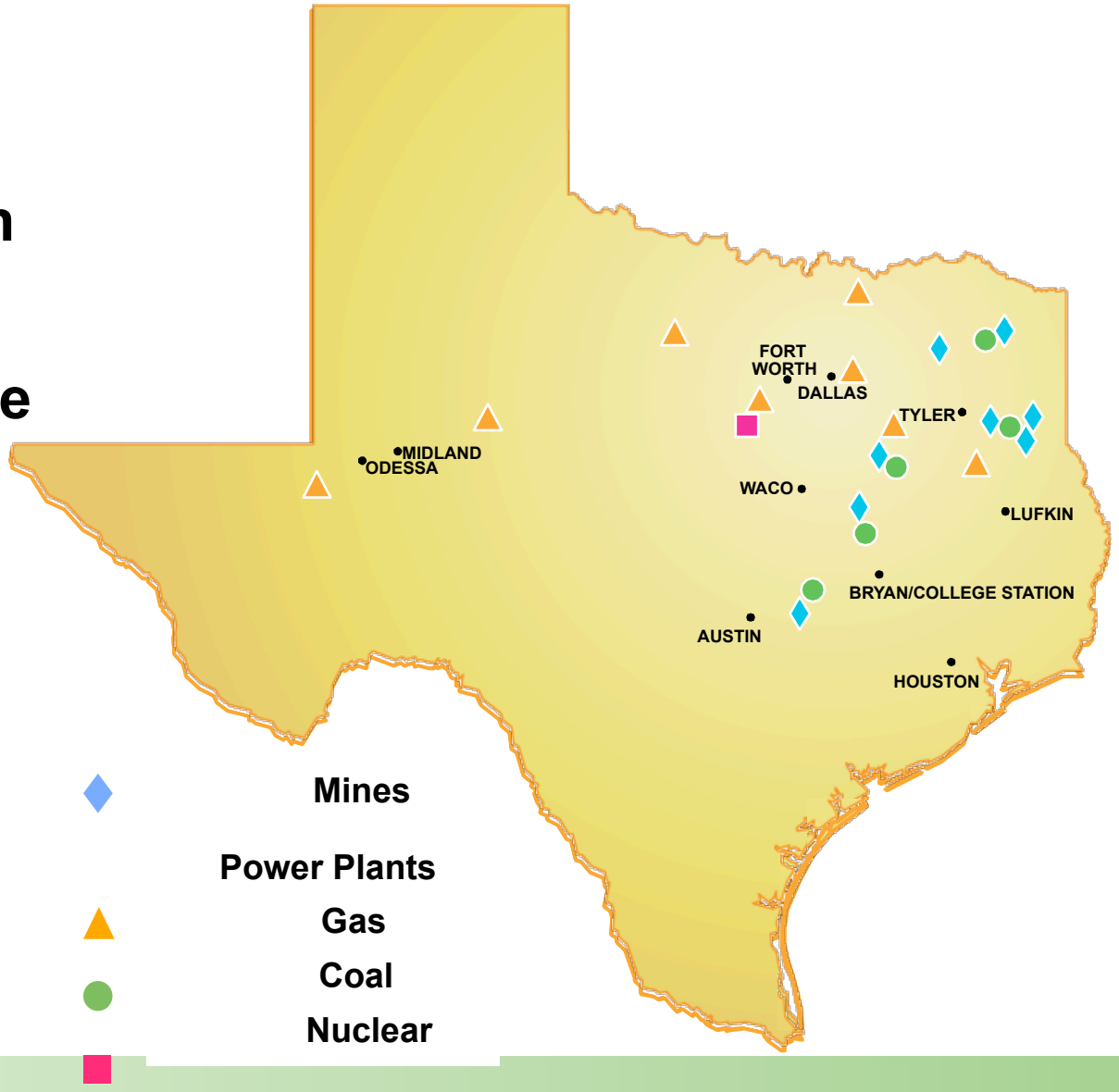
Energy Future Holdings - Luminant

Luminant is a competitive power generation business, including mining, wholesale marketing and trading, construction and development.

It has over 18,300 megawatts of generation in Texas, including 2,300 MW of nuclear and 5,800 MW of coal-fueled generation capacity, and is the largest purchaser of wind-generated electricity in Texas and fifth largest in the U.S. Luminant is generating electricity to power the future of Texas.

Luminant Is Texas' Largest Competitive Power Generator

- 15,427 MW of capacity
- Investing in cleaner generation
- Largest voluntary plan ever to reduce emissions
- Potential nuclear expansion
- Leading wind-power purchaser



Luminant

Installed PI on the Fossil Units in 1998
Installed at Comanche Peak in 2001

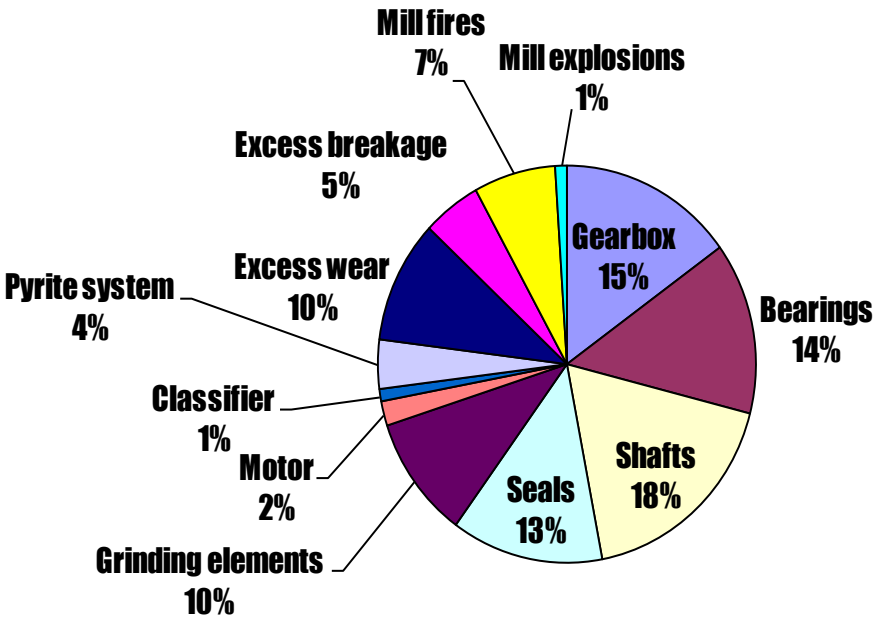
41 PI Servers
Numerous Interfaces
500,000 Tags

Multiple Applications

PI is an integral part of our monitoring solution at Luminant

3

Pulverizer Maintenance Opportunity



Pulverizer Expenditures Relative Frequency (%)

According to EPRI, pulverizers are a high maintenance item accounting for the majority of forced derates.

Pulverizers are "Low Hanging Fruit" in terms of ROI for predictive maintenance.

Typical Mill Issue Impacts

Component Failures
- Shaft fatigue
- Bearings

Accelerated Grinding Element Wear
- Premature Overhaul
- O&M / Capital budget

Pyrite (coal) Spillage

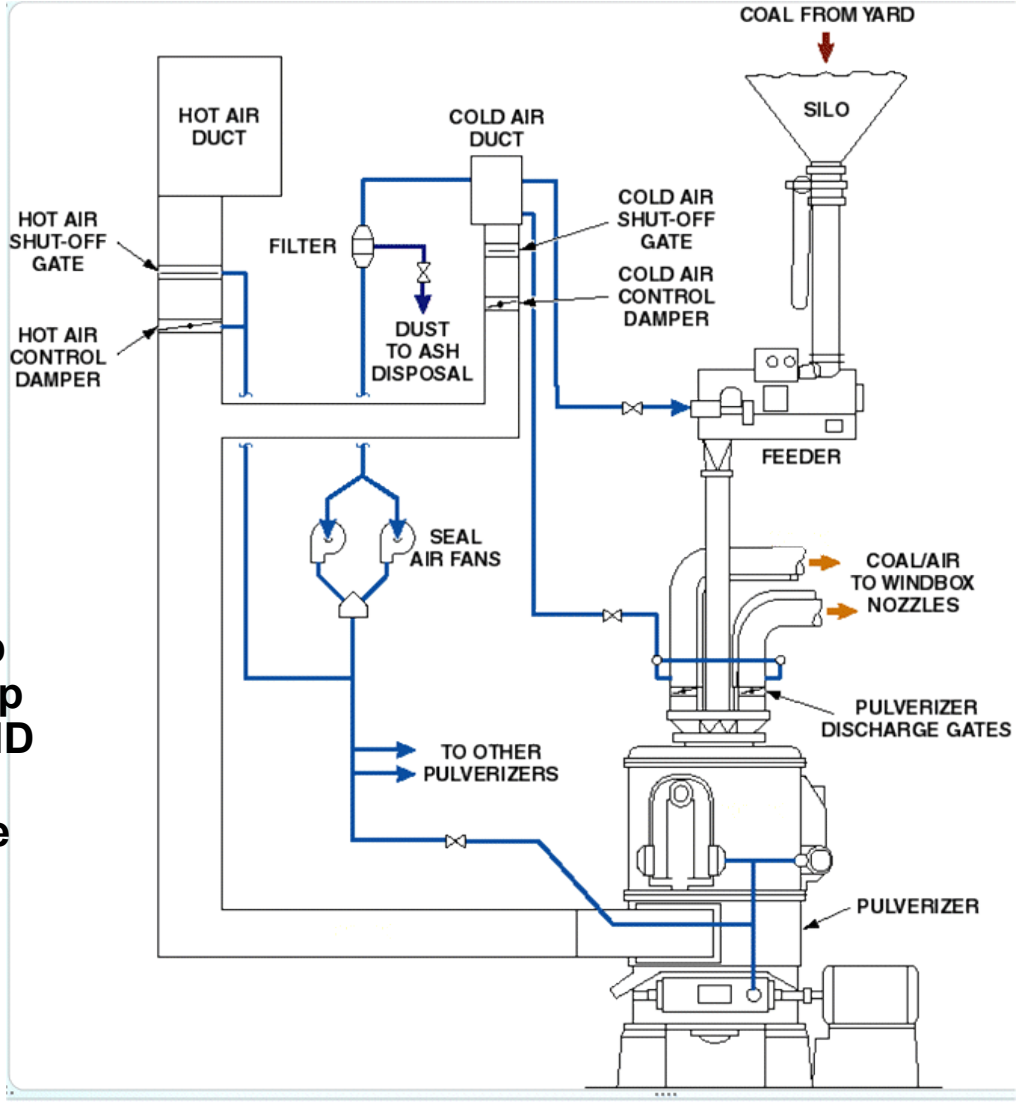
Mill Unavailability (EFOR)
- Unit Derates
- Unscheduled Maintenance

Performance Degradation
- Combustion; LOI, NOX, slagging
- Full Load Capability

Mill Instrumentation

Existing Data
- Feedrate
- Amps
- Bowl DP
- Airflow
- Inlet Temp
- Outlet Temp
- Damper DMD

DCS Interface
- 5 Second Updates



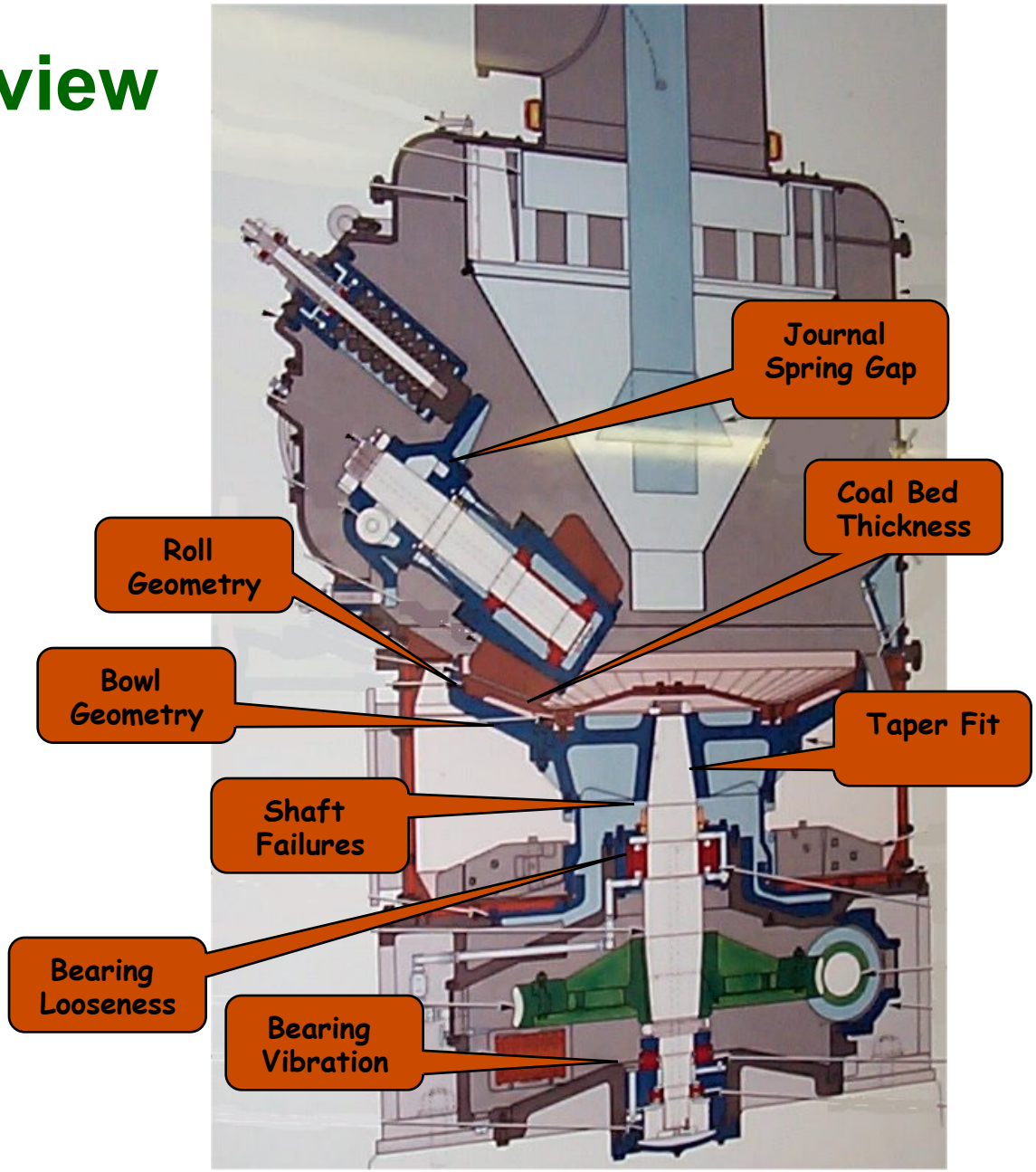
New RBC Data
- Roll Position
- Roll Accel
- Pinion Accel
- Thrust Accel
- Motor Accel

- 4K Sample/Sec

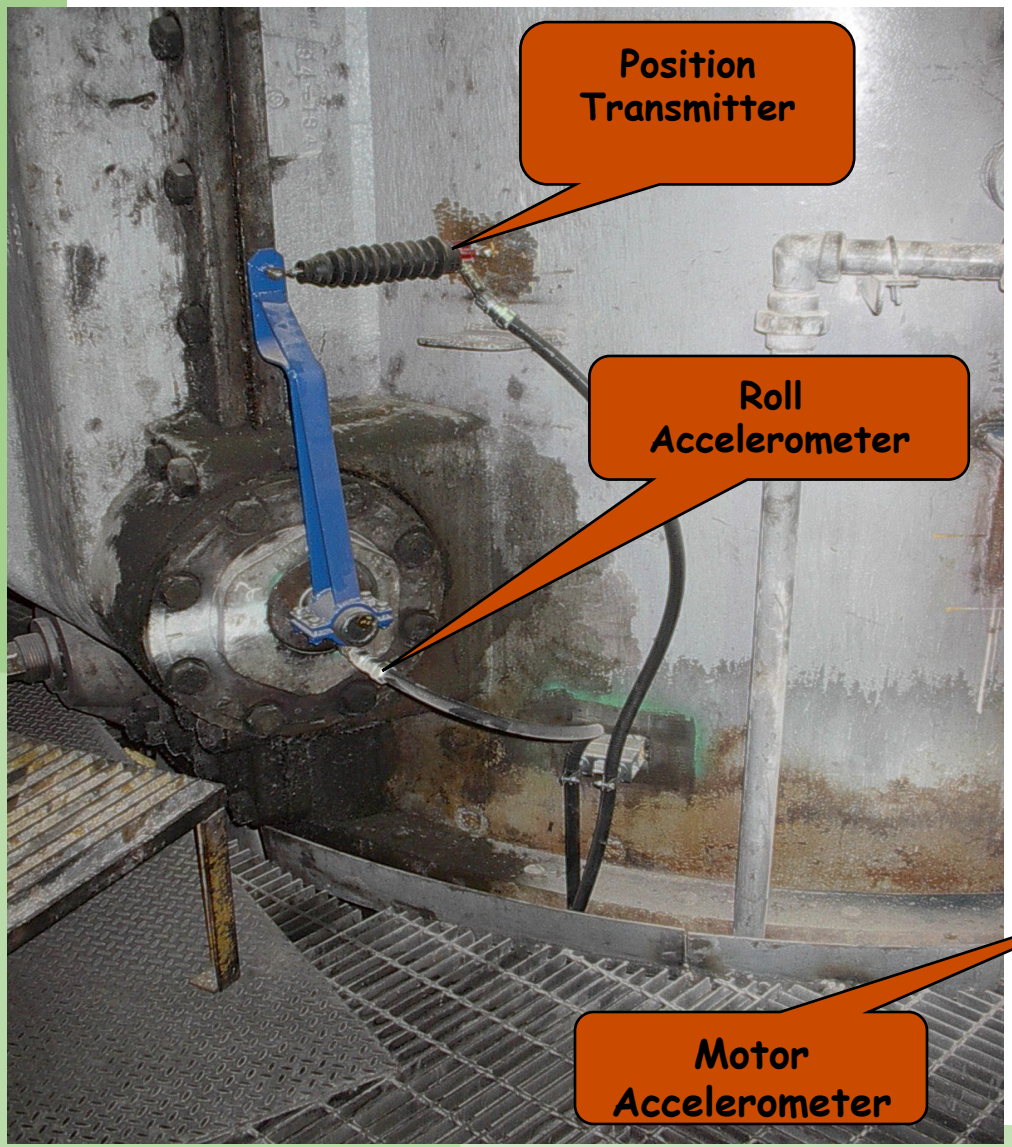
ECG RBC Overview

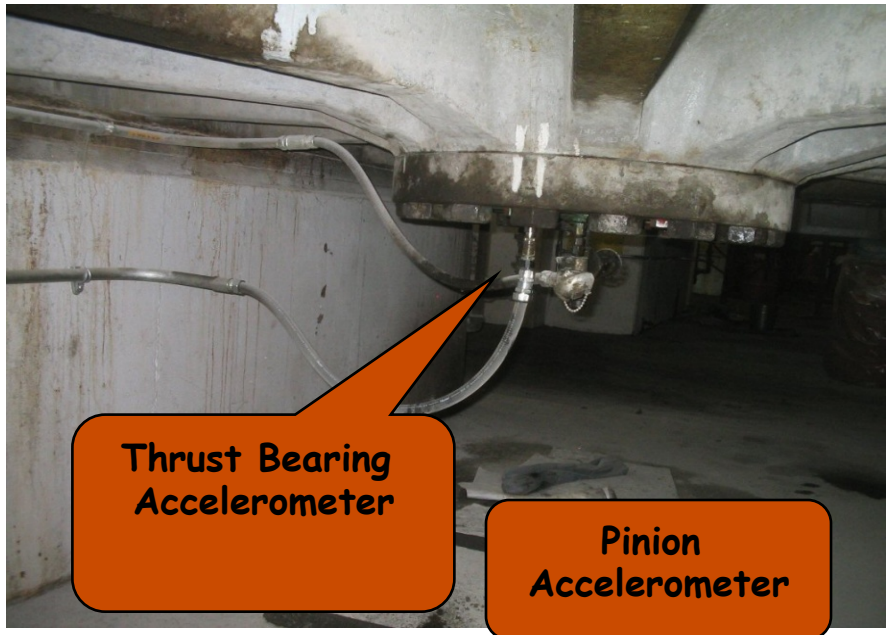
Engineered O & M Tool

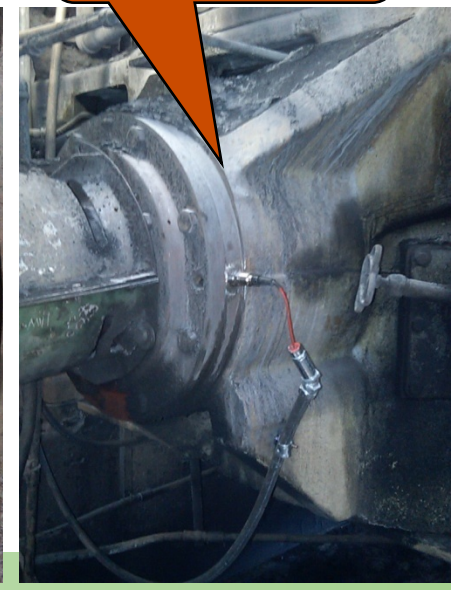
- Optimize mill performance
- Evaluate grinding elements
- Minimize stress (fatigue) on vertical shaft
  - Non-intrusive test
    - External Test
    - Quick Results
    - Use Data to Compare Mills



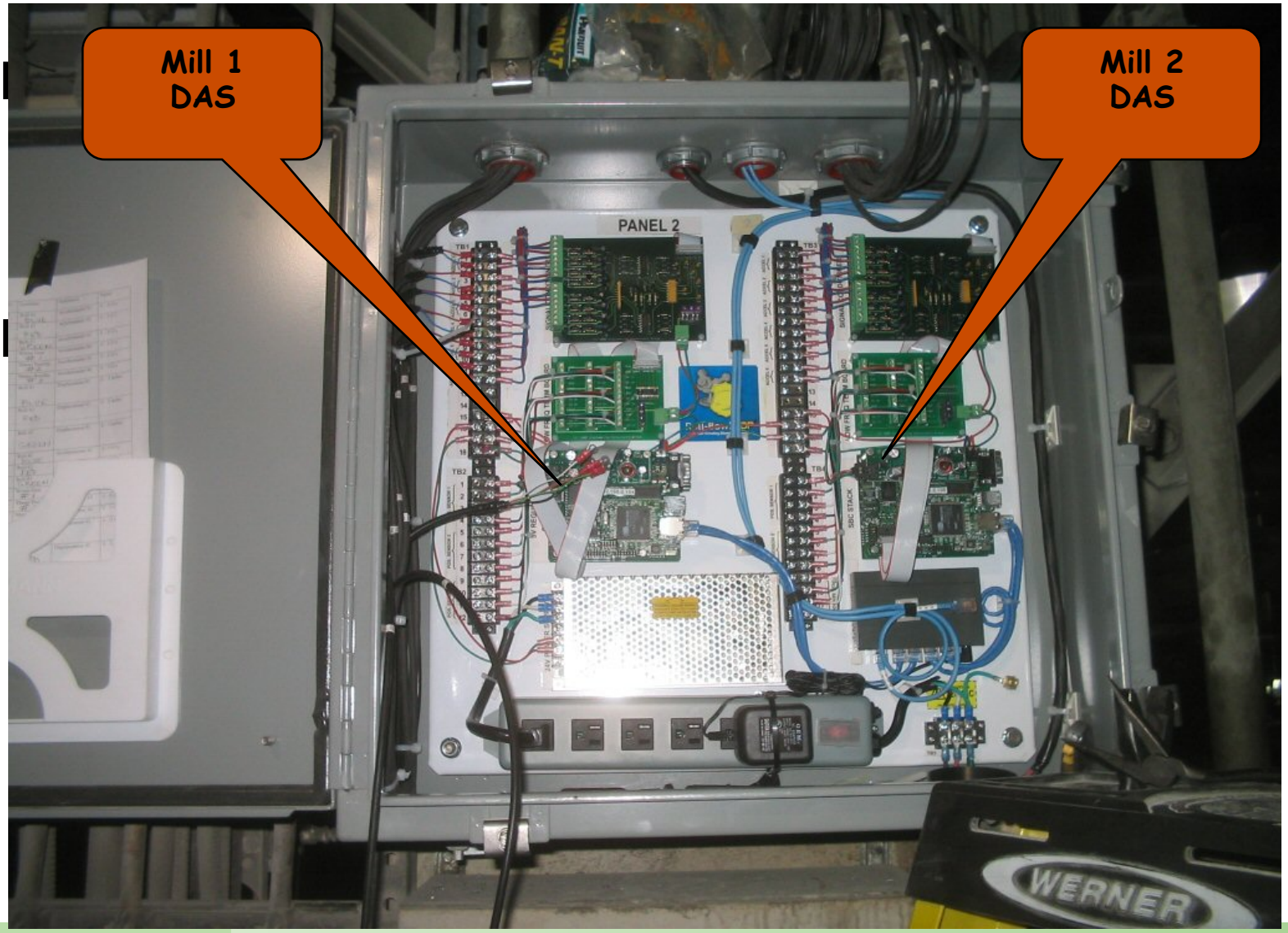
RBC Installation







RBC Installation



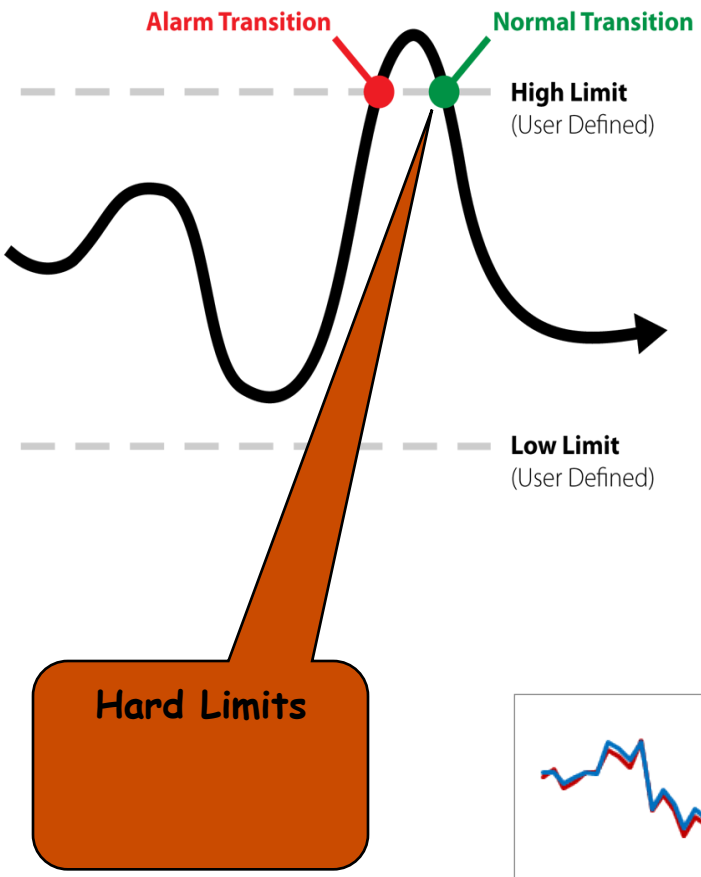
RBC Mill Alarm Detection

	Detected Problems											
Pulverizer Instrumentation	Inproper Mill Setup	Resonance	Rough Operation	Broken Spring	Mill Fire Damage	Bearing Problem	Roll Wear	Vertical Shaft Fatigue	Air/Fuel Ratio	Coal Bed Instable	Skidding	Gear Mesh
Grinding Elements												
Position Sensors	X	X	X	X	X		X	X		X	X	
DCS Data				X	X				X	X		
Roll Vibration			X			X						
Gear Box												
Vibration	X					X						X
LO Pressure	X											
Motor												
Vibration	X		X									X

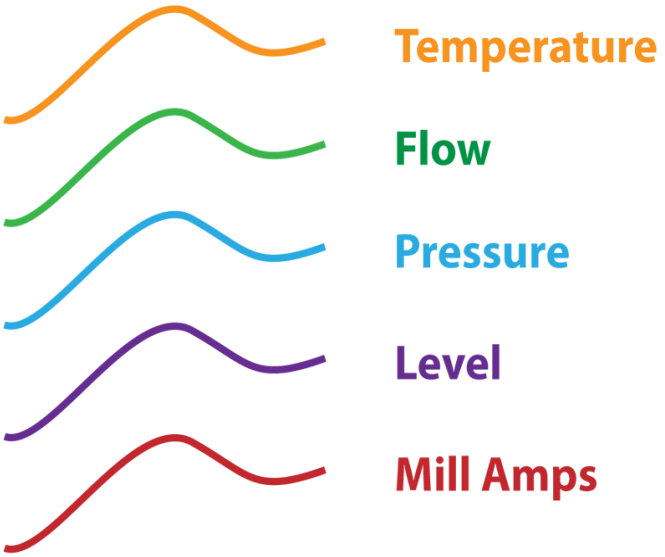
enotification

PREDICT it

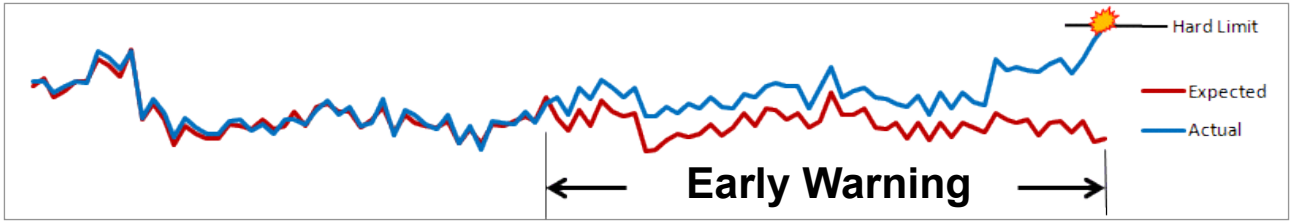
Single Tag Monitoring



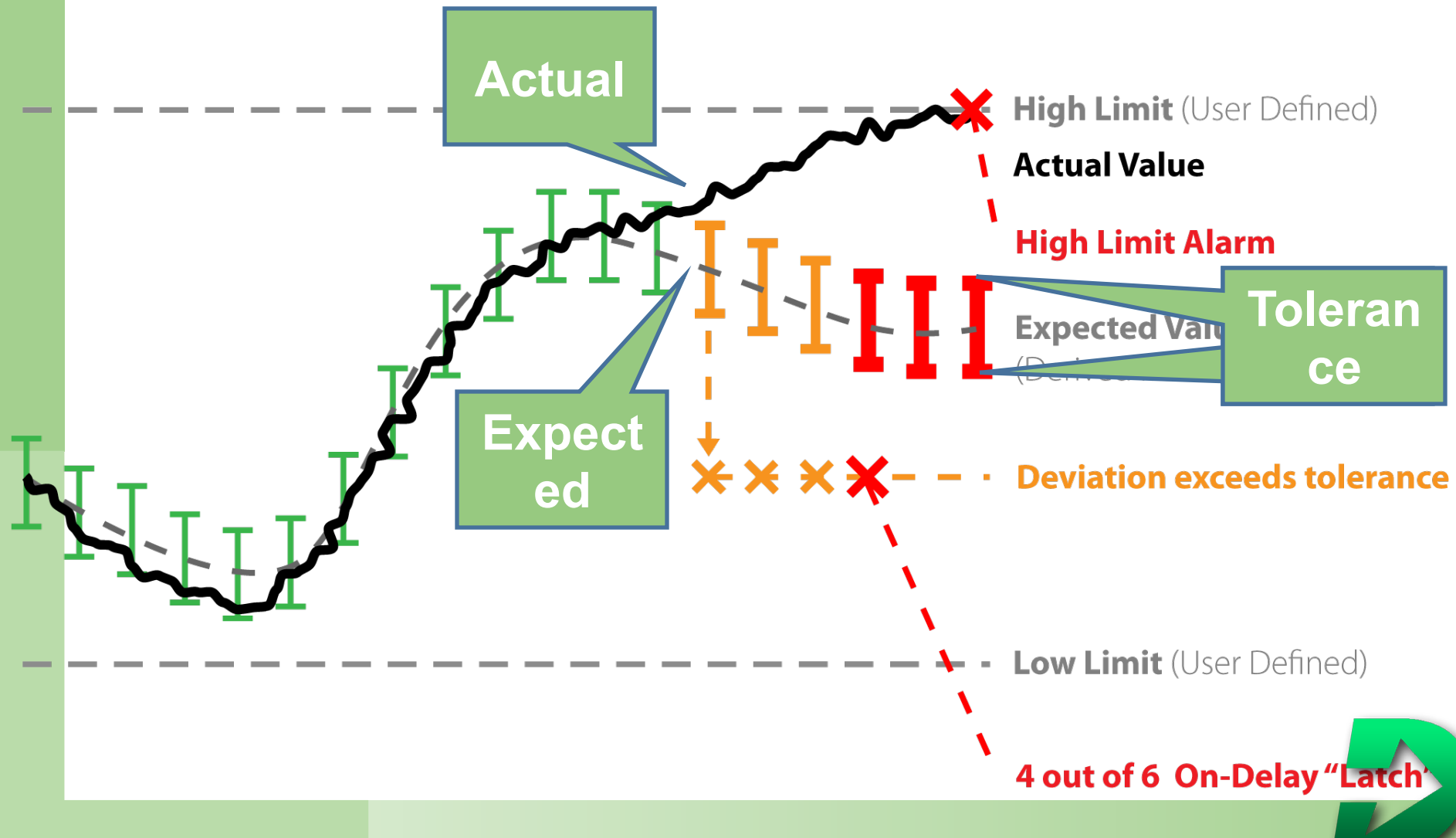
Multiple Correlated Tags



Expected value of each tag is influenced by the combined history of all selected tags.



enotification + PREDICT it (2010)



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Predict-It™
Advanced Pattern Recognition Alarms

- **Models for Mill Performance**
  - **Roll Deflection, Amps, CoalFlow, Airflow, DP**
  - **Bearing Temps, Vibration Level**
- **“Normal” defined from Mill History – PI Archive**
- **Model runs new Snapshot values every 5 minutes**
- **Alarm is on (Actual-Expected)**