Filling the Jobs of Tomorrow Today: How Manufacturers can Address their Energy Management Workforce Needs

Life After a DOE INPLT Training: How to Implement Lessons Learned Across the Company

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Compressed Air INPLT – Cedar Rapids

- Conducted a DOE INPLT on compressed air at Cedar Rapids – April 2015
- 3-4 days of in-class and plant floor training
  - In-class is very intense - a lot of information
  - Plant floor – good hands-on training with large action item list for follow-up activities
- Findings/Opportunities
  - High leak rate
  - Dust collectors – mainly leaks but some pulse timing opportunities
  - Pneumatic pumps for transporting ingredients
  - Optimization of compressed air system – cycling and when to run specific (based upon size) compressors

Block Deployment – Compressed Air

- Assess plants' current compressed air situation
  - Compressors and components makeup
  - Reliability, maintenance, air quality problems
  - Costs – energy, service, parts, water cooling
  - Metering and performance data

- Findings
  - 85% of plants use Atlas Copco ZR/ZT Series Compressors
  - 60% of plants have a VSD compressor
  - Most plants use water cooled compressors
  - Most of our plants in North America use oil free compressors
  - What's the best system?

Opportunities From Assessment

- Lack of maintenance
  - Broken components
    - Demand expanders/flow controllers
    - Dewpoint meters
    - Dryers
  - Air compressor downtime
  - Water in compressed air
  - Excessive pressure drop
- Excessive waste
    - Excessive leaks and non-production load
    - Shutting down production
- Sequencing controls not utilized or optimized
- Total ongoing operating cost of compressed air system is unknown

Opportunities From Assessment

- Cereal and dough plants use a significant amount of waste due to dust collectors
  - Poor maintenance – leaks
  - Pulse timing not optimized
- Yogurt plants have a large amount of inappropriate uses *Globally
  - Open blowing of air to check sealed lids
  - Open blowing of air to cool heat seals
- All plants
  - Compressed air for cleaning – air wands and air knives

Solutions

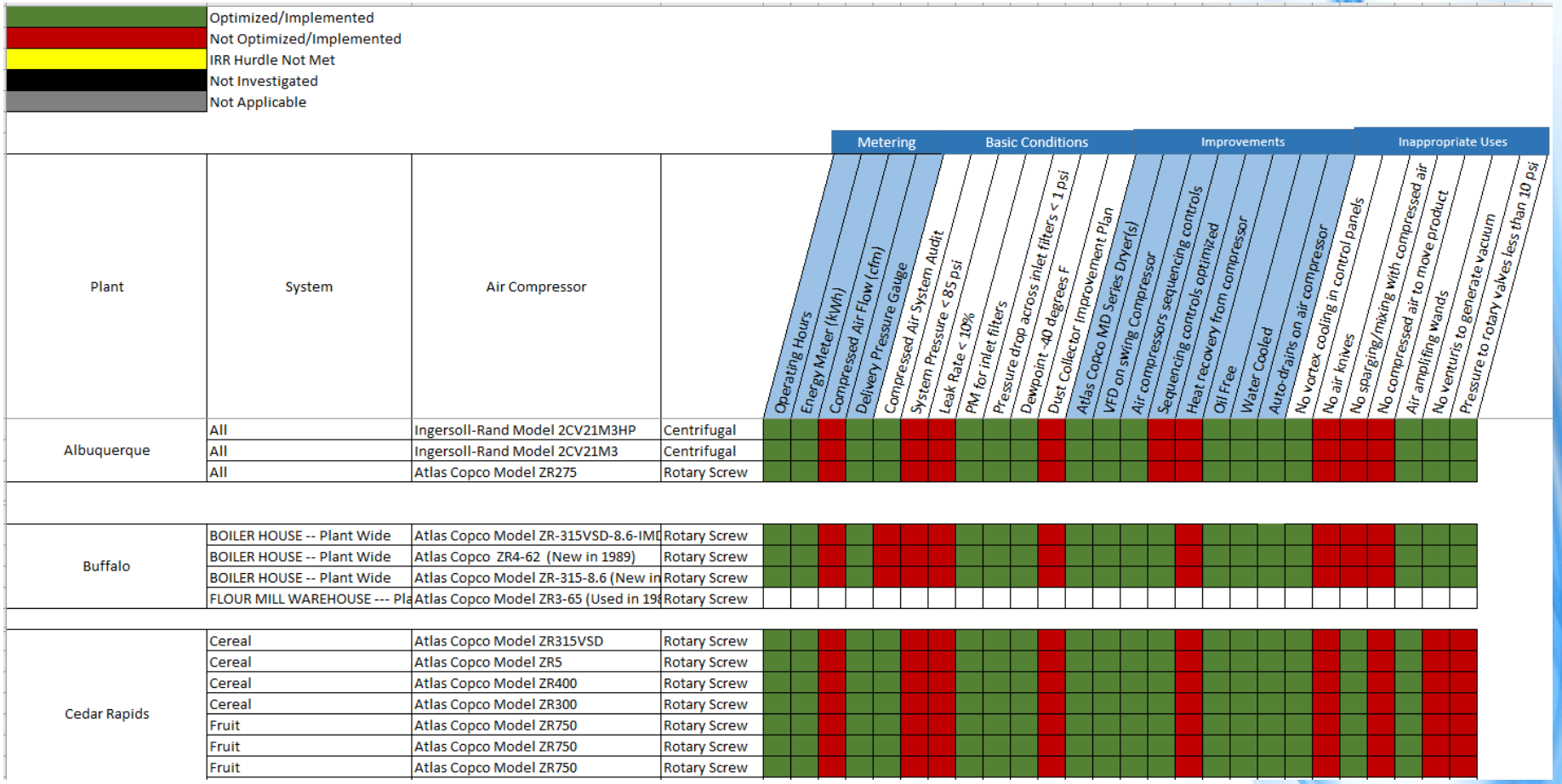
- Start with low capital/low cost with high return options
  - Leaks and non-production load (from dust collectors)
  - Basic maintenance
  - Recommission technologies already in place
    - Reeducate on the benefits and cost savings

- Implement the same solution for the same problems occurring globally across plants
  - Air knives with blowers
  - Dust collector maintenance management program
  - Standardize on dewpoint meter and calibration
  - Troubleshooting guide water in CA

Solutions

- Obtaining additional cost savings through efficient technologies – must meet return on investment
  - Sequencing controls
  - VSD air compressor
  - Heat recovery to make process hot water
  - Heat of compression desiccant dryers

TRACKING


Optimized/Implemented
Not Optimized/Implemented
IRR Hurdle Not Met
Not Investigated
Not Applicable
Metering
Basic Conditions
Improvements
Inappropriate Uses
Operating Hours
Energy Meter (kWh)
Compressed Air Flow (cfm)
Delivery Pressure Gauge
Compressed Air System Audit
System Pressure < 85 psi
Leak Rate < 10%
PM for inlet filters
Pressure drop across inlet filters < 1 psi
Dewpoint -40 degrees F
Dust Collector improvement Plan
Atlas Copco MD Series Dryer(s)
VFD on swing Compressor
Air compressors sequencing controls
Sequencing controls optimized
Heat recovery from compressor
Oil Free
Water Cooled
Auto-drains on air compressor
No vortex cooling in control panels
No air knives
No sparging/mixing with compressed air
No compressed air to move product
Air amplifying wands
No venturis to generate vacuum
Pressure to rotary valves less than 10 psi
Plant
System
Air Compressor
Albuquerque
All
Ingersoll-Rand Model 2CV21M3HP
Centrifugal
All
Ingersoll-Rand Model 2CV21M3
Centrifugal
All
Atlas Copco Model ZR275
Rotary Screw
Buffalo
BOILER HOUSE -- Plant Wide
Atlas Copco Model ZR-315VSD-8.6-IMI
Rotary Screw
BOILER HOUSE -- Plant Wide
Atlas Copco ZR4-62 (New in 1989)
Rotary Screw
BOILER HOUSE -- Plant Wide
Atlas Copco Model ZR-315-8.6 (New in
Rotary Screw
FLOUR MILL WAREHOUSE --- Pla
Atlas Copco Model ZR3-65 (Used in 19
Rotary Screw
Cedar Rapids
Cereal
Atlas Copco Model ZR315VSD
Rotary Screw
Cereal
Atlas Copco Model ZR5
Rotary Screw
Cereal
Atlas Copco Model ZR400
Rotary Screw
Cereal
Atlas Copco Model ZR300
Rotary Screw
Fruit
Atlas Copco Model ZR750
Rotary Screw
Fruit
Atlas Copco Model ZR750
Rotary Screw
Fruit
Atlas Copco Model ZR750
Rotary Screw

SUSTAINABILITY

- Standardize on best practices
  - Maintenance plans
  - Metering/monitoring guidelines and performance tracking
  - System design
  - Troubleshooting guides
- Collaborate
  - Compressed Air Platform Team
  - Create a culture where information is shared
- Build technical expertise
- Continue the same block deployment process on other utilities using DOE INPLT