



ACCELERATING  
INNOVATION

# Using Smart Valve Positioners to Cut Downtime and Optimize Outages

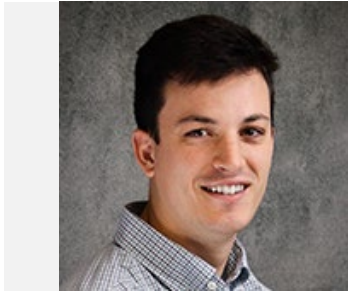
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## **Important Reminders**

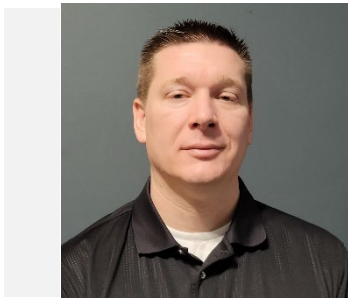
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# The Maintenance Manager's Dilemma

- Increase Plant Reliability with Fewer Technicians
- Combined Cycle Plant has 6 Combustion Turbines, 3 Steam Turbines, and 5 Technicians to keep them running!
- ~200 Control Valves



# What Tools Do We Have at Our Disposal?

- Various Manufacturer Control Valves
- FIELDVUE™ Digital Valve Positioners
- AMS ValveLink™ Diagnostics Software
- Emerson Ovation™ Distributed Control System (DCS)
- Historical Valve Maintenance Data
- Preventative Maintenance
  - Documented Strategy
  - How effective is our current approach?
  - Where can we improve for better reliability and performance?

Datasets: 25 Oct 2024 00:03:20 Scheduled

Dashboard | Monitor | Alerts | Device | Notes

Alert Variable	Status	Enabled	Current Value	Alert Point
Travel Deviation	✘	Yes	64.69 %	5.00 %
Supply Pressure Low	✘	Yes	-0.17 psi	40.00 psi
Alert Record Not Empty	✘	No		
Alert Record Full	✘	No		
Instrument Time is Approximate	✘	No		
Travel Limit/Cutoff Low	✘	No		
Travel High High	●	Yes	64.69 %	104.98 %
Travel Low Low	●	Yes	64.69 %	-5.00 %
Cycle Count High	●	Yes	394023 counts	1000000 counts
Travel Accumulator High	●	Yes	1217562 %	10000000 %
Drive Signal	●	Yes	0.00 %	
Configuration Changed	●	Yes		
Internal Sensor Out of Limits	●	Yes		
Variable Out of Range	●	Yes		
Travel Sensor Failure	●	Yes		
Temperature Sensor Failure	●	Yes		
Pressure Sensor Failure	●	Yes		
Drive Current Failure	●	Yes		
Critical NVM Failure	●	Yes		
Flash Integrity Failure	●	Yes		
Reference Voltage Failure	●	Yes		
Shutdown Activated	●	Yes		
Pressure Deviation	●	Yes		0.00 psi
Non-Critical NVM Failure	●	Yes		
Diagnostic Data Available	●	Yes		
Manual Reset Required	●	Yes		
Pressure Ctrl Mode Active	●	Yes		
Excessive Writes to NVM	●	Yes		
Travel High		No	64.69 %	125.00 %
Travel Low		No	64.69 %	-25.00 %
Aux Input		No	OPEN	
Loop Current Validation Alert		No		
In Calibration Mode		No		
Autocal in Progress		No		

Auto Stop after Next Complete Read

Start Monitoring Save Dataset Delete Dataset Close Tag Help

AMS ValveLink™ Status Monitor Page

# Accelerate Maintenance Actions

- Is improvement achievable?
- “Technology is neat, but does it make my life *better*?”
- Who is going to become the valve monitoring expert?
  - Who has the bandwidth?
  - Who has the experience with control valve repair?
  - Who has the experience interpreting valve diagnostics data?
- Action is at the center of the Valve Condition Monitoring program
  - Check, Do, Check, Adjust

# The Solution and Deliverable

EXECUTIVE  
**SUMMARY**  
Jan 2025  
REPORT PERIOD: 01-Jan-2025 - 31-Jan-2025

REPORT #17

VALVE  
CONDITION  
MONITORING

PREPARED FOR:  
Combined Cycle Power  
Facility

EMERSON

Svcs Job # 3021722

## SUMMARY

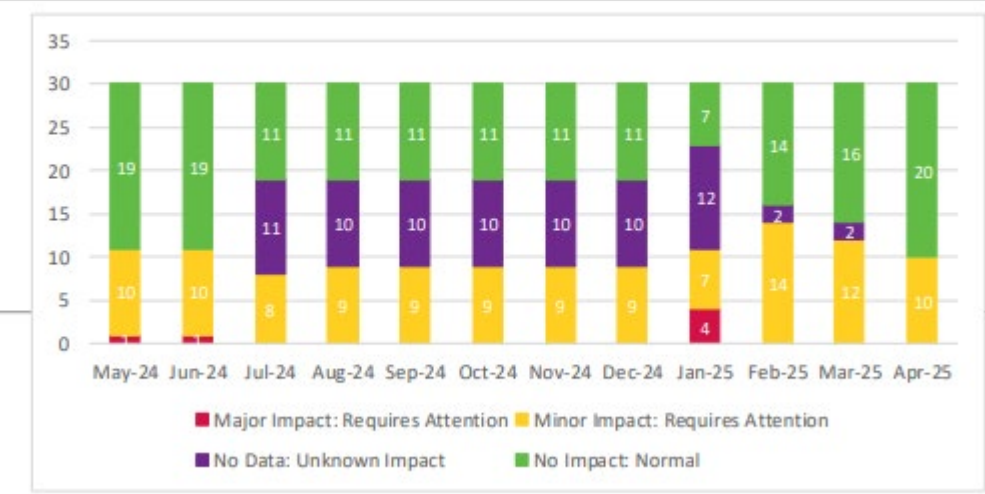
30  
VALVES MONITORED

36%  
NEEDS MAINTENANCE

### NEW ISSUES

VALVE TAG #	PROCESS APPLICATION	ISSUE DESCRIPTION
<a href="#">PCV-0005</a>		No supply pressure reading captured.
<a href="#">PCV-0001</a>		The FIELDVUE positioner is reporting a Supply Pressure that is higher than the specification.
<a href="#">PCV-0002</a>		The FIELDVUE positioner is reporting a Travel Deviation while throttling that is higher than expected.
<a href="#">PCV-0003</a>		The FIELDVUE positioner is reporting a Travel Deviation while throttling that is higher than expected.
<a href="#">TCV-0001</a>		The FIELDVUE device is reporting a Relay Position value that is lower than normal.

## MONTHLY VALVE STATUS



# What Data Drives the Program Findings?

- Travel Deviation
- Relay Adjustment
- Drive Signal
- HART Alerts
- Supply and Output Pressures
- Internal Temperature
- Trigger Profiles
- Status Monitors
- More.....

# “Boost” Maintenance Decisions

- Valve Condition Monitoring report identified an inoperable assembly
- Actionable feedback directs site to valve issues
- Plant can act to intercept issue before downtime happens
- Frozen booster was found on assembly

## VALVE DETAIL

TAG # FW-1234 – (4x4 in 807812/100 / SC/V sz 320 / DVC6200 )

**Problem 1:** The FIELDVUE positioner is reporting that the valve travel is not responding to control signal changes.

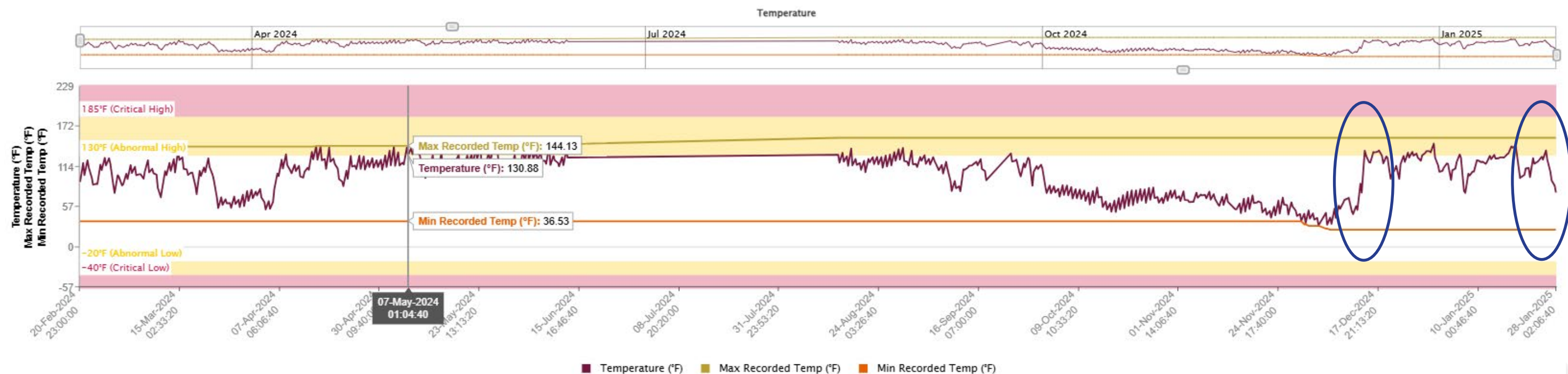


**Potential Impact 1:** The FIELDVUE positioner and actuator are unable to move the valve from the Closed position, due to a significant failure or manual override.

**Recommendation 1:** Recommend investigating the FIELDVUE positioner’s feedback arm and bracketry for tightness and correctness. Refer to the instruction manual for further information.

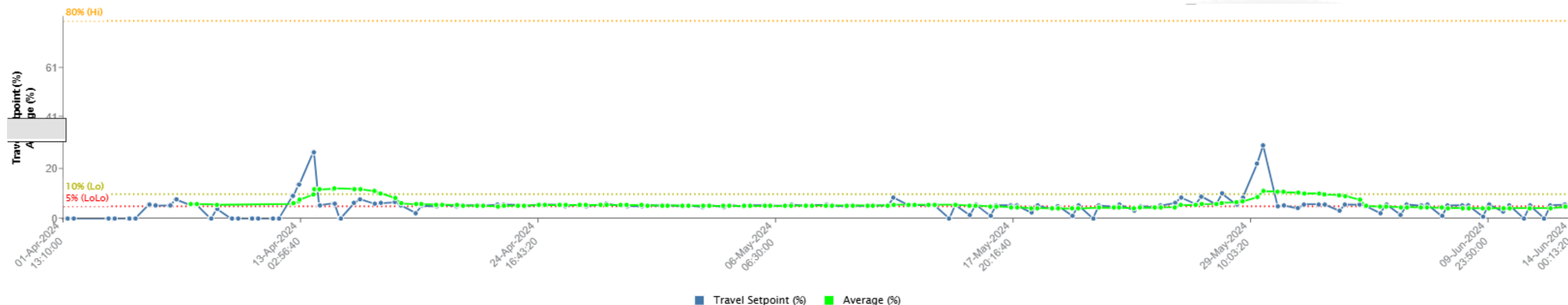
# Temper the Temperature

- Internal temperature sensor on FIELDVUE positioner indicates abnormally high ambient temperature
- Temperature begins to drop at finding date



# Root Cause Analysis

- Low friction alert appears on 2 of 6 valves – in the same application
- High relay adjustment on 5 of 6 valves – in the same application
  - “Where there is smoke, there is fire”
- Valve Condition Monitoring investigation finds valve operating outside of ideal control range
- Further review found consistent plug erosion each outage



# Modification of Maintenance Mindset

- “Are we missing maintenance on critical valves?”
- “Are we putting too much focus on valves that are consistently in good condition?”
- Use actionable data to make smarter decisions

# Savings

- Issue #1 – A IP FW (Unit 5) Ambient Heating Issue
  - 3 Hours of Downtime Assumed
  - 280 MW Lost on GT, 100 MW Lost on ST
- Issue #2 – A IP FW (Unit 6) Ambient Heating Issue
  - 3 Hours of Downtime Assumed
  - 280 MW Lost on GT, 100 MW Lost on ST
- Issue #3 – B IP FW Positioner Circuit Failure
  - 3 Hours of Downtime Assumed
  - 280 MW Lost on GT, 100 MW Lost on ST
- At 14.63 cents/kWh, a total lost generation of  $(380 \text{ MW} \times 3 \text{ trips}) \times 3 \text{ hours} = 3,420 \text{ MWh}$ 
  - Lost Revenue of **\$500,346**



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# Thank You