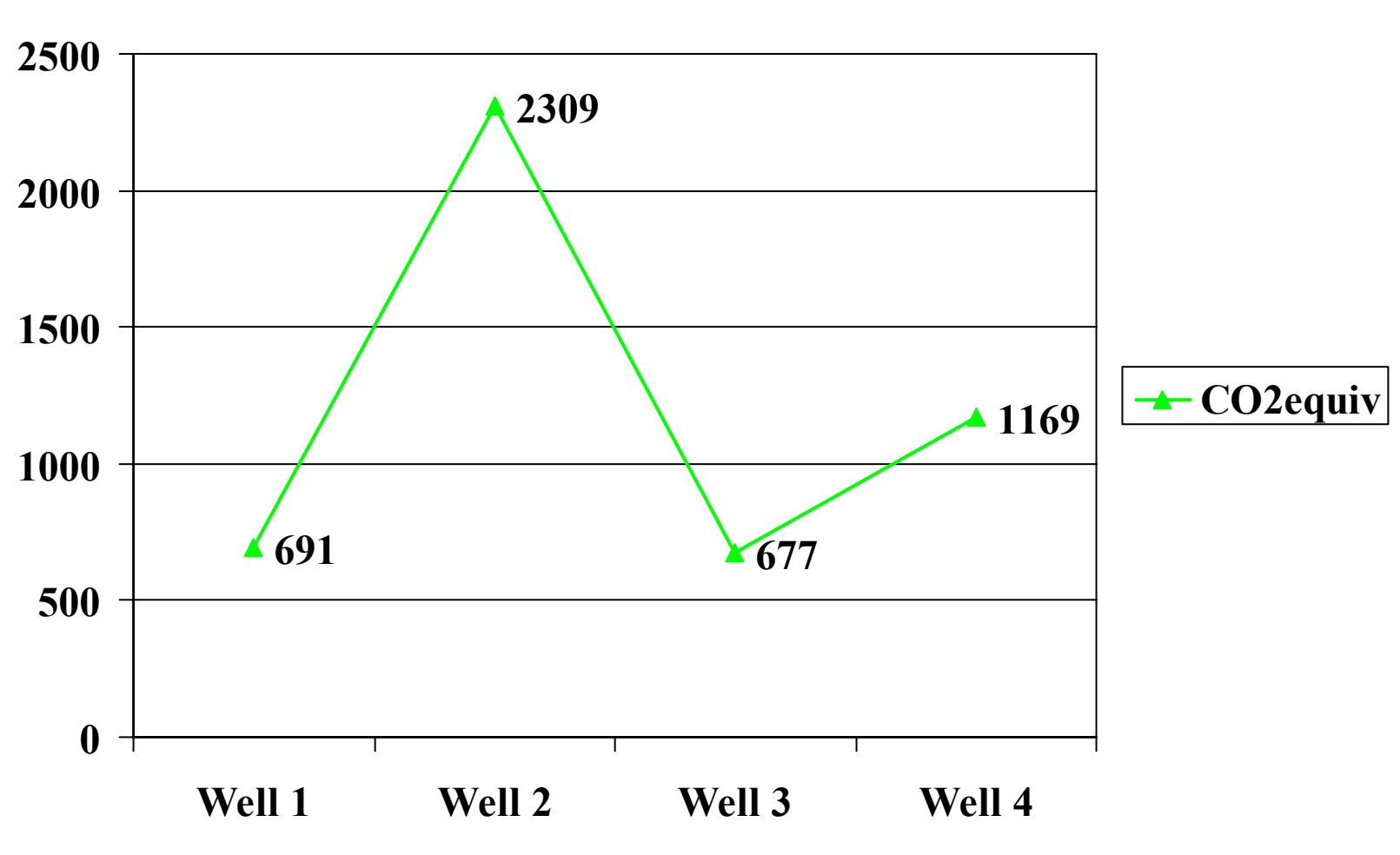
Green Completions Emissions Reductions (tons/year)



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