

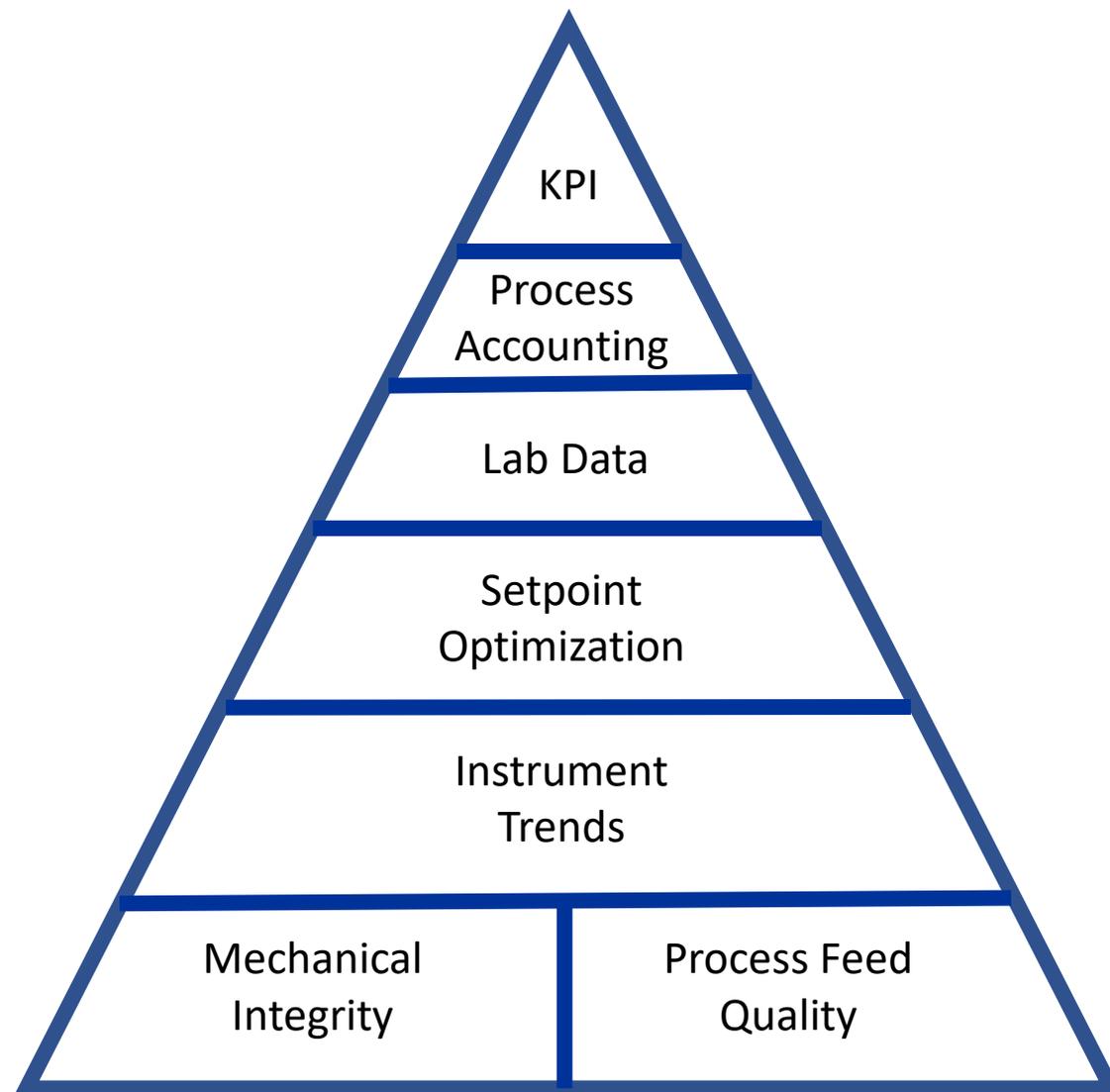
Efficient Operations Management at Sugar Factories with a Focus on Industrial Separators

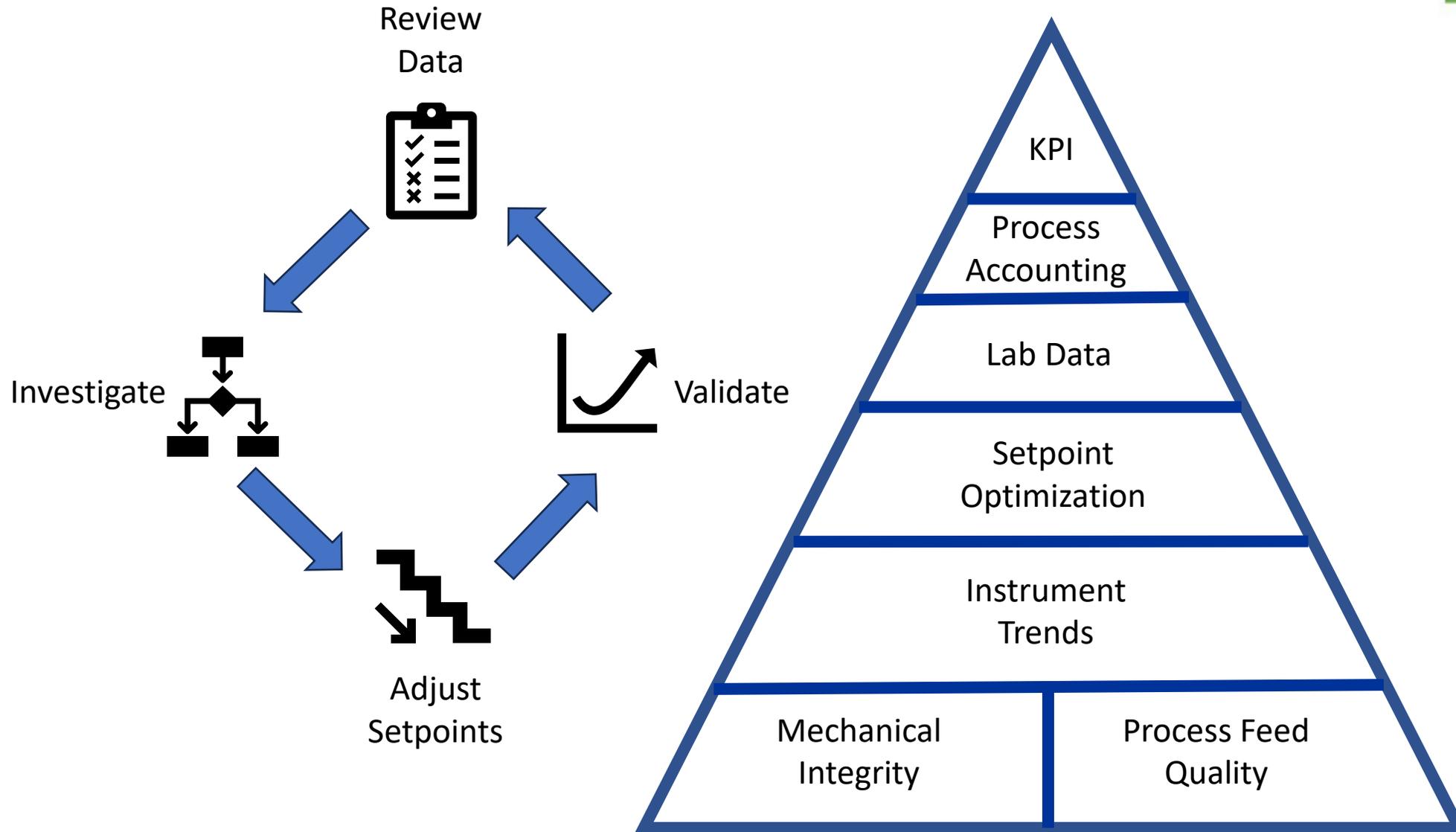
CY GAUDET, IRMA ARRIETA, and STEVE PEACOCK

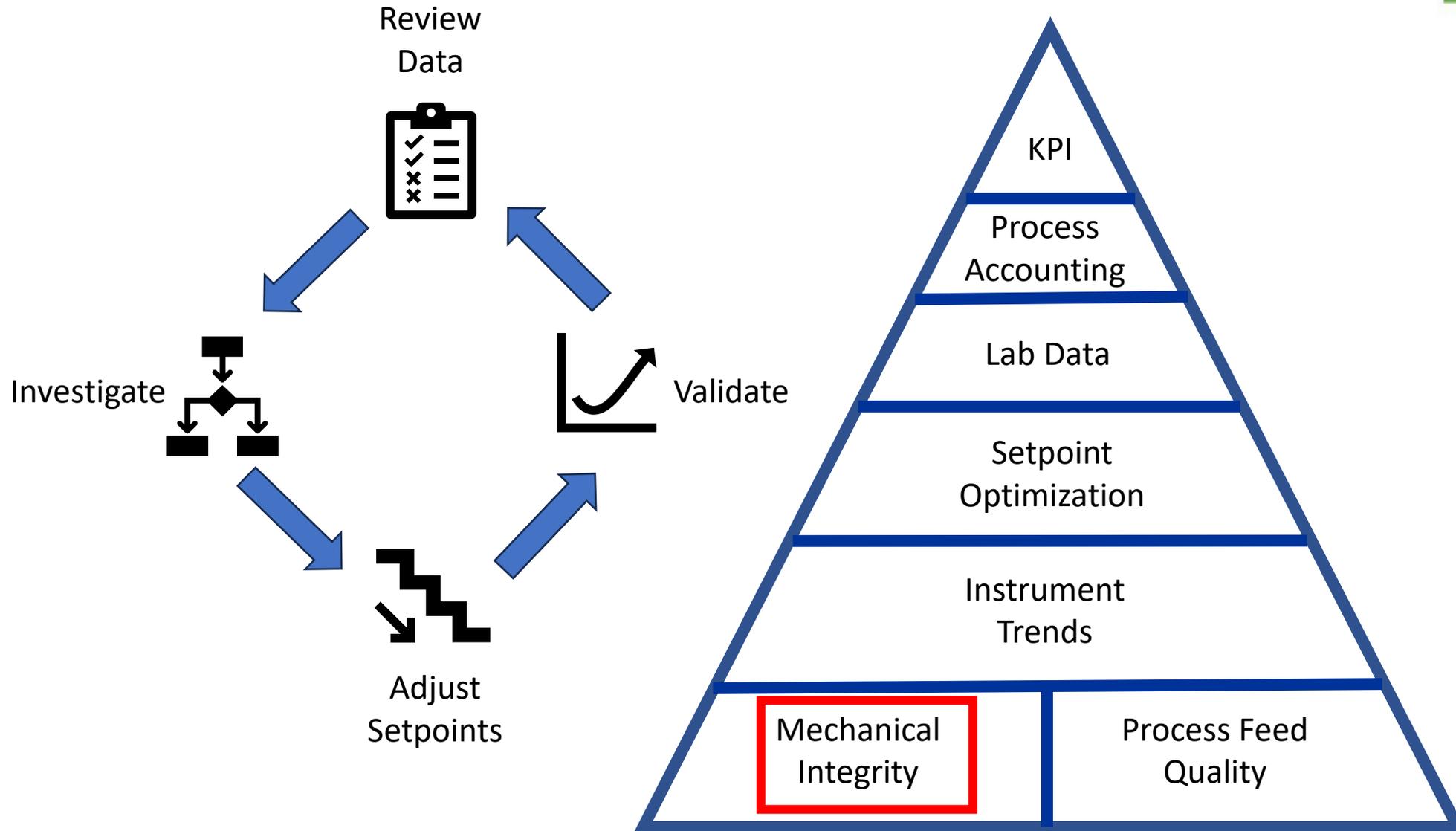
Amalgamated Research LLC

Steps to a Successful Process

- Defined Process Goals and Targets
 - Throughput
 - Recovery
 - Product quality
 - HSE compliance
 - Utility-use efficiency
- Debottlenecking and Optimizing Performance to KPI's
 - Is the unit capable of operating at the KPI targets
 - Is there a functional failure in the system?
 - Does the system need setpoint adjustments?
 - Is performance being accurately reported?
- Maintaining System Capability
 - Production Consistency
 - Performance Consistency
 - Equipment Service Life and Longevity







Reactive Maintenance

Contributing Factors:

- Tools are unavailable to isolate causes.
- Historical data is not available to link cause and effects.
- Troubleshooting starts when the process stops.
- Undiagnosed failures cause system instability.
- There is no time for root cause analysis.
- Symptoms of the cause are being treated.

Consistency Focused Operation

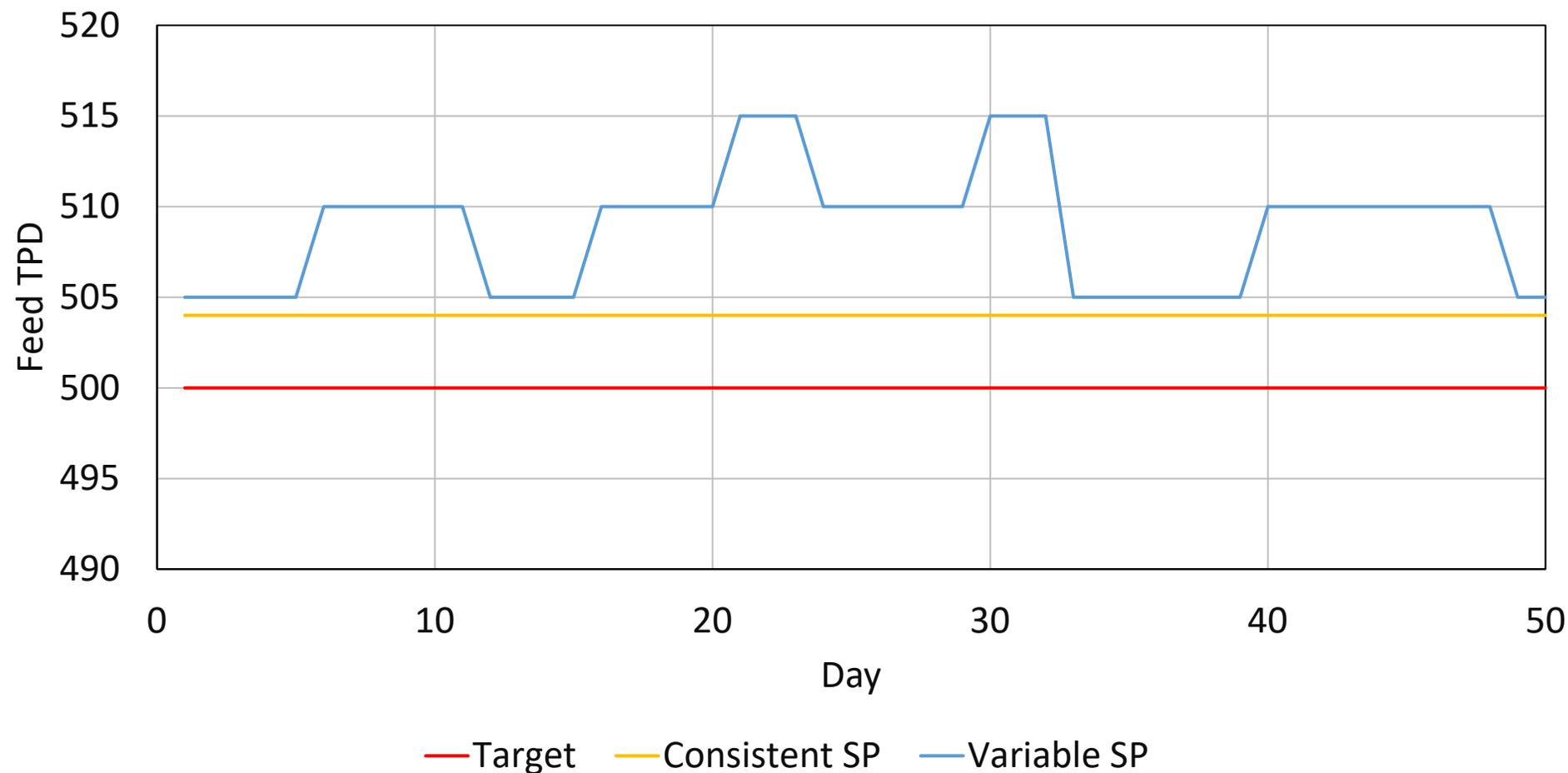
Operational Characteristics

- Achievement of performance targets
- Products are meeting specification
- Defined operating windows

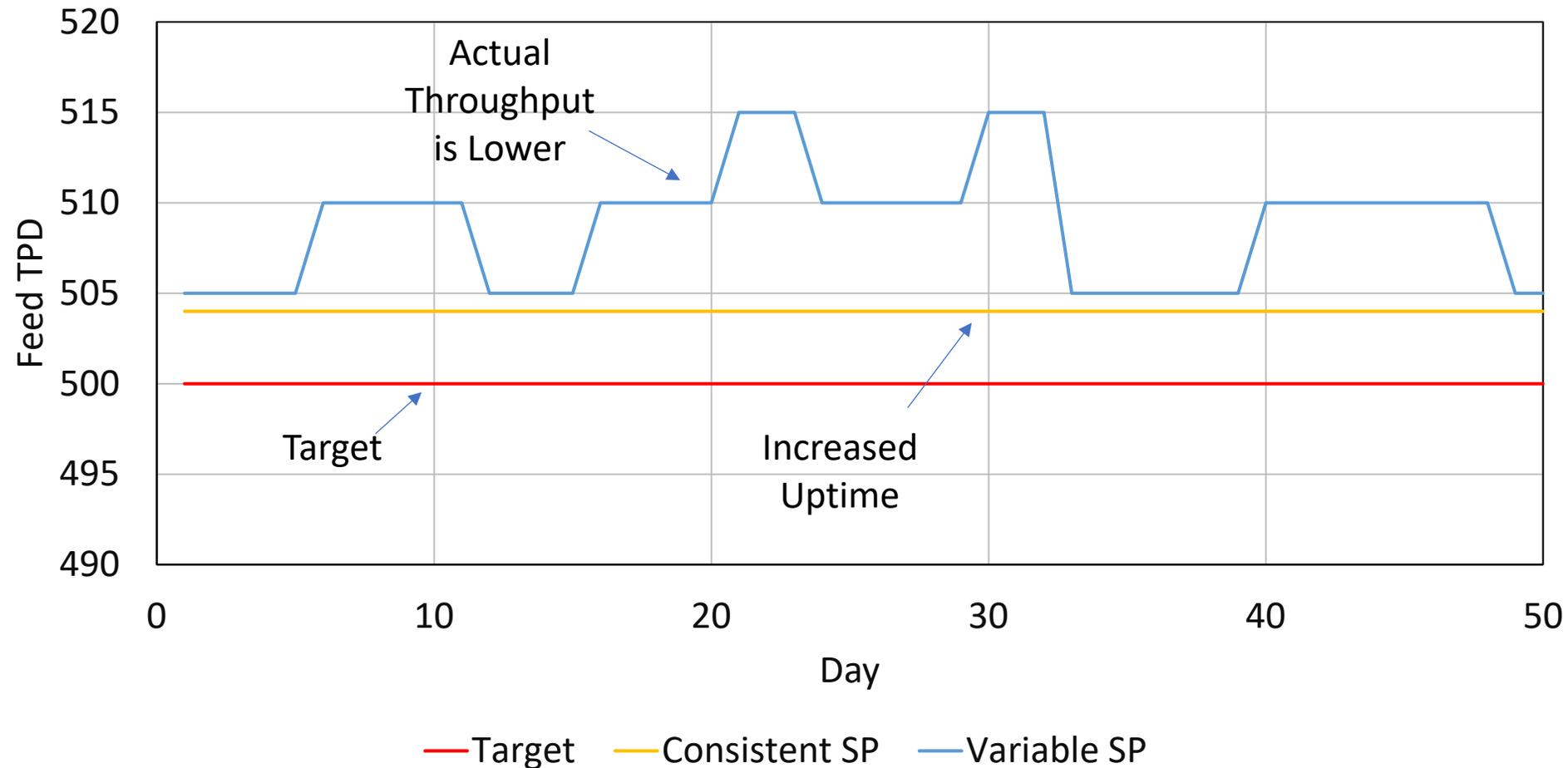
Process Focus

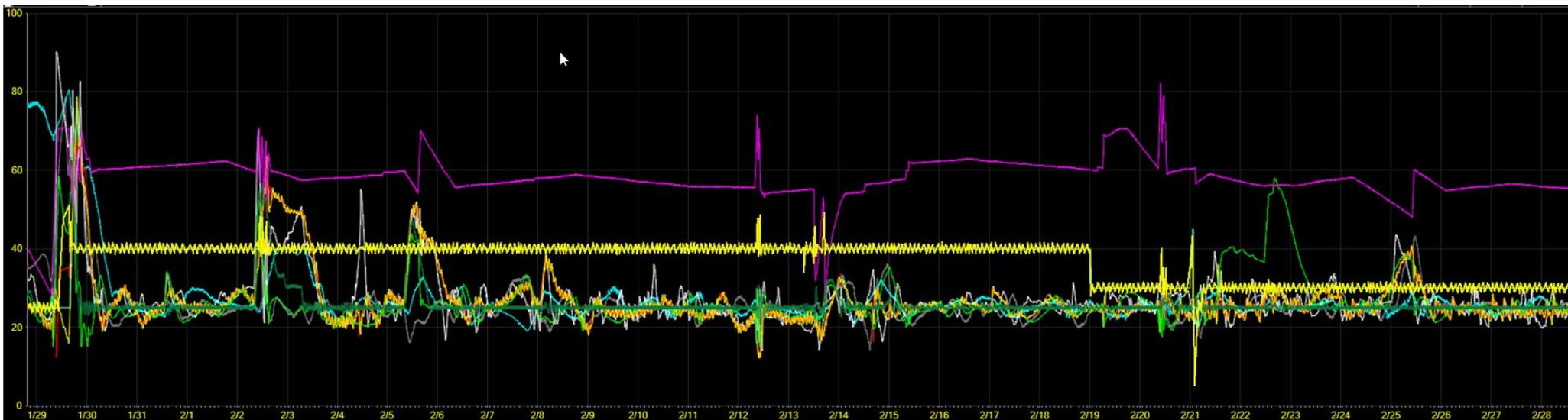
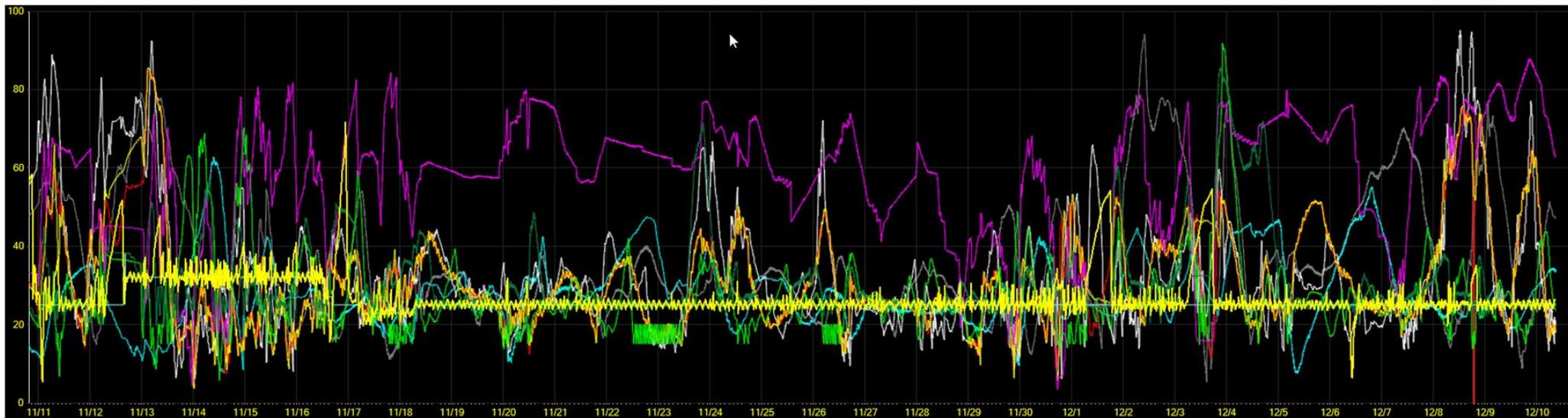
- Systematic monitoring
- Reduction of user input variations
- Process predictability
- Increase of uptime

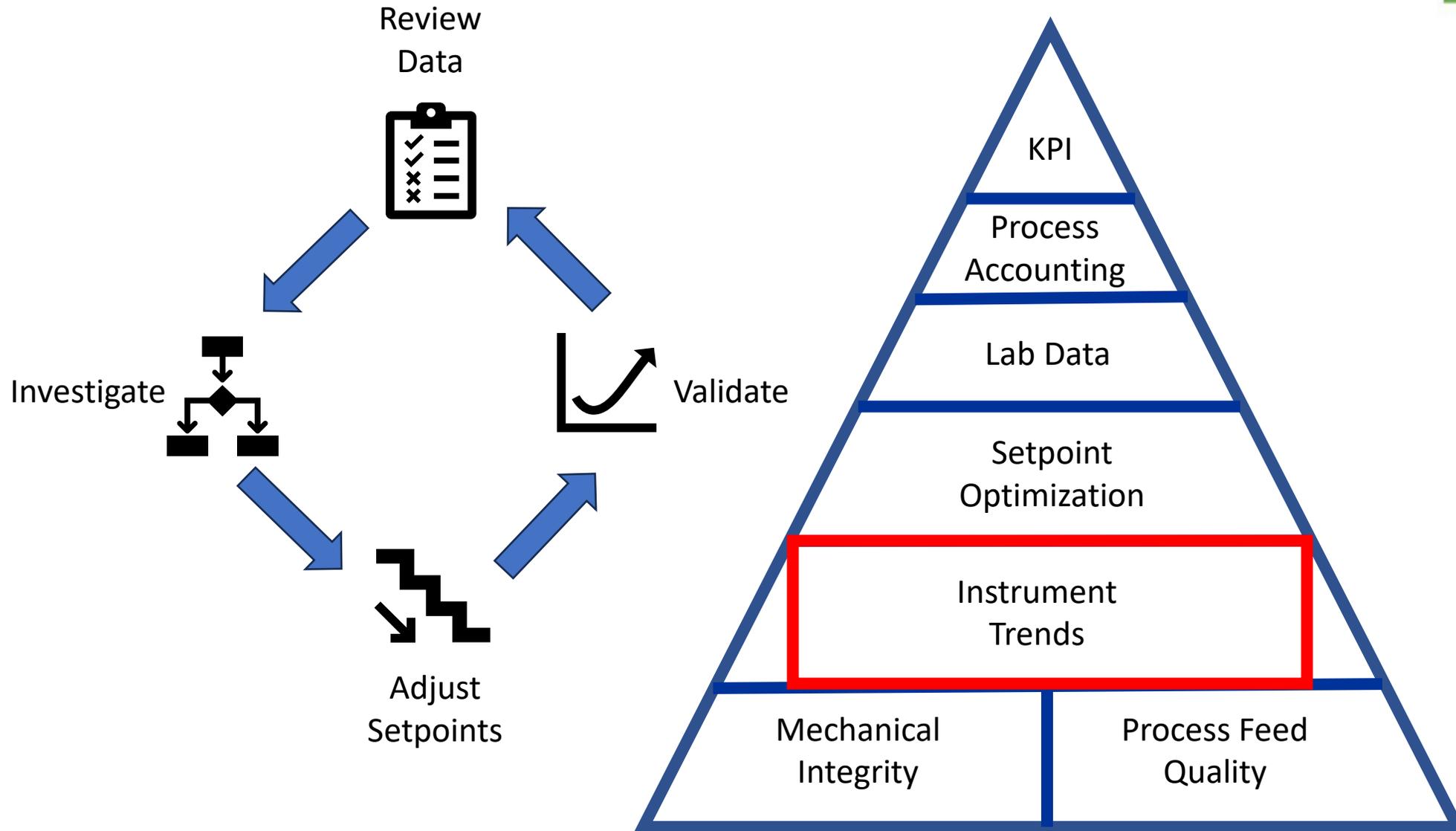
Input Disturbances

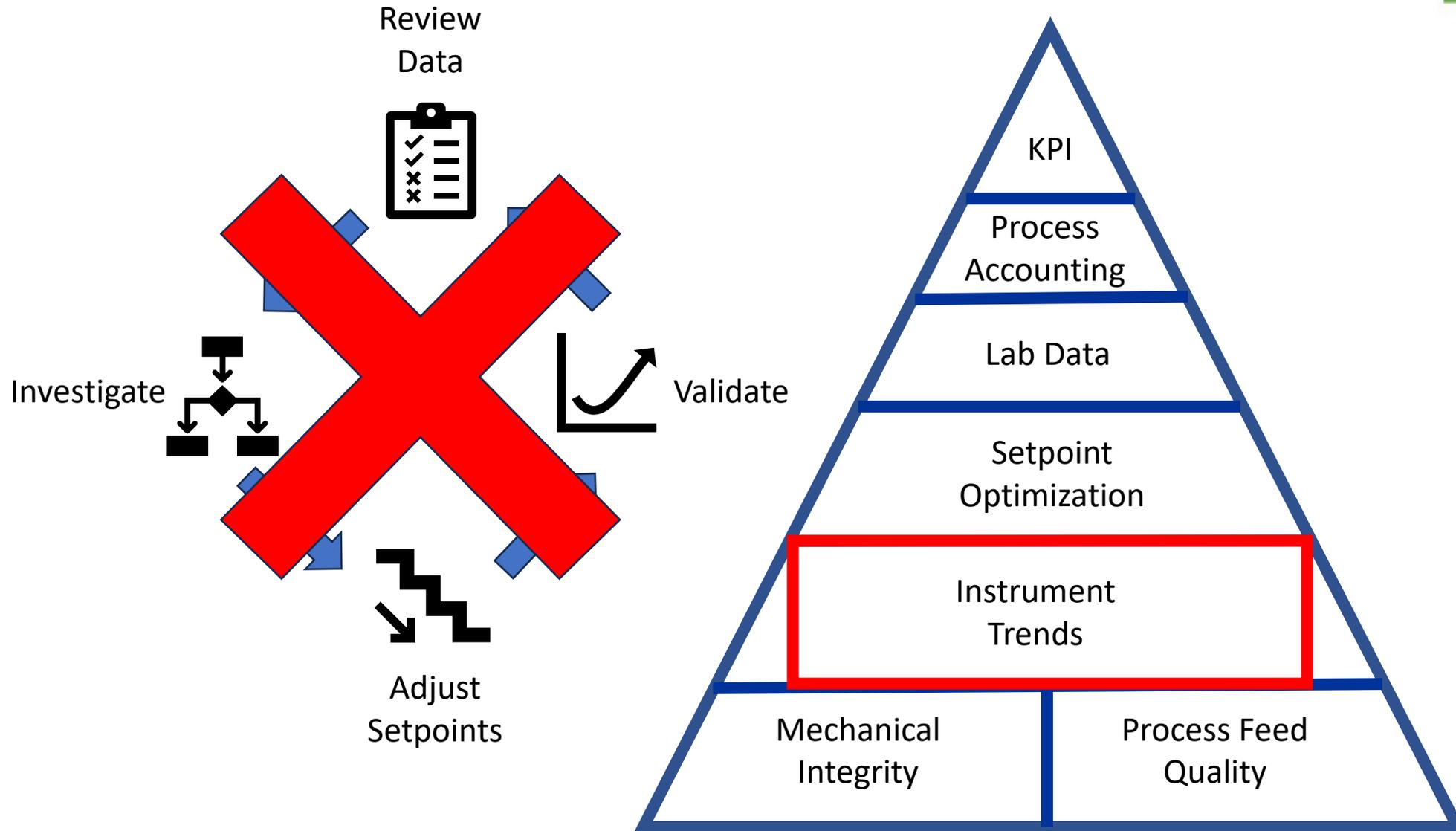


Input Disturbances







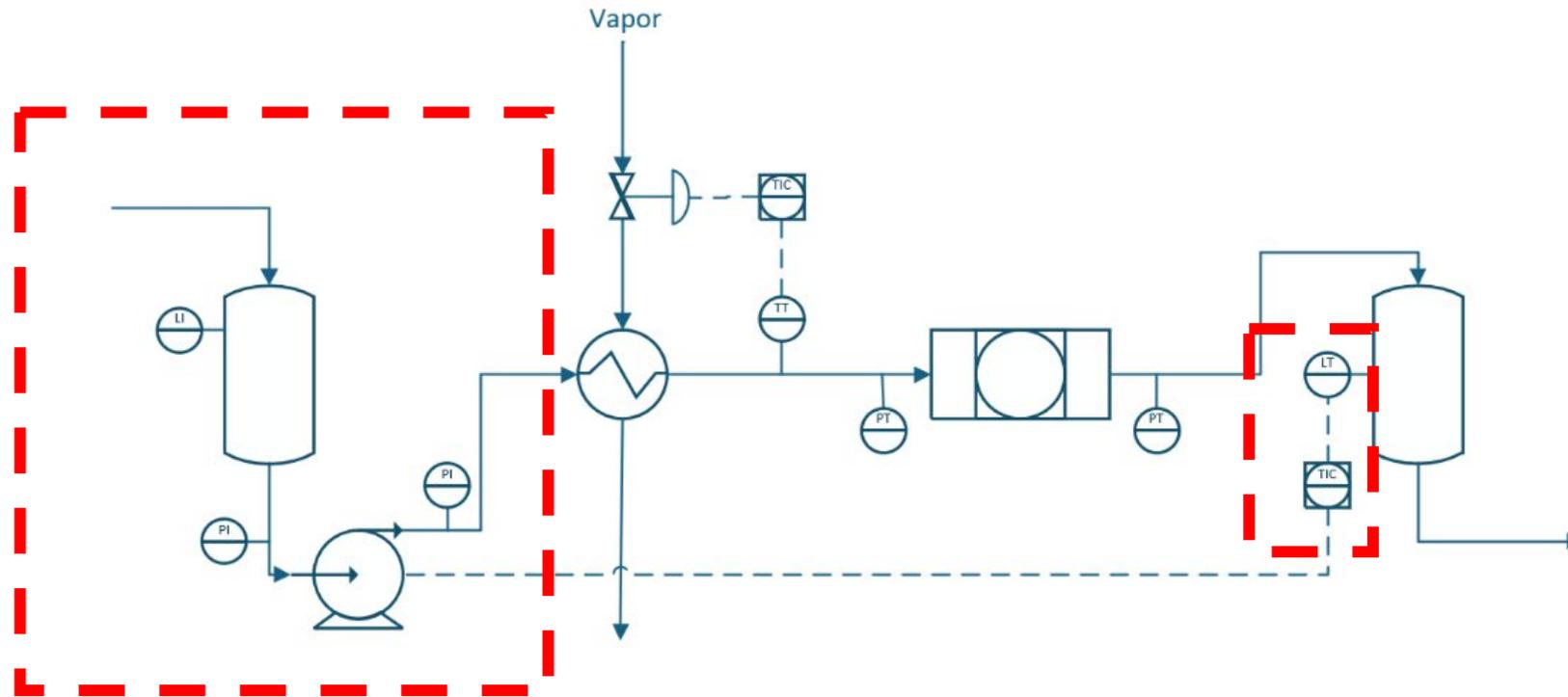


Failure Modes and Effects Analysis

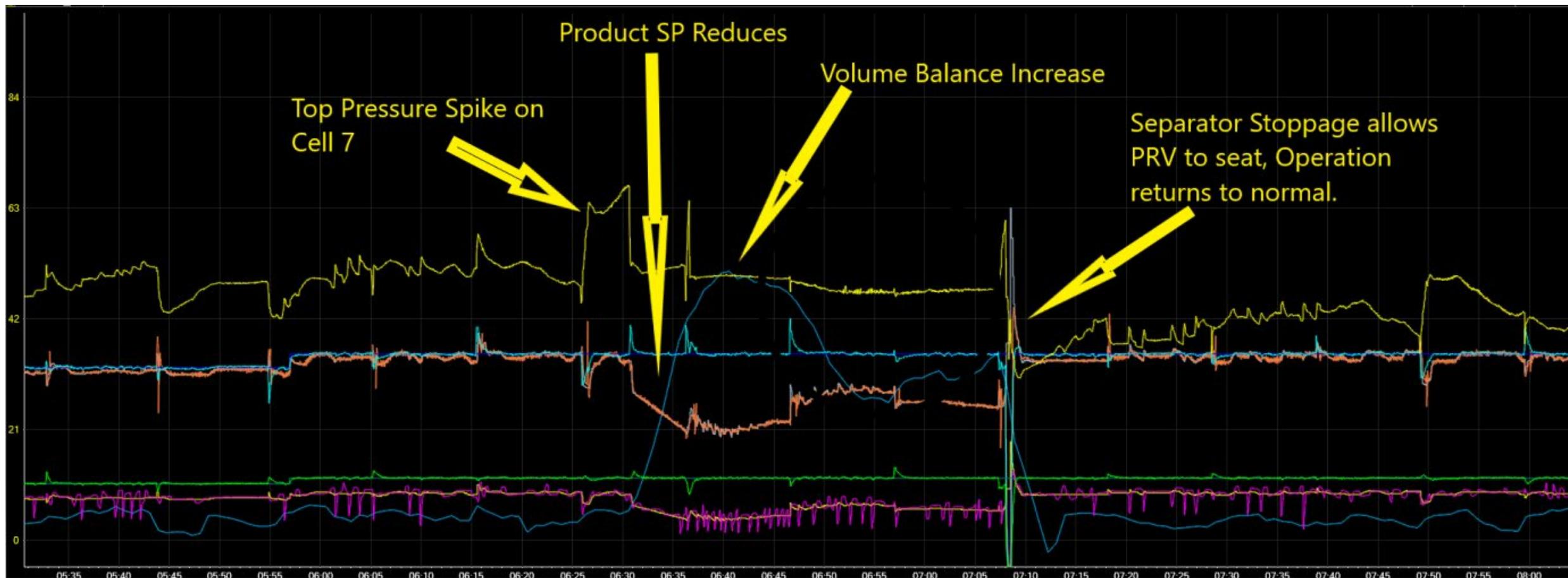
- List potential failures
- Determine the effects of each failure
- Determine data to trend to monitor for fault
- Rank by severity, detection ability, and occurrence

- Use to organize trends to monitor unit
- Use to add monitoring points
- Individual trends should be built for higher ranked faults

Process Mapping

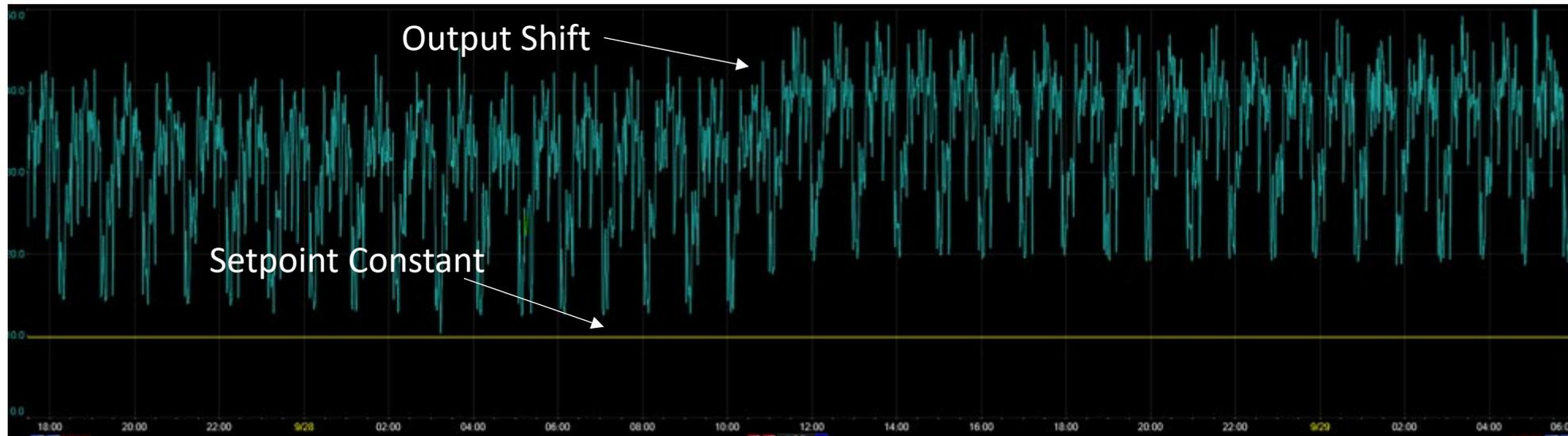
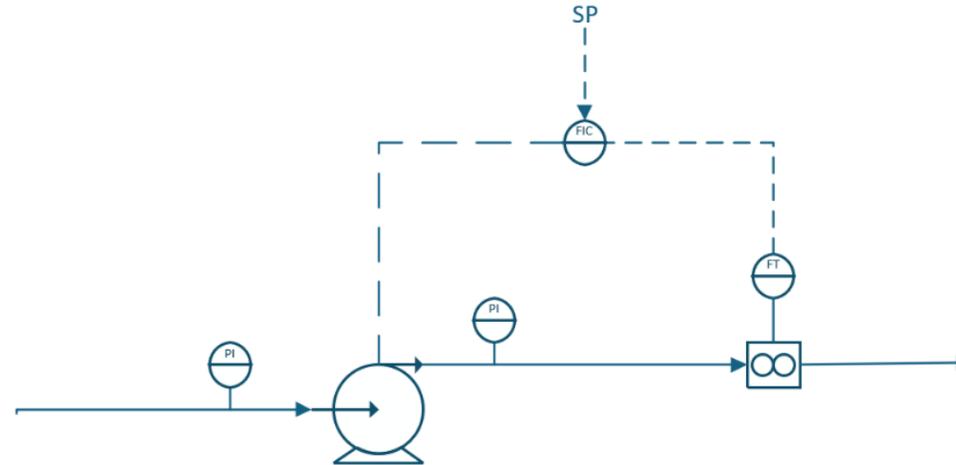


Cause and Effect



Trending Points

- Process Values
- Process Setpoints
- Outputs
- Lab Data



Proactive Maintenance

- Reliability engineers
- Application of RCA learnings
- Planners
- Equipment Inspections
 - Ultrasonic
 - Thermography
 - Vibration Analysis
 - Acoustic Analysis
- Asset management system

Documenting the Process

- Broadening the knowledge base
- Training of operators and future managers to recognize failure patterns
- Ensure correct valve orientations by work SOPs
- Stable baseline process as an example
- Troubleshooting log database for pattern recognition – “Live Documents”

Final Thoughts

- A consistent process helps simplify troubleshooting.
- Build trending tools and monitor the process to make data driven decisions.
- Process managers should focus on stability of underlying components.