

EnergyINet

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Boundary Dam CO₂ Capture Plant History

- * Originally constructed as a joint venture project with SaskPower, Sask Government, and three oil companies in the summer of 1987
- * One objective was to test two different solvents from both Union Carbide and Dow Chemicals (now Fluor)
- * Other objective was to test the effectiveness of removing SO₂ with the Anderson 2000 SO₂ Scrubber unit



CO₂ Capture Plant Details

- 0.5 MMSCFD Flue Gas(15% CO₂, 5% O₂, 15% H₂O, 380ppm SO₂, 350 ppm NOx)
- 4 tonnes/day CO₂
- Major Equipment
 - Absorber-18"-64' high
 - Stripper 16"-59' high
 - Anderson 2000 SO₂ removal Unit
 - 2 million Btu/hr boiler



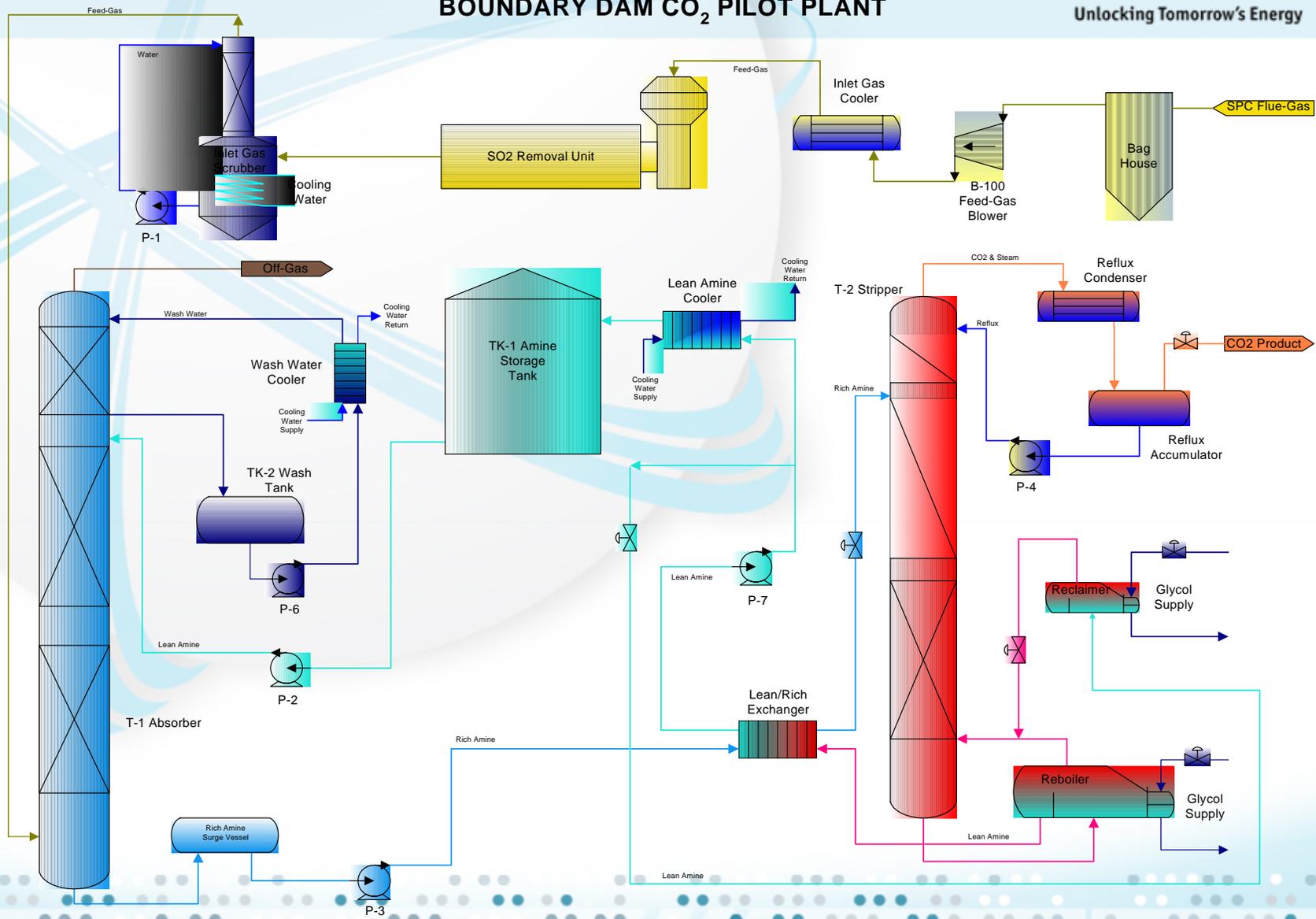
Boundary Dam CO₂ Pilot Plant Major Upgrades

- ✦ Re-commissioning commenced summer of 2000
- ✦ Install baghouse
- ✦ Various upgraded instrumentation, new control system, data acquisition, and equipment added.
- ✦ Initial startup and shakedown of equipment in summer of 2001



Baghouse

BOUNDARY DAM CO₂ PILOT PLANT

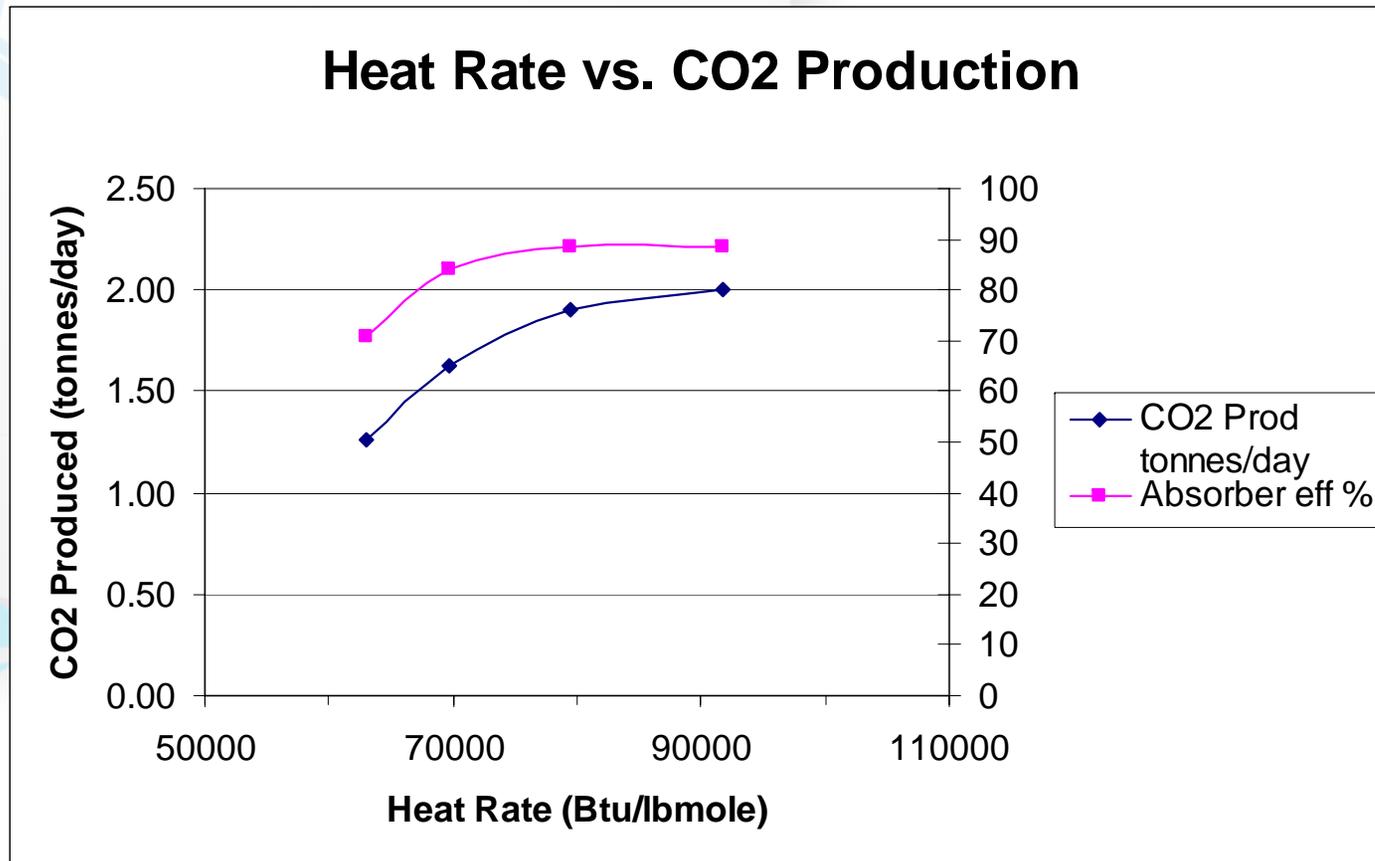


UR CO₂ Capture Plant Details

- ✦ 4.8 10³m³/day (170 mscfd) feed gas – 11.6% CO₂, 1.1% O₂, 87.3% N₂
- ✦ 1 tonne/day CO₂ production
- ✦ Absorber and stripper columns 305 mm (12") dia x 10 m (32.8 ft) high
- ✦ Steam supply to reboiler from boiler skid package

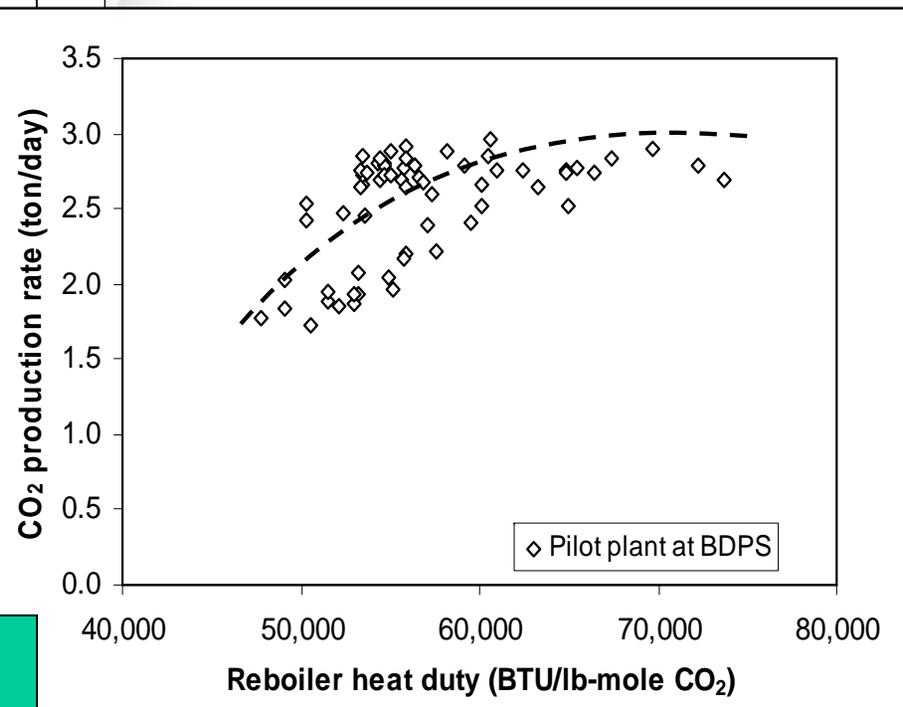
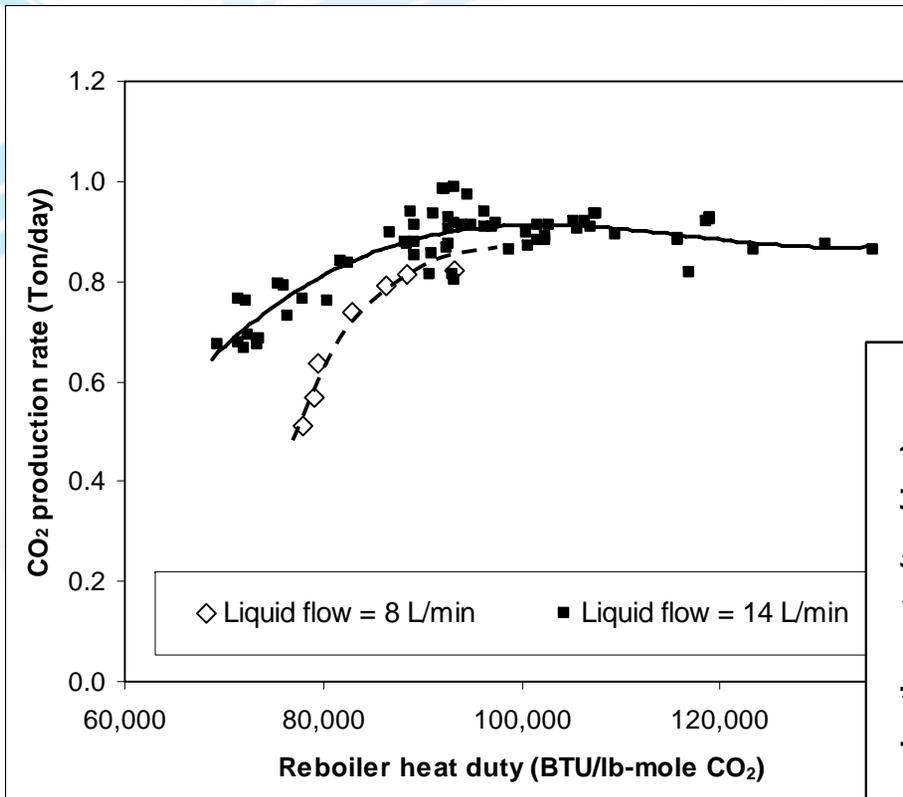


Heat Rate vs. CO₂ Production & Absorber Efficiency



MEA 5 Molar Base (Heat Duty & CO₂ Production)

UR Plant



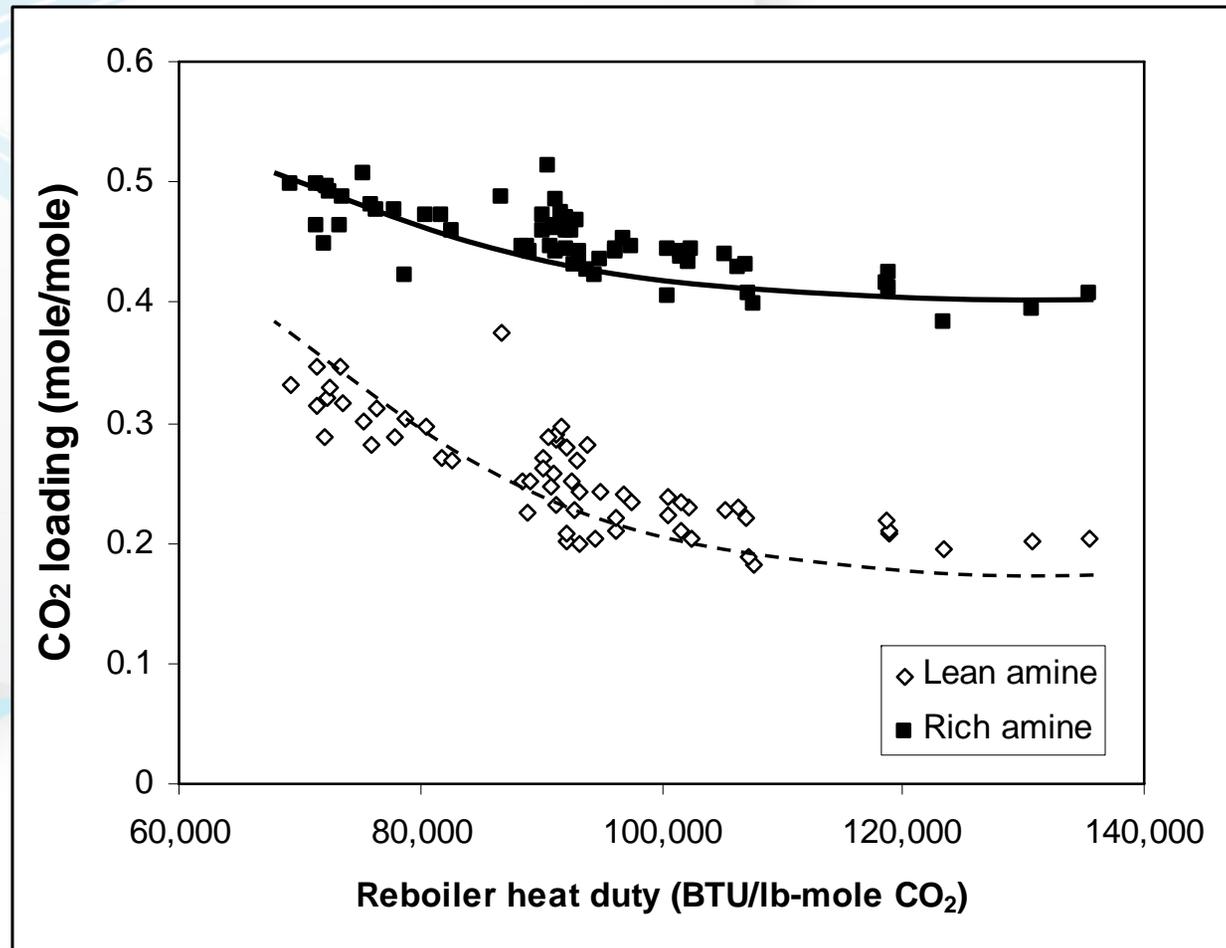
BD Plant



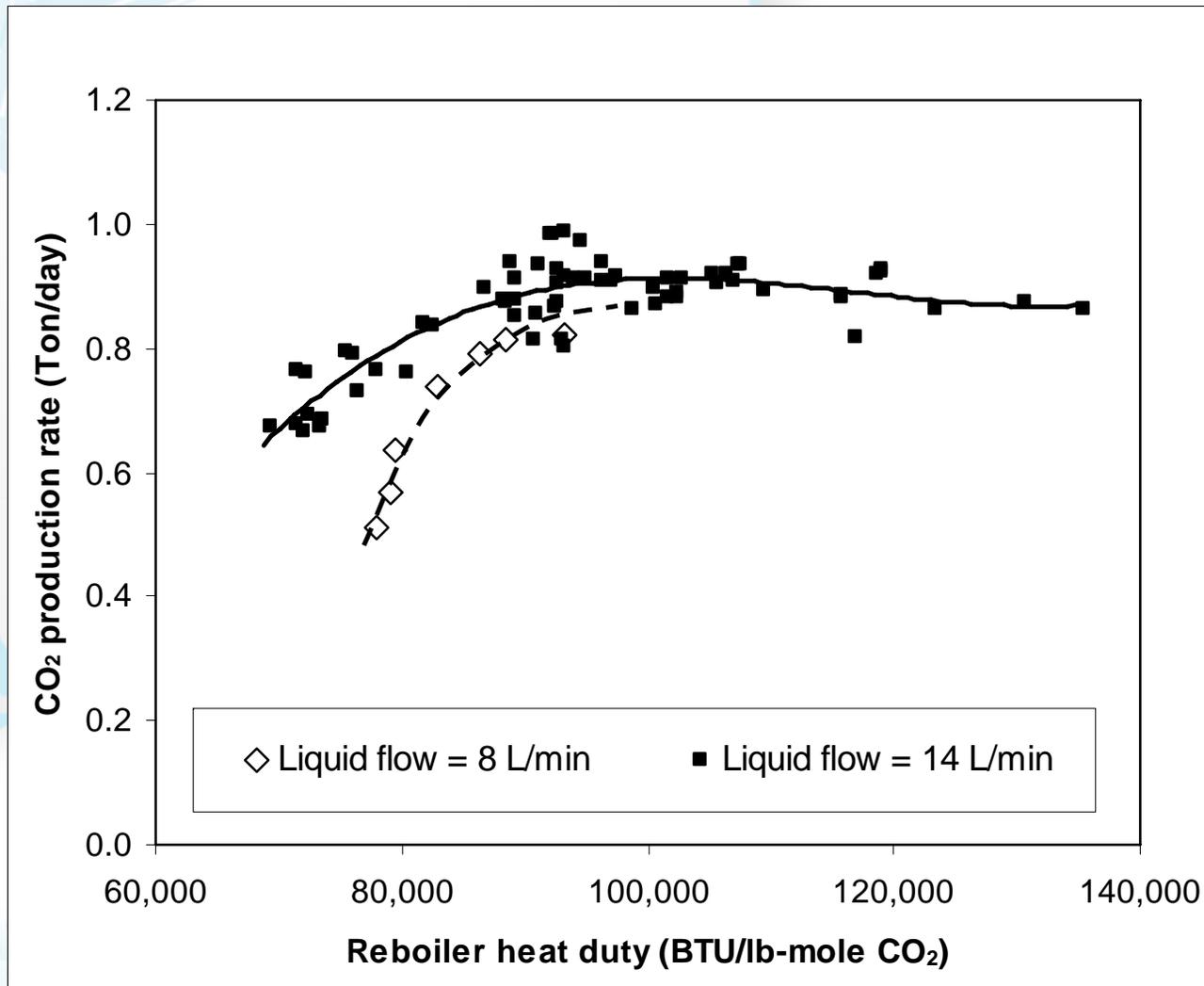
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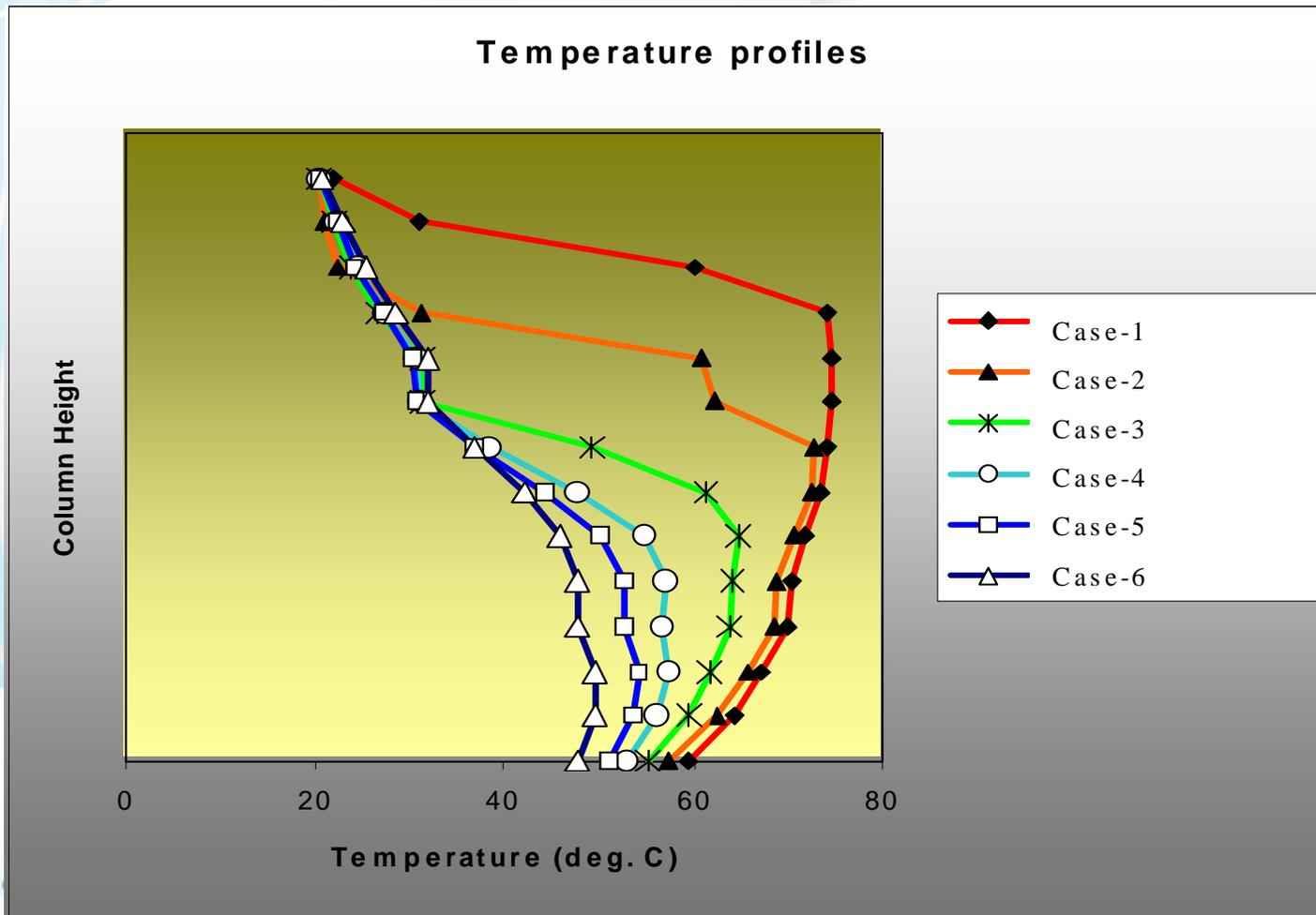
Effect of CO₂ Loading (UR Plant)



Baseline conditions with 5M MEA: Effect of Circulation Rate



Absorber Column Temperature Profile (UR Plant) Baseline Conditions



Summary of Test Results

- ✦ **Successful use of UR pilot plant for amine-based tests**
- ✦ Reboiler heat duty range: 35,000 to 90,000 BTU/lb-mole CO₂
- ✦ Low heat duty (35,000) could provide 75% removal
- ✦ Higher MEA concentration (> 5 Molar) : on-going



Phase 2 Test Program

- * Testing of increased concentration
- * Mixed amine testing to continue
- * Affirm results of changing heat duty
- * Comparative testing of “custom amines”
- * Look at lower temperature systems
- * Economic modeling
- * Continued fundamental research
- * Training program development

