Control Objective

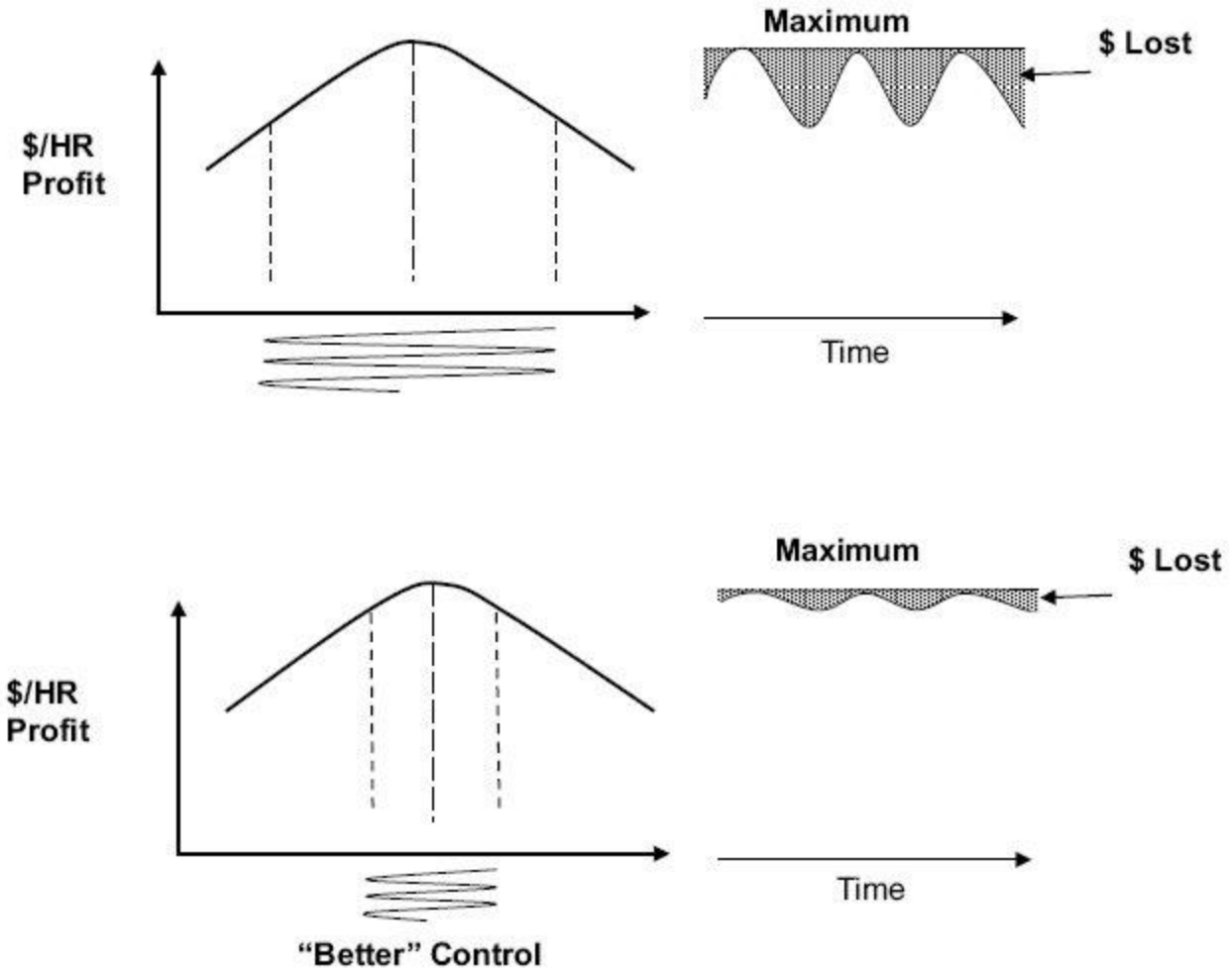


Figure 10-1. Operating at Global Production Maximum

- For the case, production is greatest when the band of variation is reduced to zero and the process parameter is maintained at the value corresponding to maximum production

Impact of Operating Target

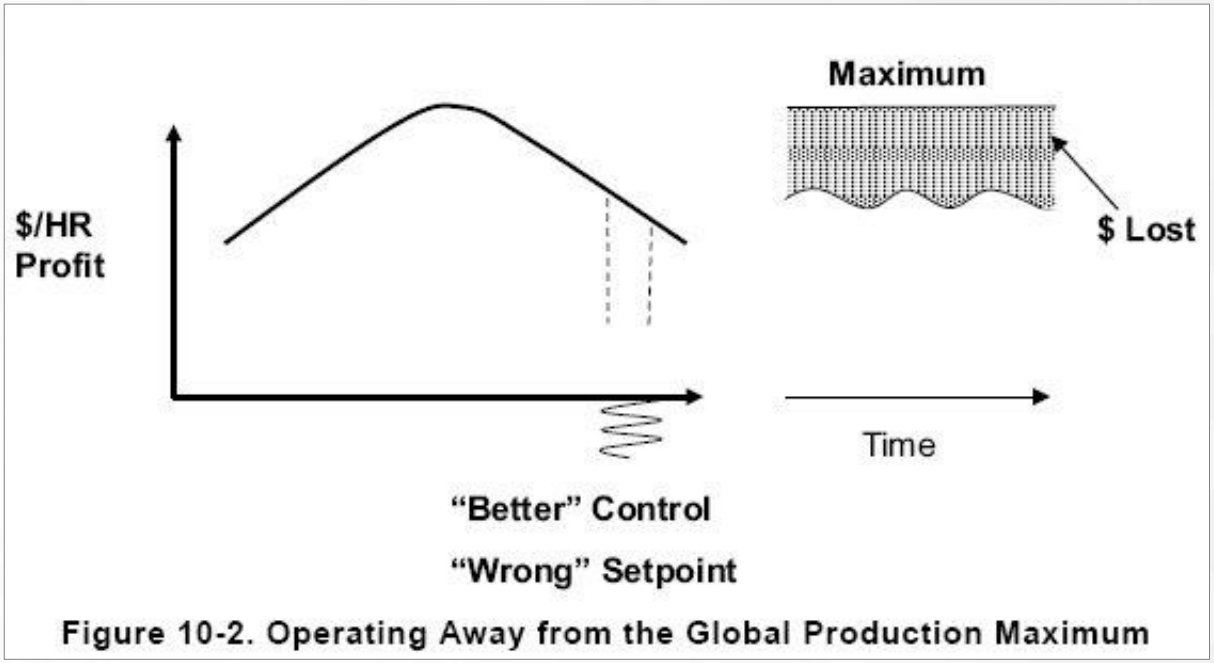


Figure 10-2. Operating Away from the Global Production Maximum

- To benefit from improvement in control, the loop must operate at the target that provides maximum production.
- The plant design conditions may be used as a guide in establishing setpoints for best operation

Operating at a Limit

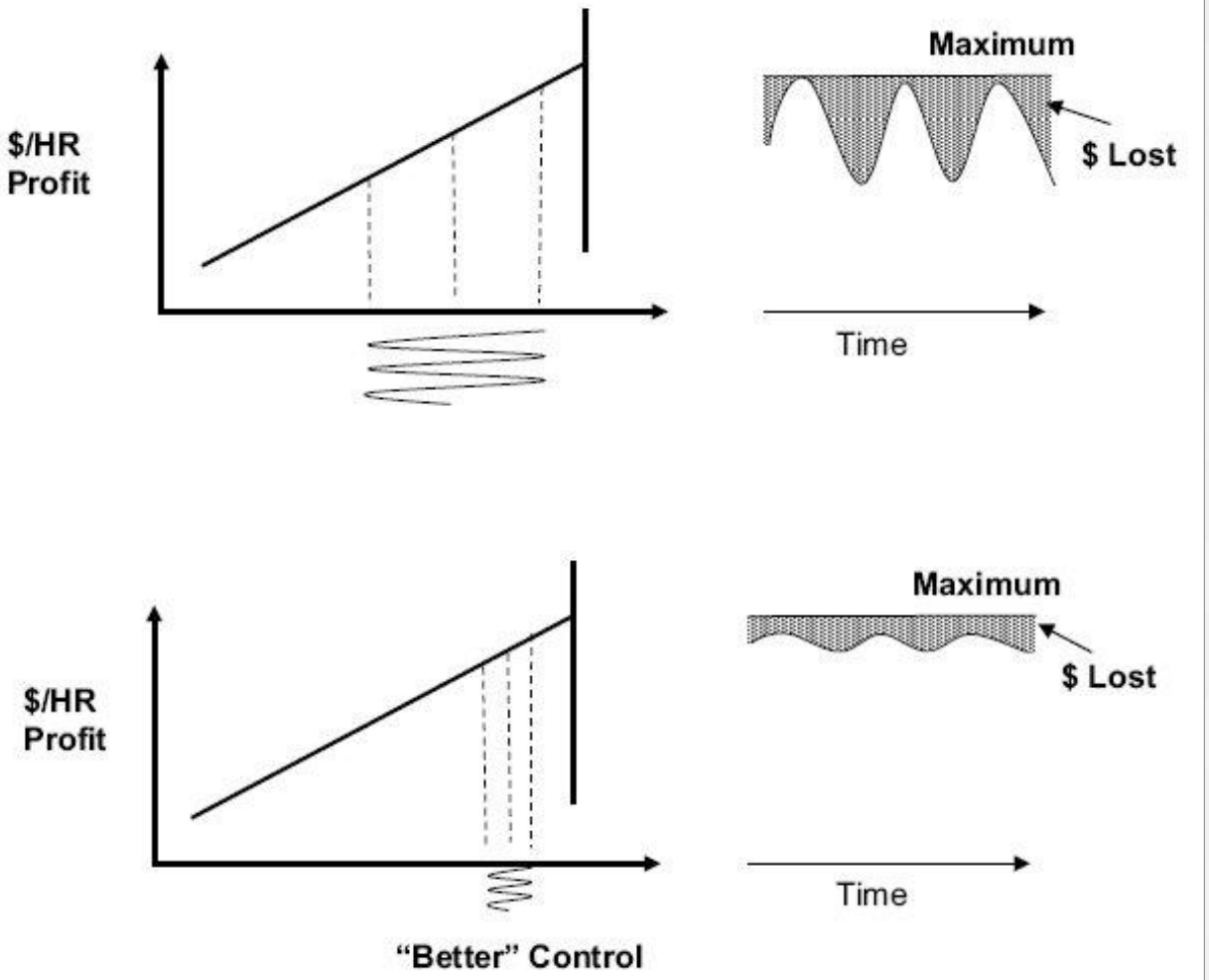


Figure 10-3. Production Maximum at Equipment Physical Limit

- For this case, maximum production is obtained by maintaining the process parameter at a limit determined by some plant limitation.
- How close to the limit you can operate is determined by the quality of the control

Impact of Reduced Variability

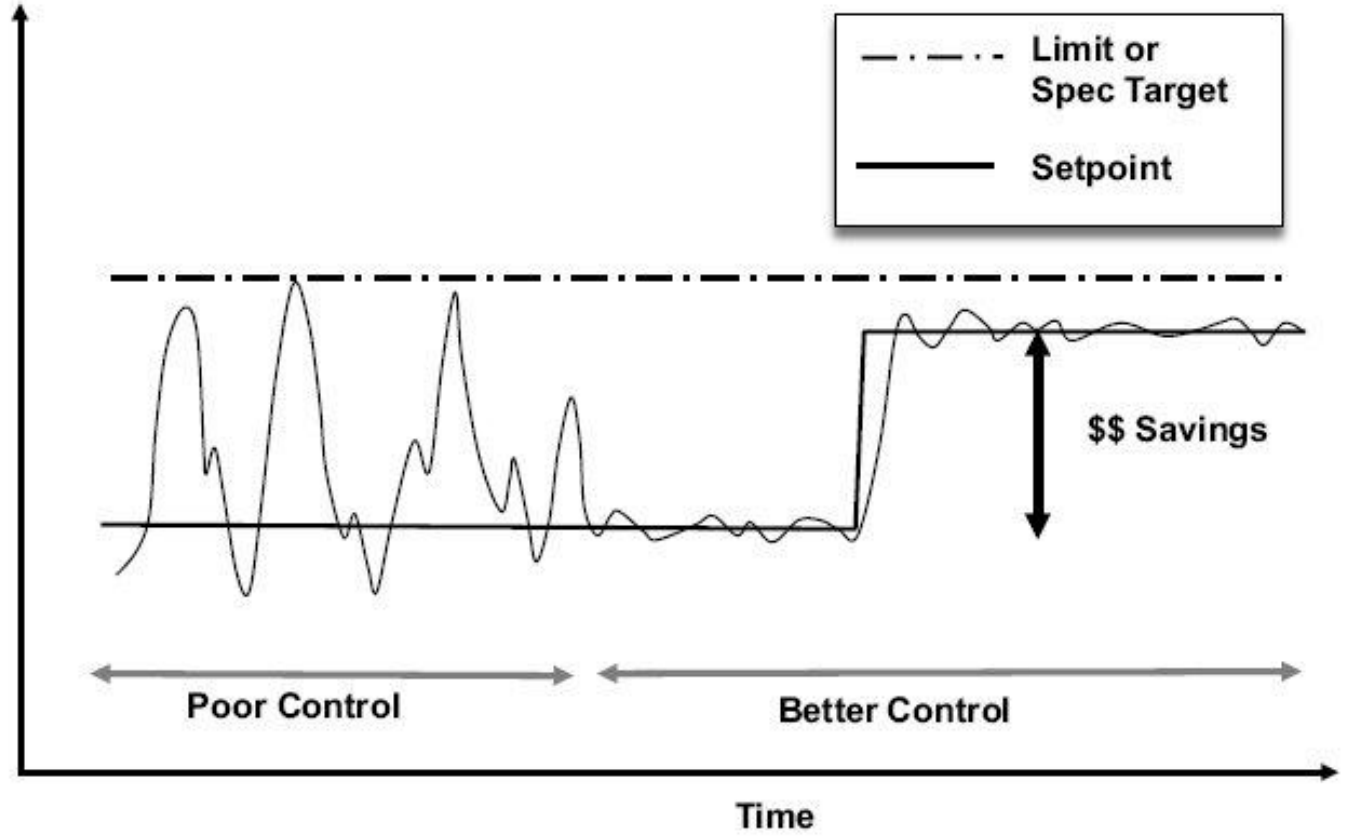


Figure 10-4. Production Maximum at Limit

- Production improvement is obtained by operating closer to product specification or operating limit.

Example - Ammonia Plant

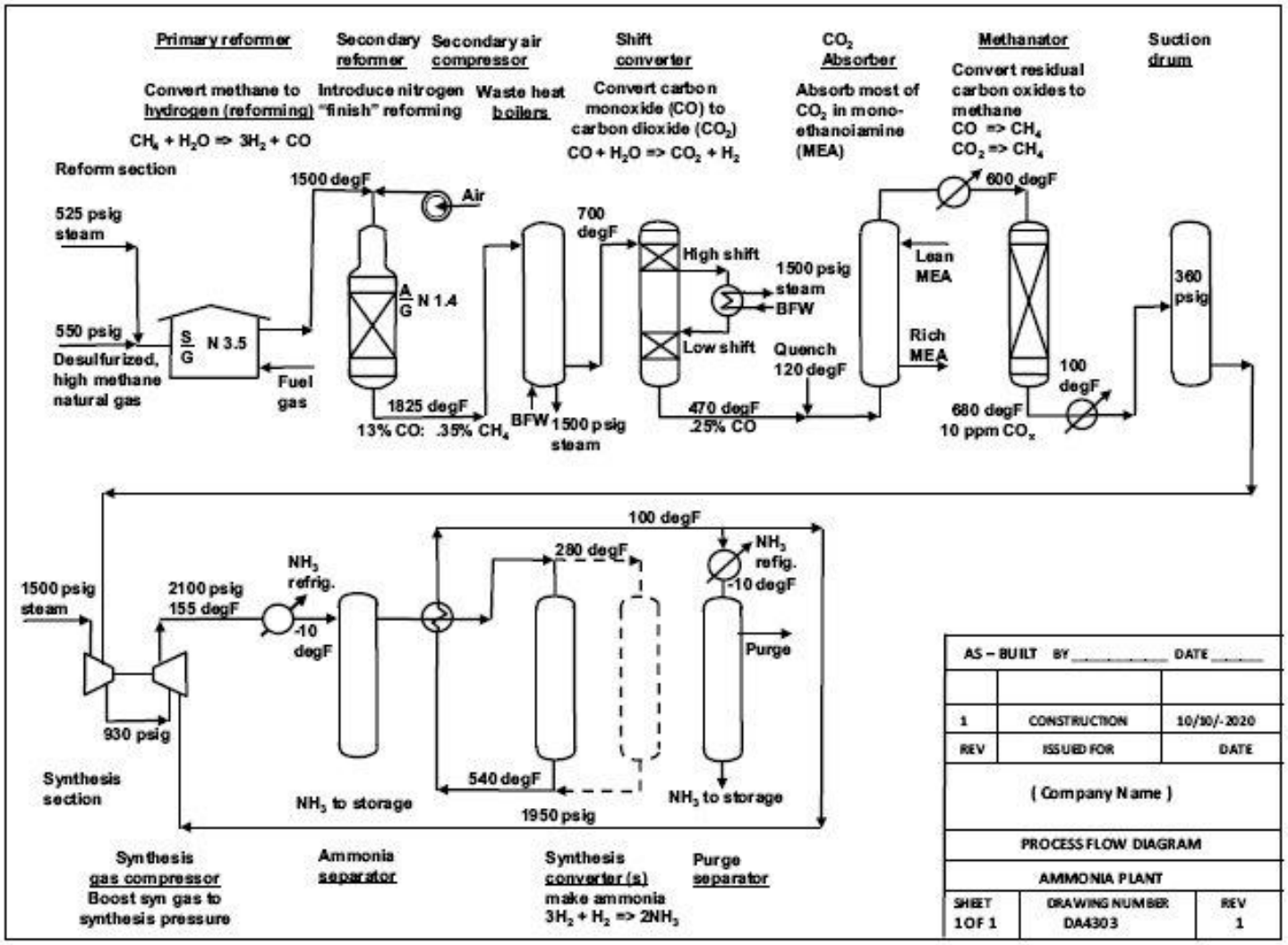
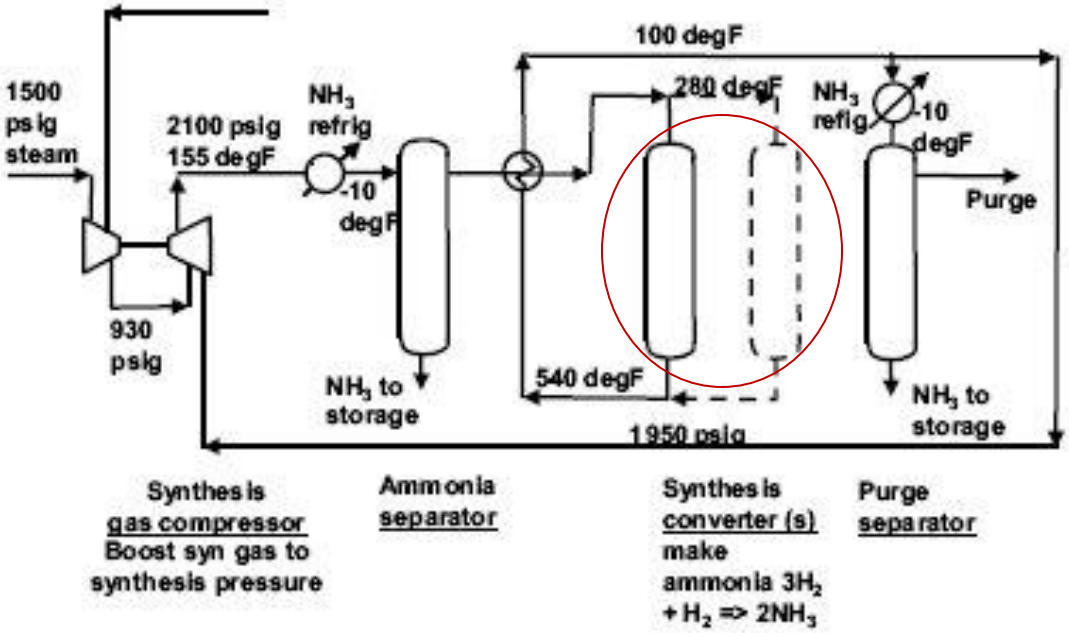


Figure 10-5. Ammonia Plant Example

Example - Ammonia Plant (Cont.)



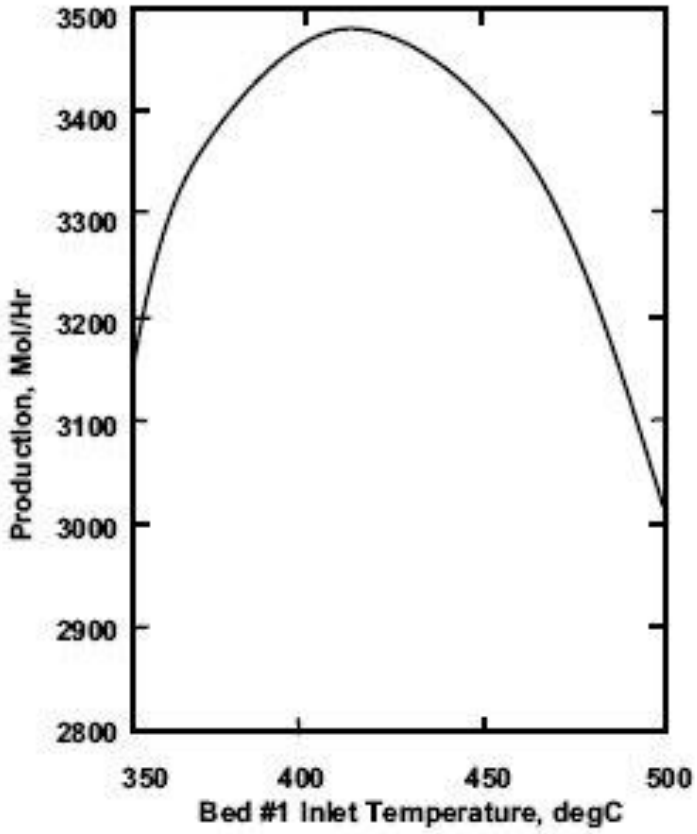
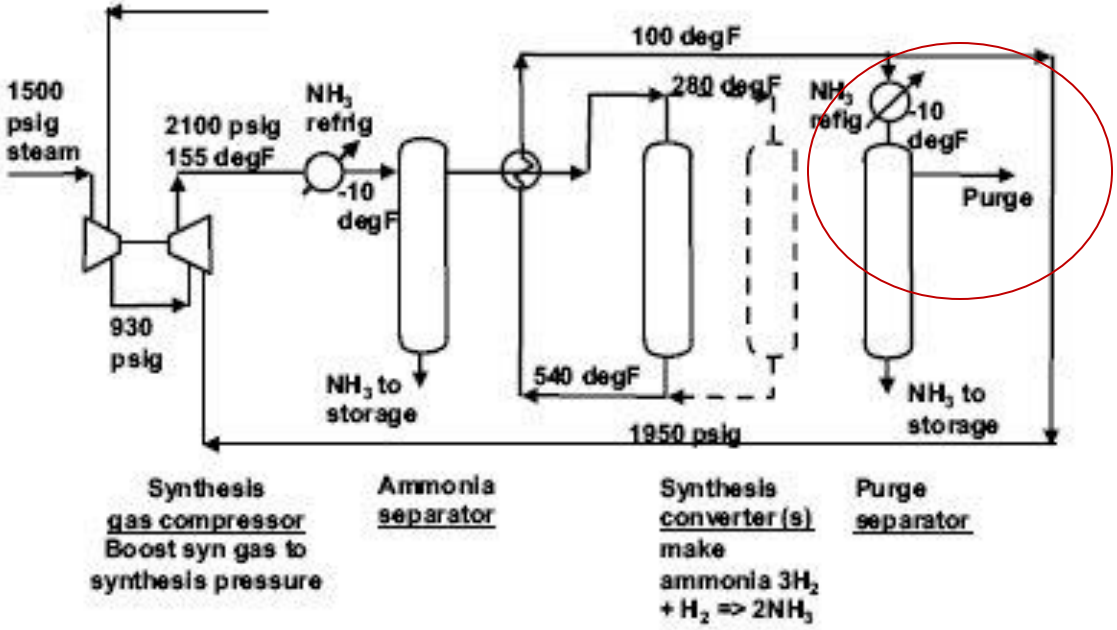


Figure 10-6. Impact of Synthesis Bed Temperature on Plant Production

Example - Ammonia Plant (Cont.)



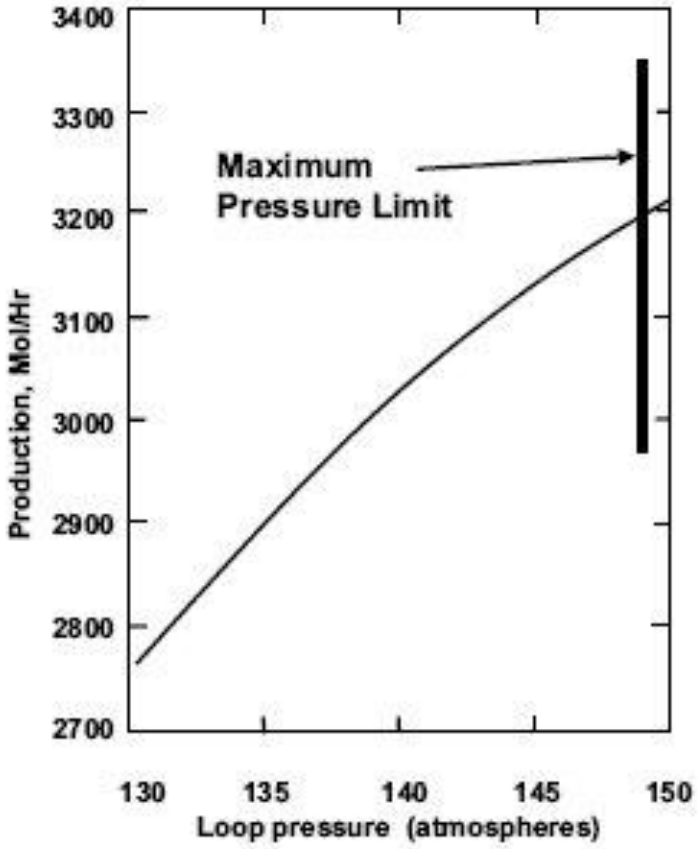


Figure 10-7. Synthesis Loop Pressure Control at a Limit

Other Control Objectives

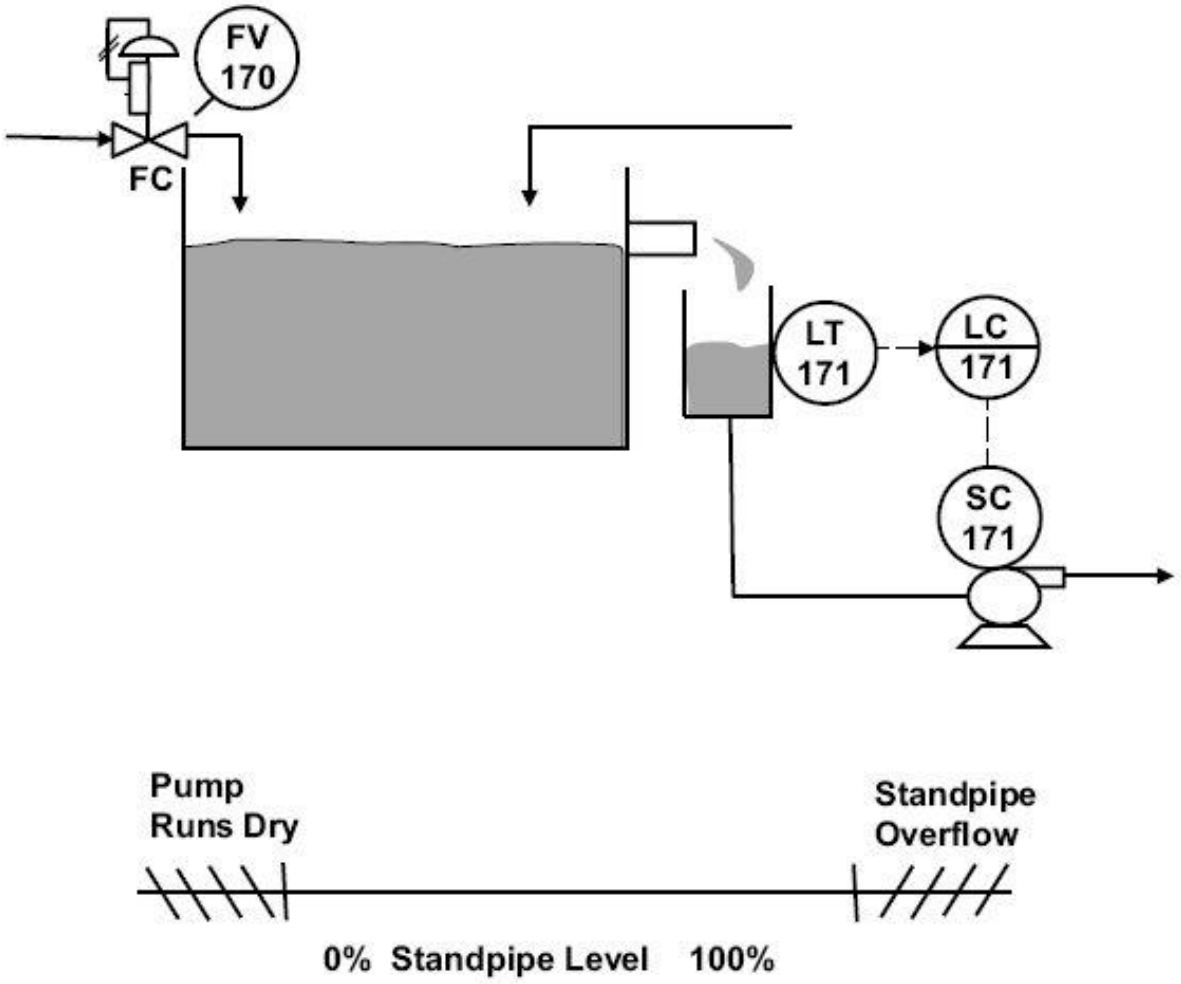


Figure 10-11. Equipment Protection – Standpipe Level Control

Balancing Control Complexity and Benefits

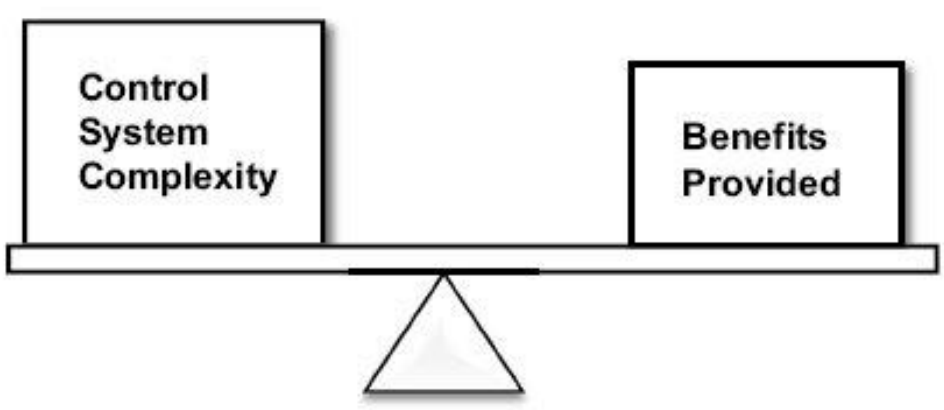


Figure 10-12. Control System Benefits Balance

- Various techniques may be used to improve the control of a process
- As the complexity of the control system increases, so does cost for operator training and maintenance
- The complexity (cost) of the control system should be balanced with the benefits provided
- The benefits of control improvement may be influenced by market conditions i.e. value of product, cost of feedstock, energy cost