

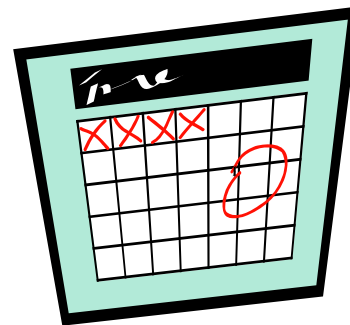
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Role of customers in the APC application How to improve production excellence in your plant

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Agenda

- Introduction
 - Key ingredients to successful APC
 - Typical hurdles
- A sample case – APC applied to an IGCC plant
 - Brief process description
 - Project execution
 - Results
 - Lessons learnt



Ingredients for a successful APC application

Latest technology software

✓ Know-how

References

Organization

✓ People

Contract terms

Schedule

✓ *Cooperation*

Price

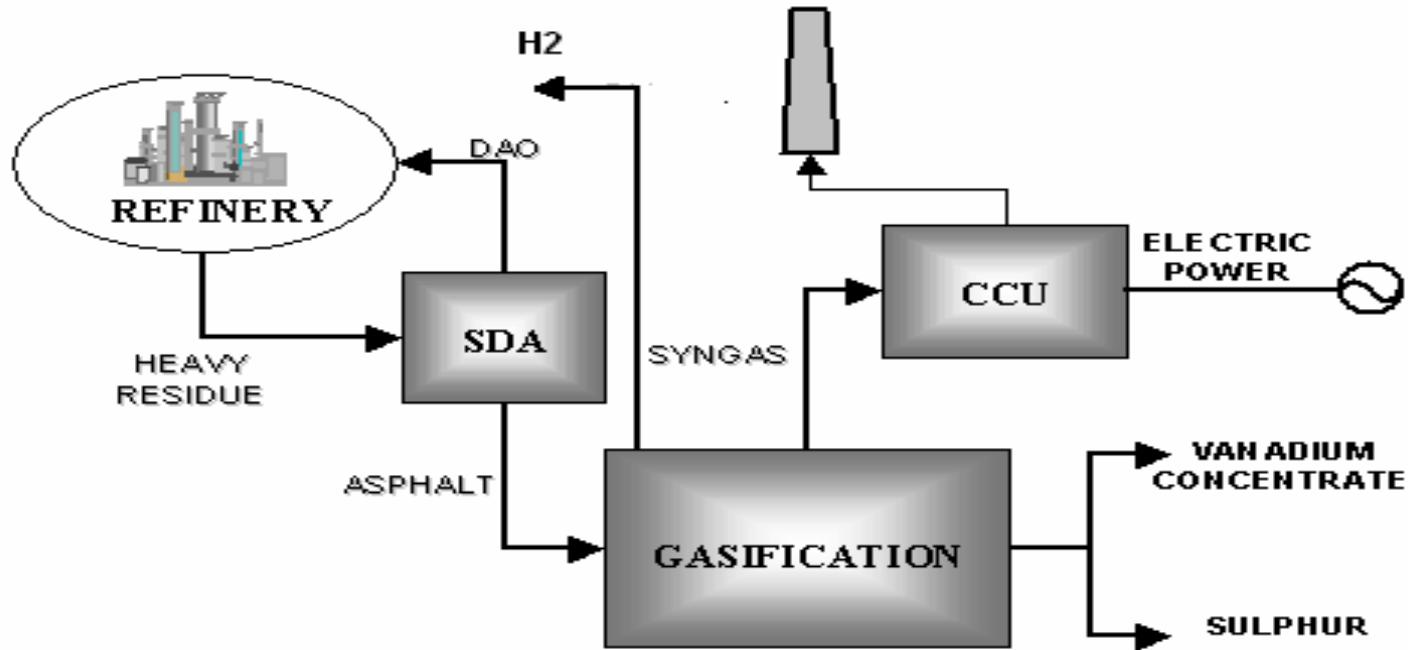
Guaranteed Benefits

What can go wrong in an APC Project ?

- Unrealistic objectives
- Tight/unrealistic schedule
- Lack of cooperation
- Technology issues
- Lack of resources (vendor/customer side)
- Overuse of resources (complete and run away)
- Lack of maintenance over time
- Etc.



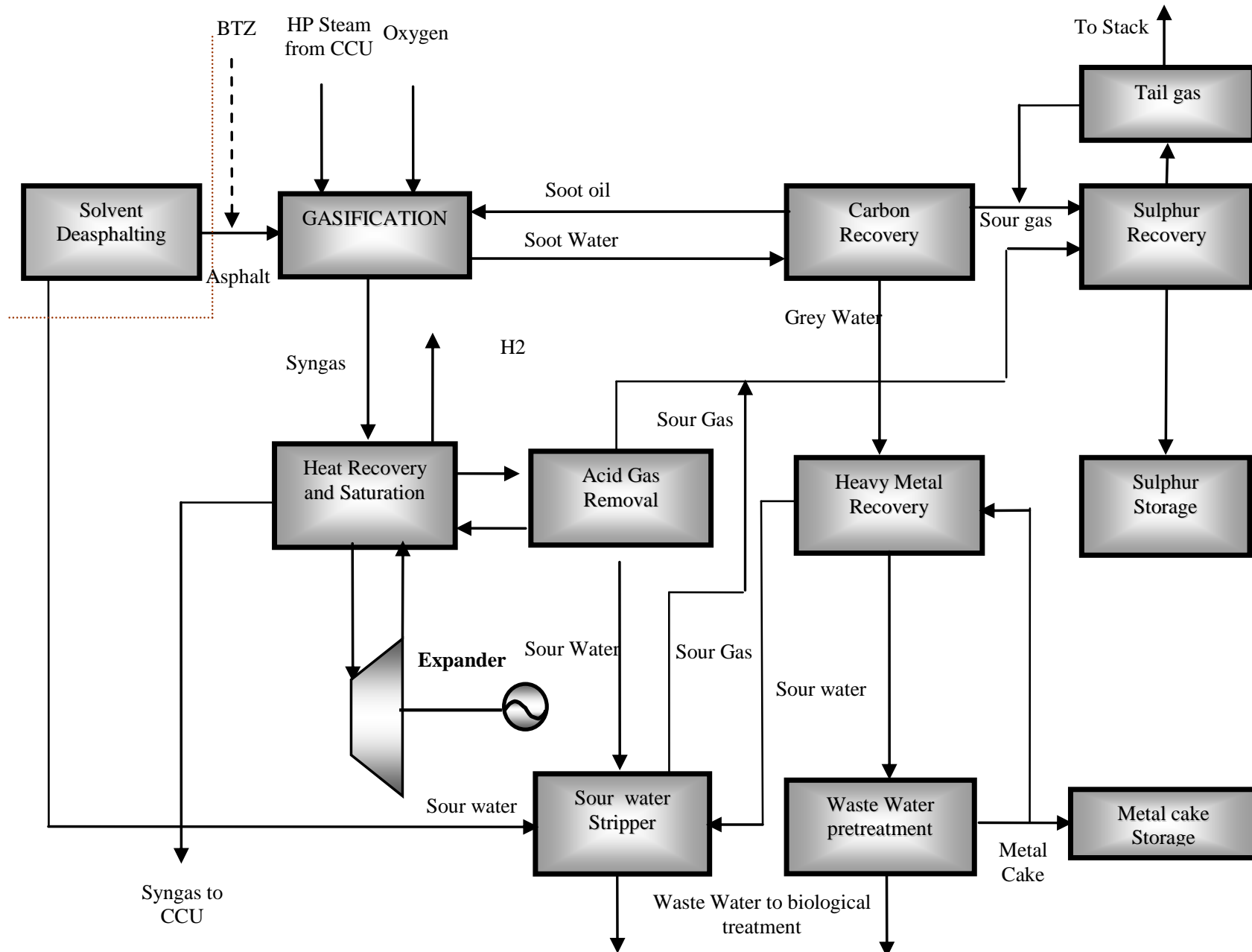
Sample case – IGCC Project



IGCC main objectives

- Process refinery residuals
- Produce Syngas to be used for Power Generation
- Extract valuable H₂

IGCC – main units

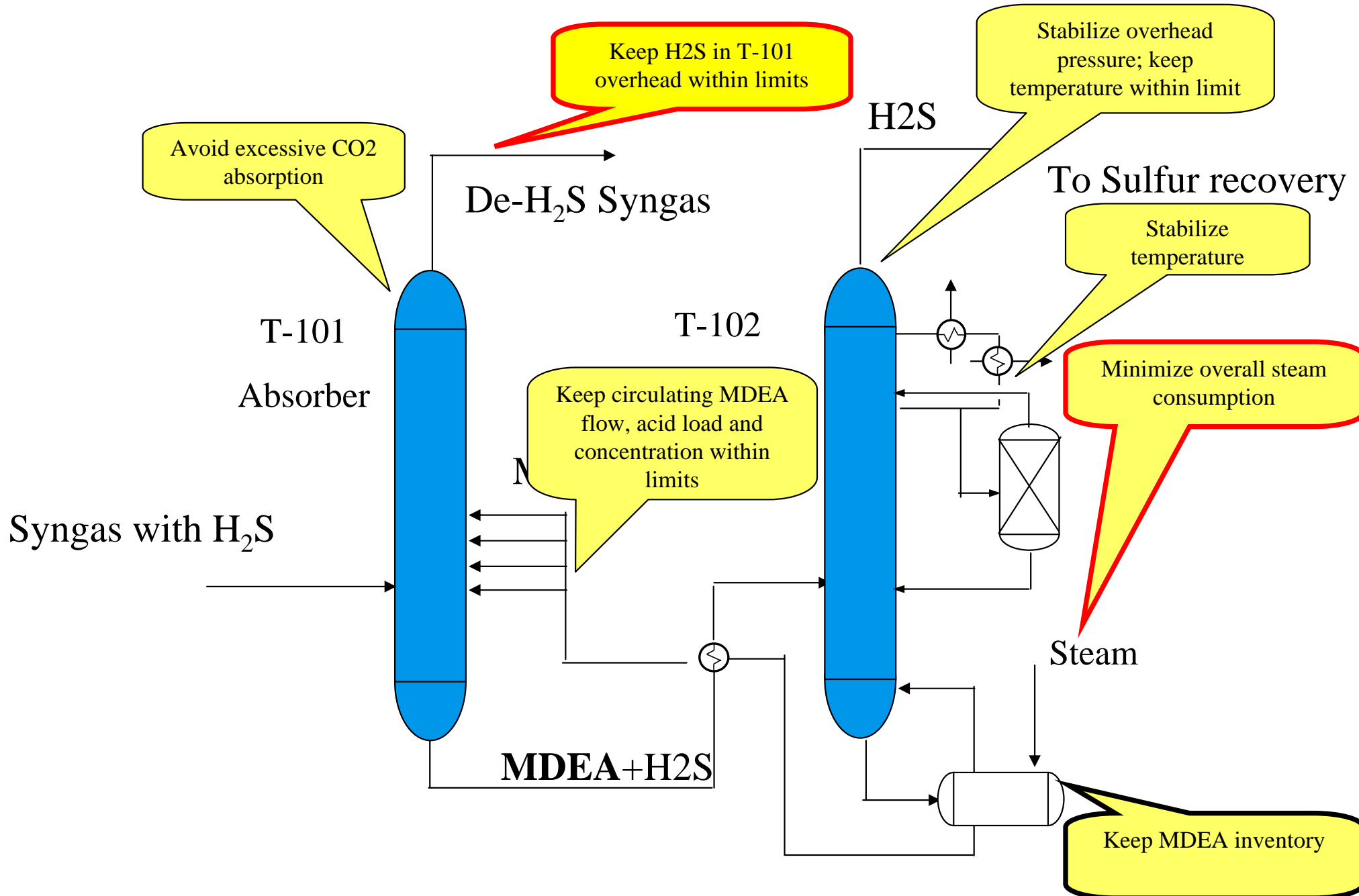


APC Implementation – phased approach

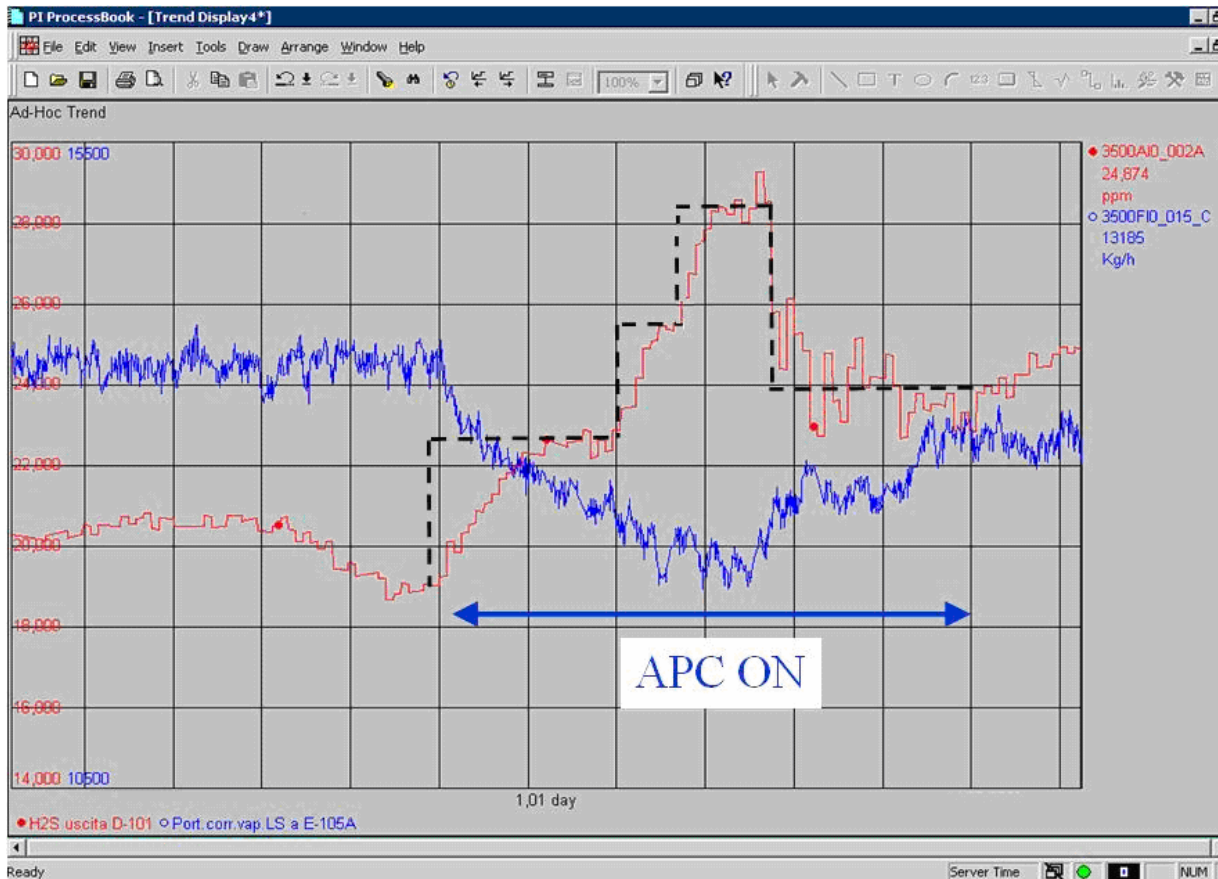
- Phase I (2006-2007)
 - Solvent De-Asphalting Unit
 - Gasifier Units (2 trains)
 - Acid Gas Removal Unit (AGR)
- Phase II (2008-2009)
 - APC Study
 - Waste Water Pre-treatment
 - Gasifiers and CCU coordination (Master Controller)
 - APC Monitoring
- Phase III (2010-2011)
 - APC Study
 - Gasifier Scrubbers level coordination
 - Master Controller expansion

Optimize^{IT} Predict & Control

APC on Acid Gas Removal Section - overview



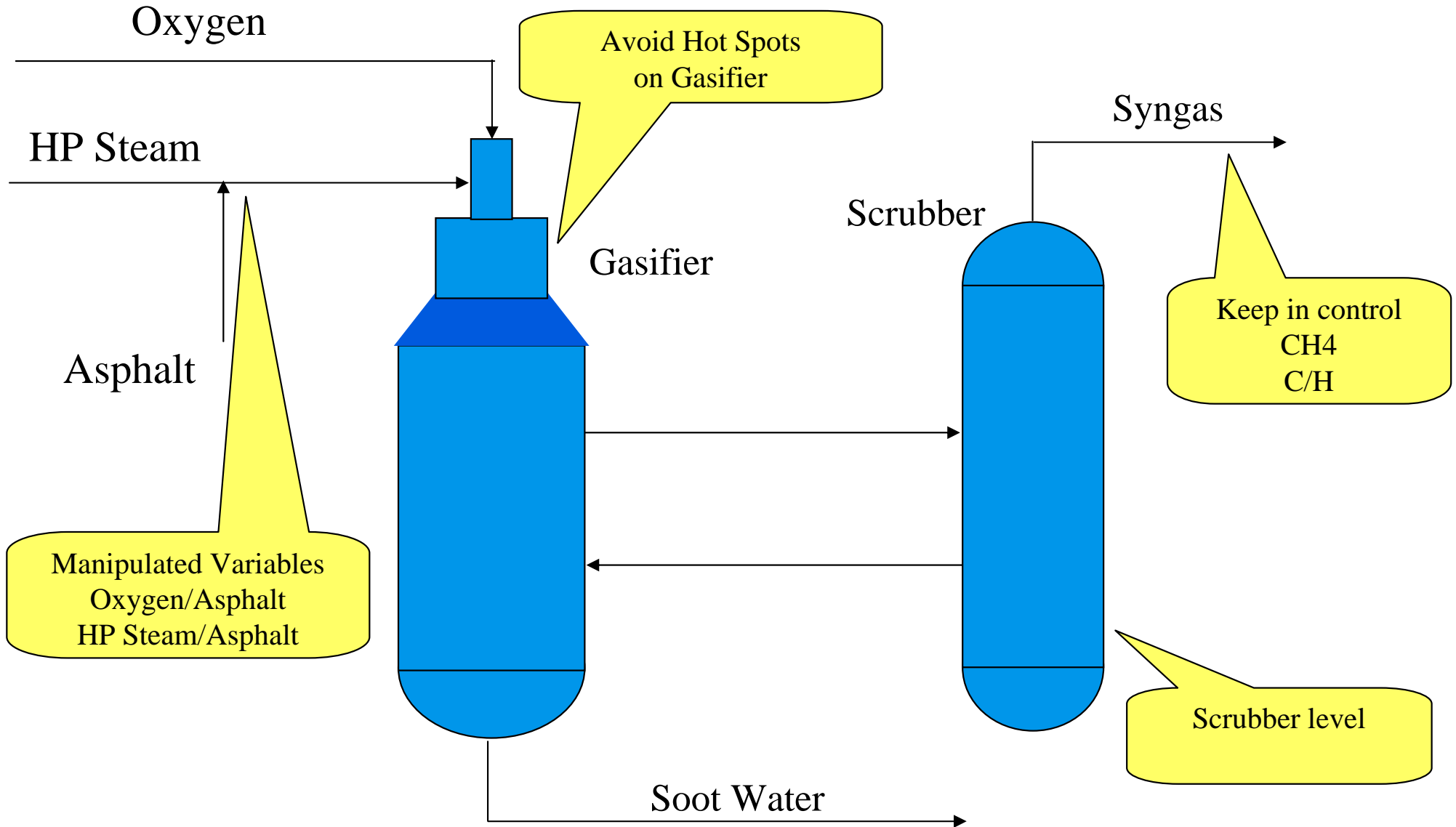
APC on Acid Gas Removal Section - overview



- Average reduction of steam usage: 10 – 15%
- MDEA injection moved to a higher average position
- Service factor: 95+ %
- ROI: <3 m

Closed loop response to a H₂S setpoint change with APC ON – impact on regenerator steam

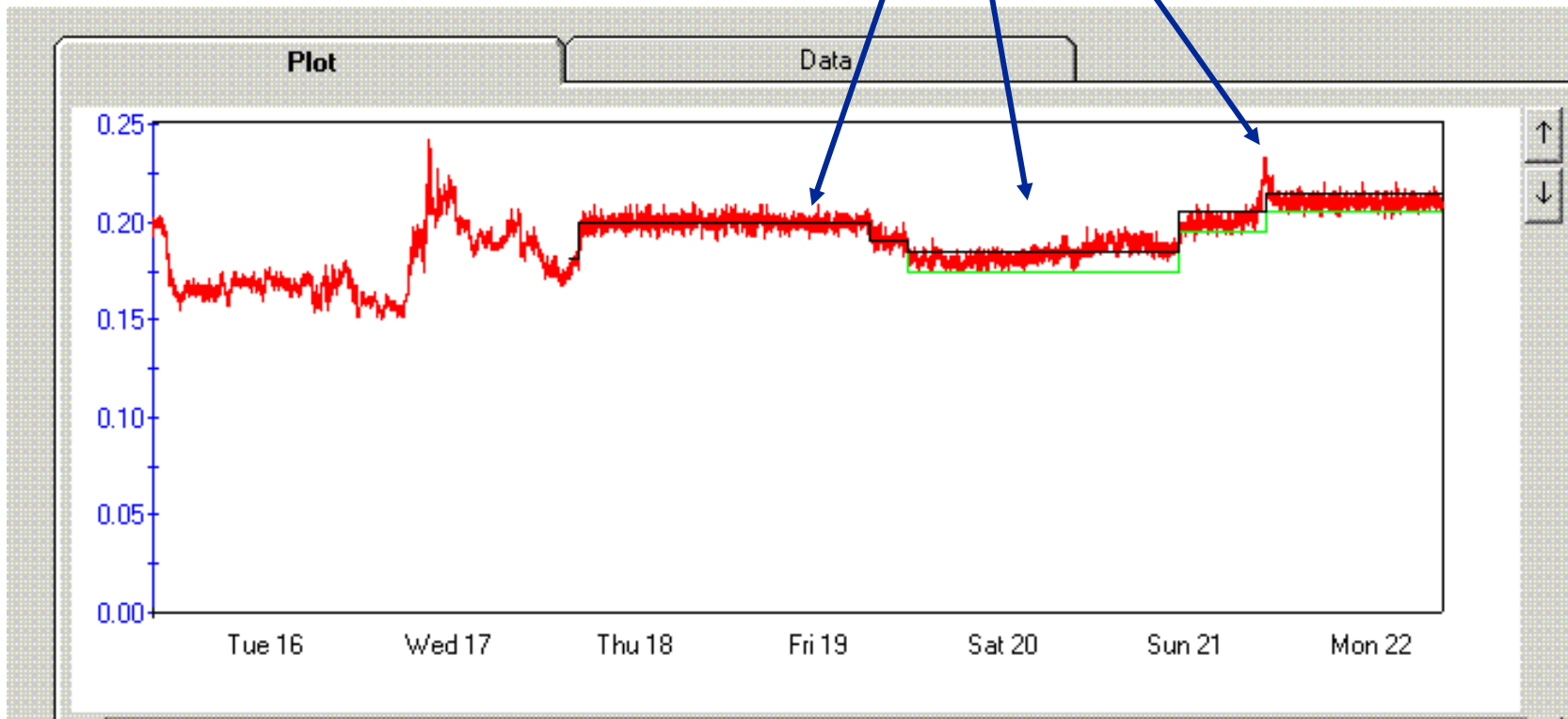
APC on Gasifiers - overview



Gasifier – CH₄ control sample

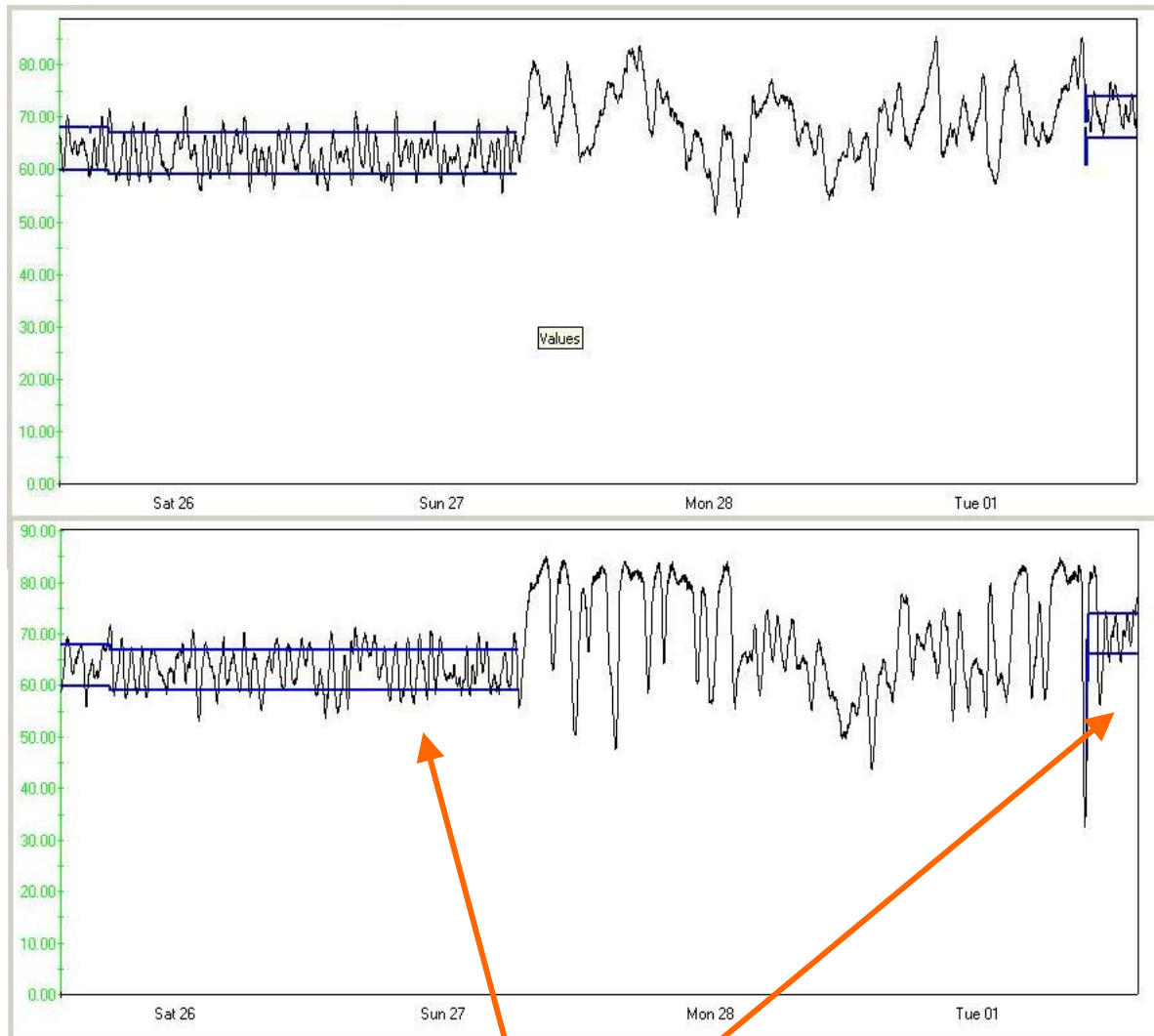


CH₄ Control APC ON



Methane control -over one week

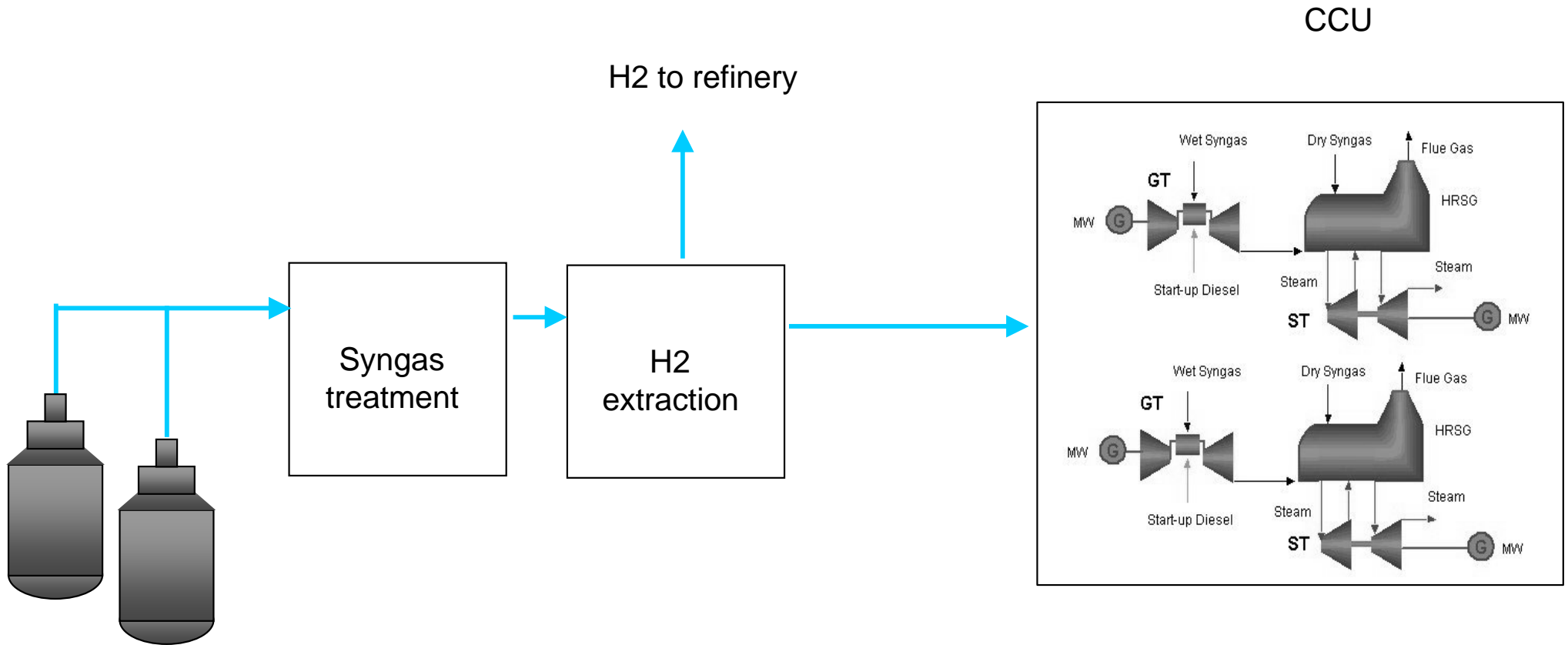
Gasifier Scrubbers – level control (2011)



- Multiple levels interacting – 2 scrubbers, 3 drums
- Pump limits
- Levels - slow dynamics
- Highly complex DCS control schemes
- Need for periodic operator actions/check
- 10 CVs, 4 MVs, 7 FFs

APC ON

Master Controller APC



Gasifiers

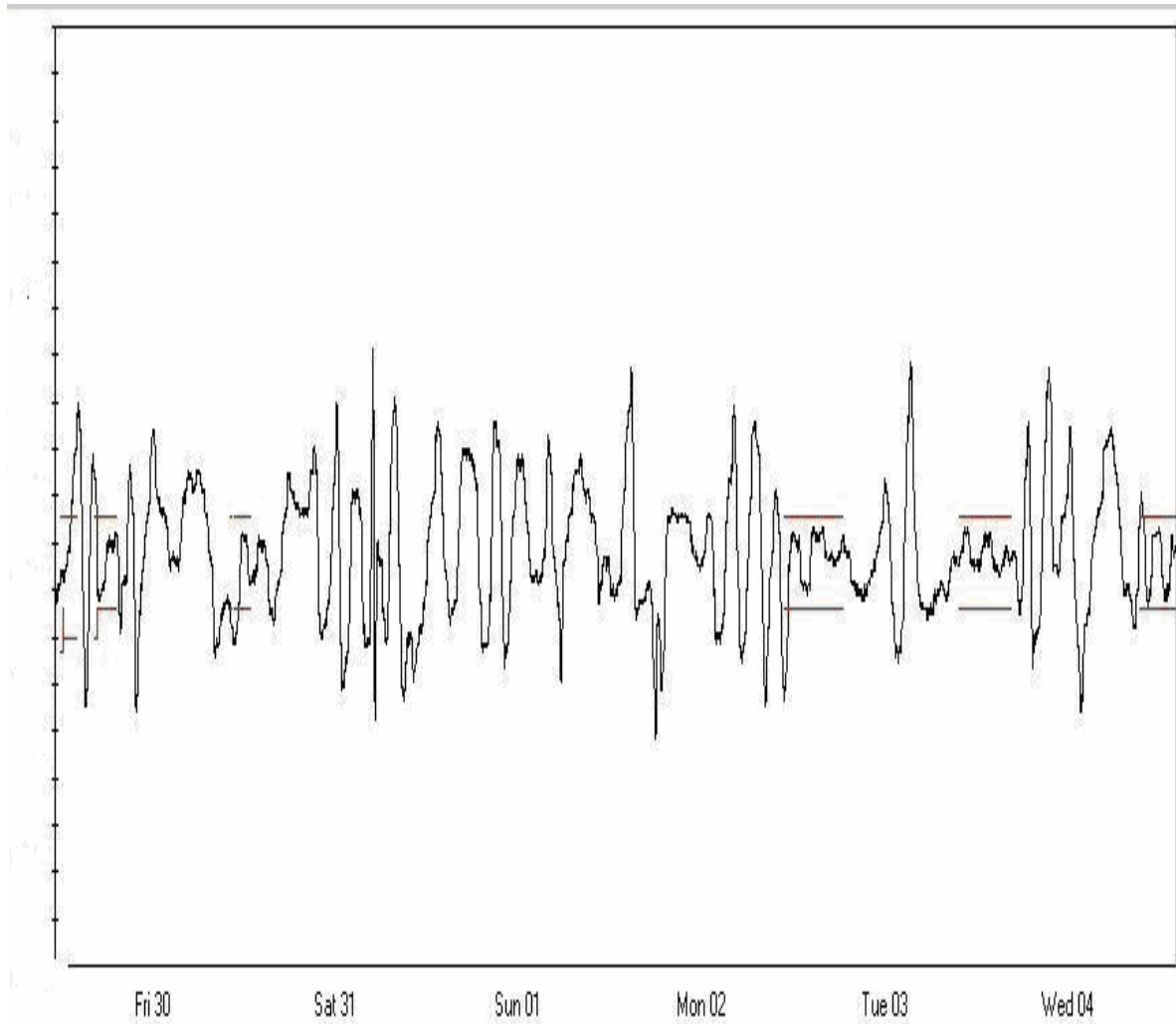
Main objective – balance Syngas to produce MW

Master Controller APC

- Objectives
 - Balance Syngas production and usage – keep pressure constant
 - MW production target
 - Production and safety constraints (e.g. postfiring temps/pressure, pumps amperes, etc.)
- Different dynamics – slow (gasifiers, mass transportation) and very fast (GTs), postfiring, expander
- React to disturbances – e.g. H₂ production



Pressure control – Syngas header



- Pressure control over first week of commissioning
- Syngas balancing
- MW Maximization against plant bottlenecks
- ‘ON’ when limits are shown

APC Implementation – lessons learnt

- Key factors
 - Team work and cooperation
 - Resource Commitment
 - Phased approach helps when resources are limited (in this case customer side)
 - Long term maintenance
 - Justify additional projects/extensions with studies – safer approach



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Thank you !