Spring into Action!

Using Connected Chiller Technology to Optimize Spring Start-up

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SMART EQUIPMENT Johnson Controls

Johnson Controls

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Agenda

- What is Connected Chiller Technology?
- Optimizing Spring Startup Using Connected Chillers
- Demo
- Q & A

WHAT IS CONNECTED CHILLER TECHNOLOGY?

Connected Chiller Technology

- Predictive or Internet of Things technologies that provides a complete picture of chiller health and performance to help avoid random failures
- Cost-effective, proactive approach to chiller maintenance
- Advanced algorithms to detect, diagnose, and troubleshoot machine problems
- Operating and trend data accessible anywhere, anytime by you and global factory experts

In this presentation we'll be using examples from our Smart Connected Chiller IoT Dashboard

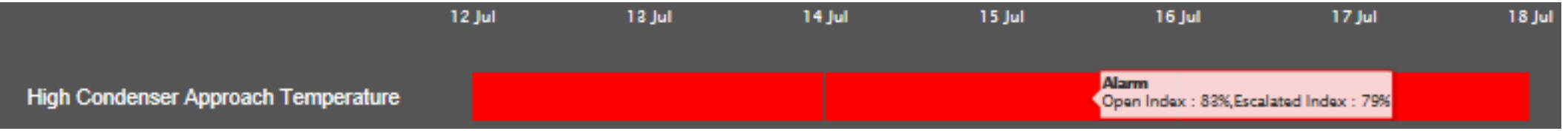
- Health Checks
- Overview Charts
- Comparative Charts

OPTIMIZING SPRING STARTUP USING CONNECTED CHILLERS

Six Steps to Optimize Chiller Spring Start-up

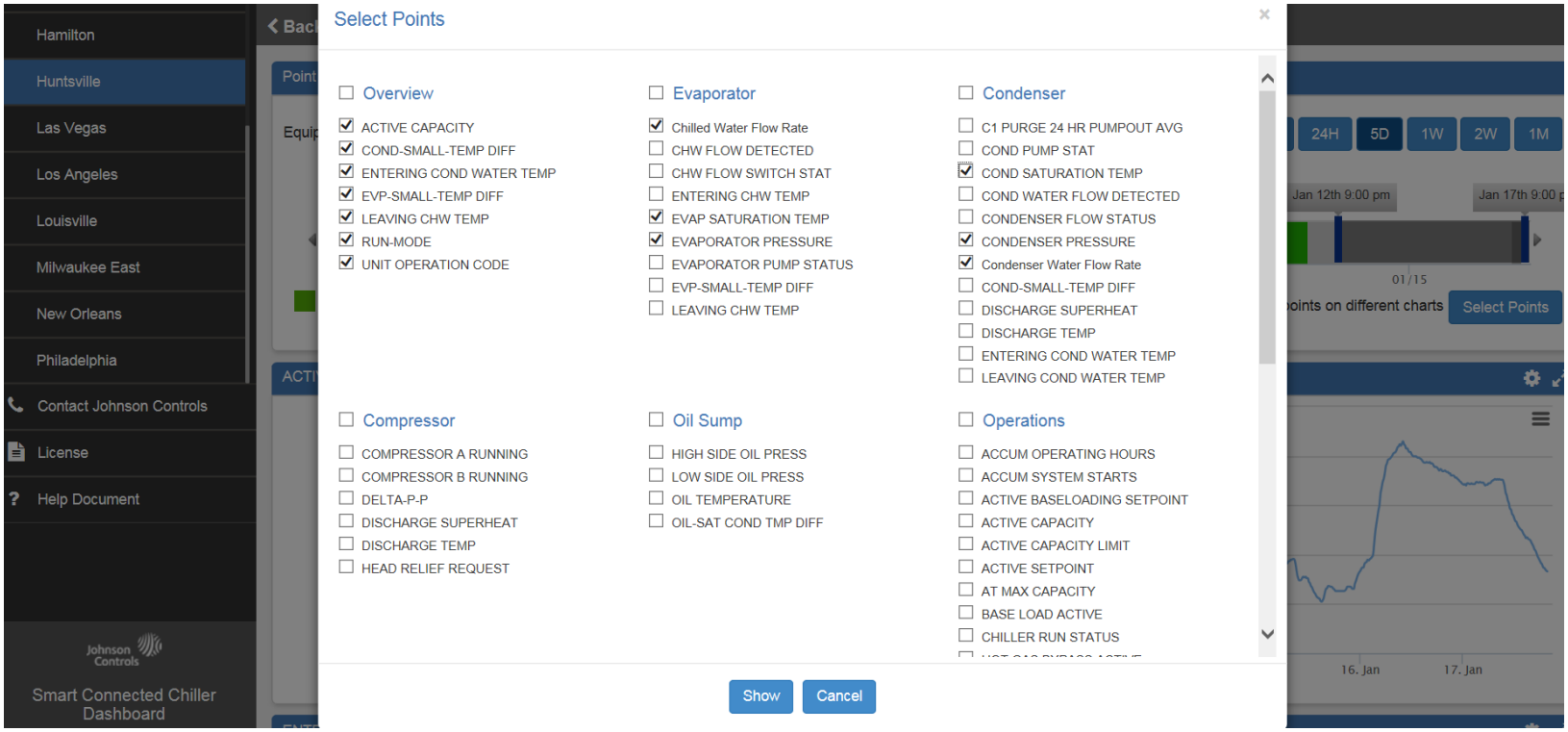
- Ensure non-condensable gases are removed from low pressure chillers
- Checking condenser and evaporator flow rates, pressures and temperatures
- Review all set points and actuals to make sure they are tracking
- Load test the chiller to make sure design load is achieved
- Confirming that chiller capacity control is loading and unloading chiller per design
- Trimming refrigerant charge for optimum chiller efficiency

Ensure Non-condensable Gases Are Removed



Health Check	Status	Comments
High Condenser Approach Temperature	Alarm	Condenser approach is an indication of how well the condenser heat exchanger is performing. For this chiller, it has been well above its design value for an extended period of time during the reporting period. Common causes of this condition include: 1. Non-condensable gases in the condenser 2. Tube fouling 3. Pass baffle gasket leakage Operating with this condition can result in: 1. Increased chiller energy consumption 2. Reduced chiller cooling capacity 3. Unplanned down time

Verifying Flow Rates, Temperatures and Pressures



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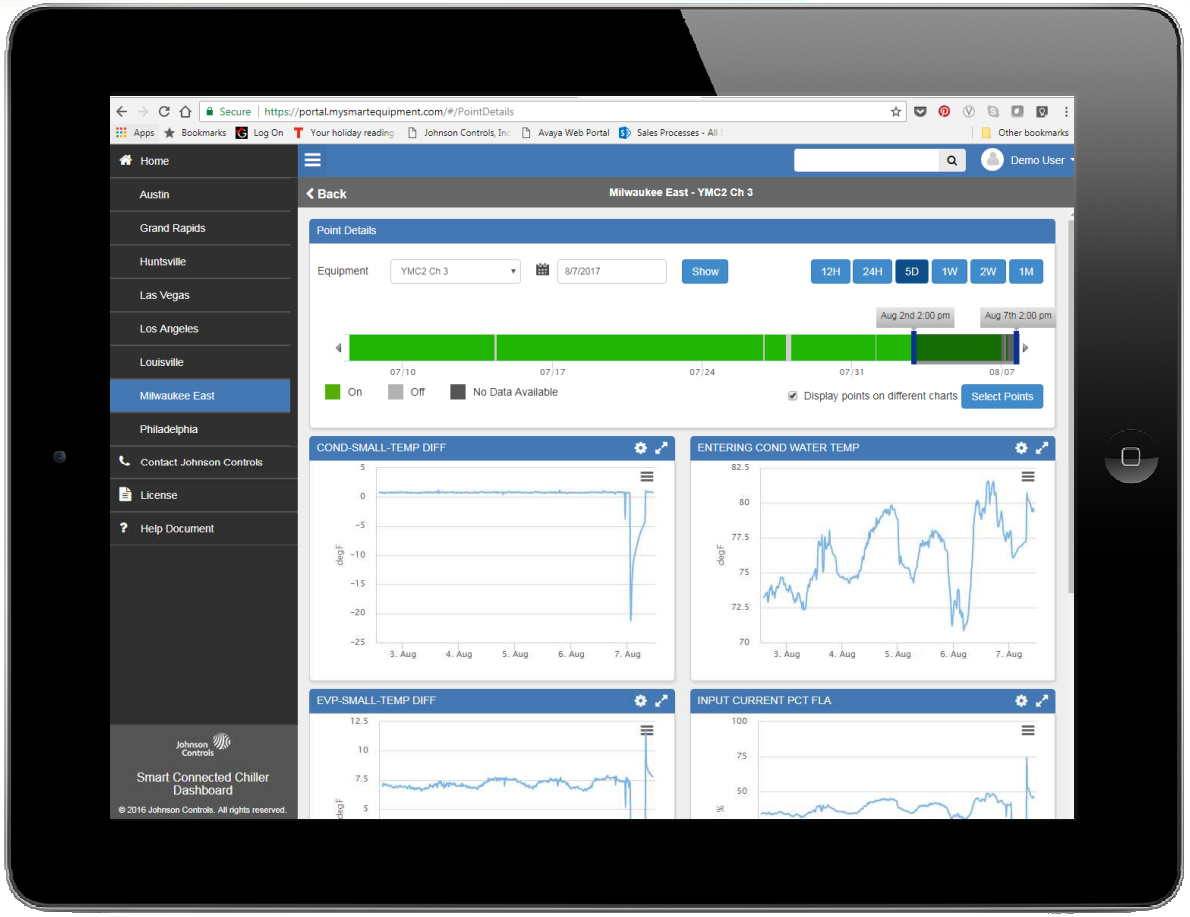
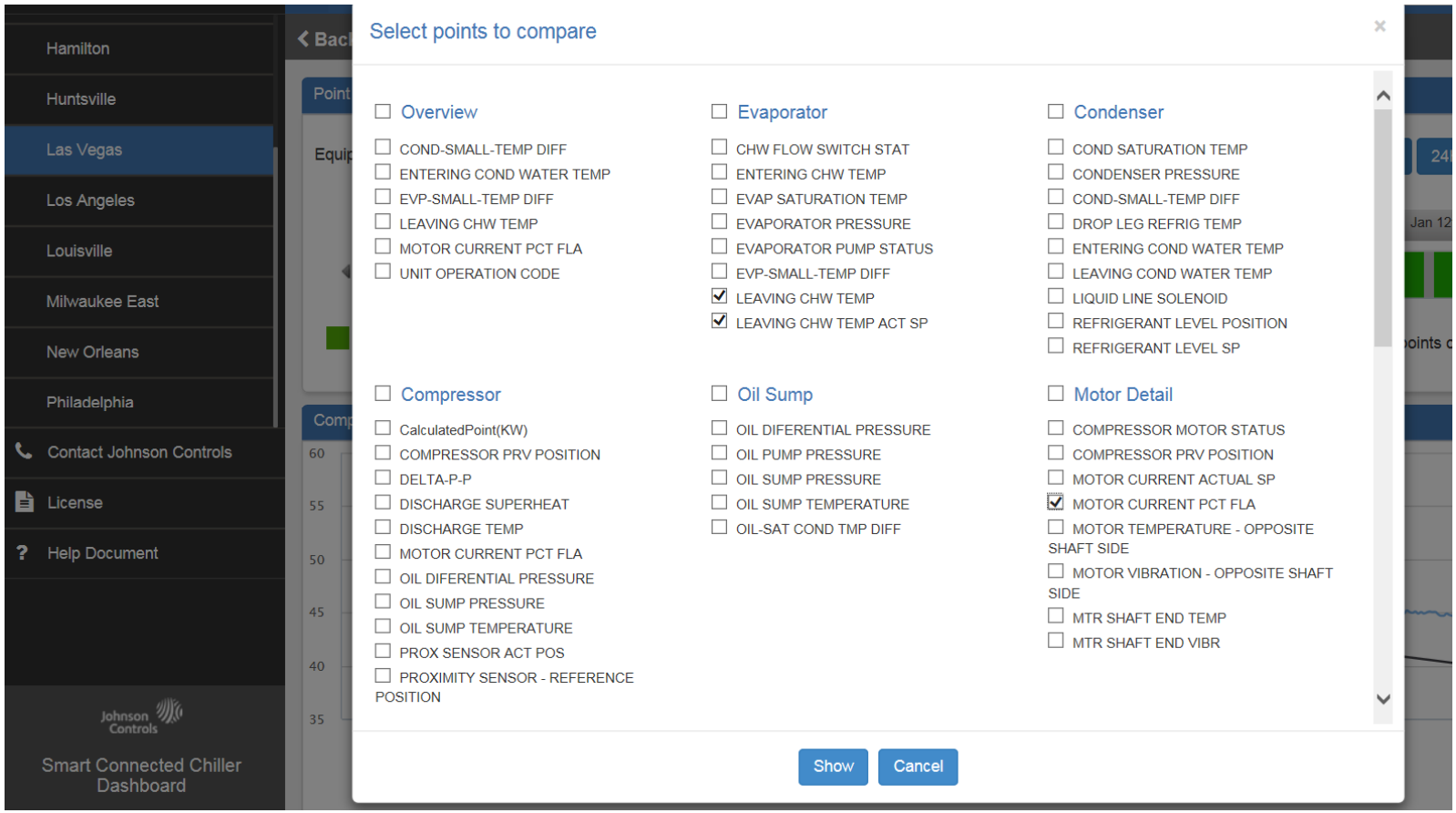
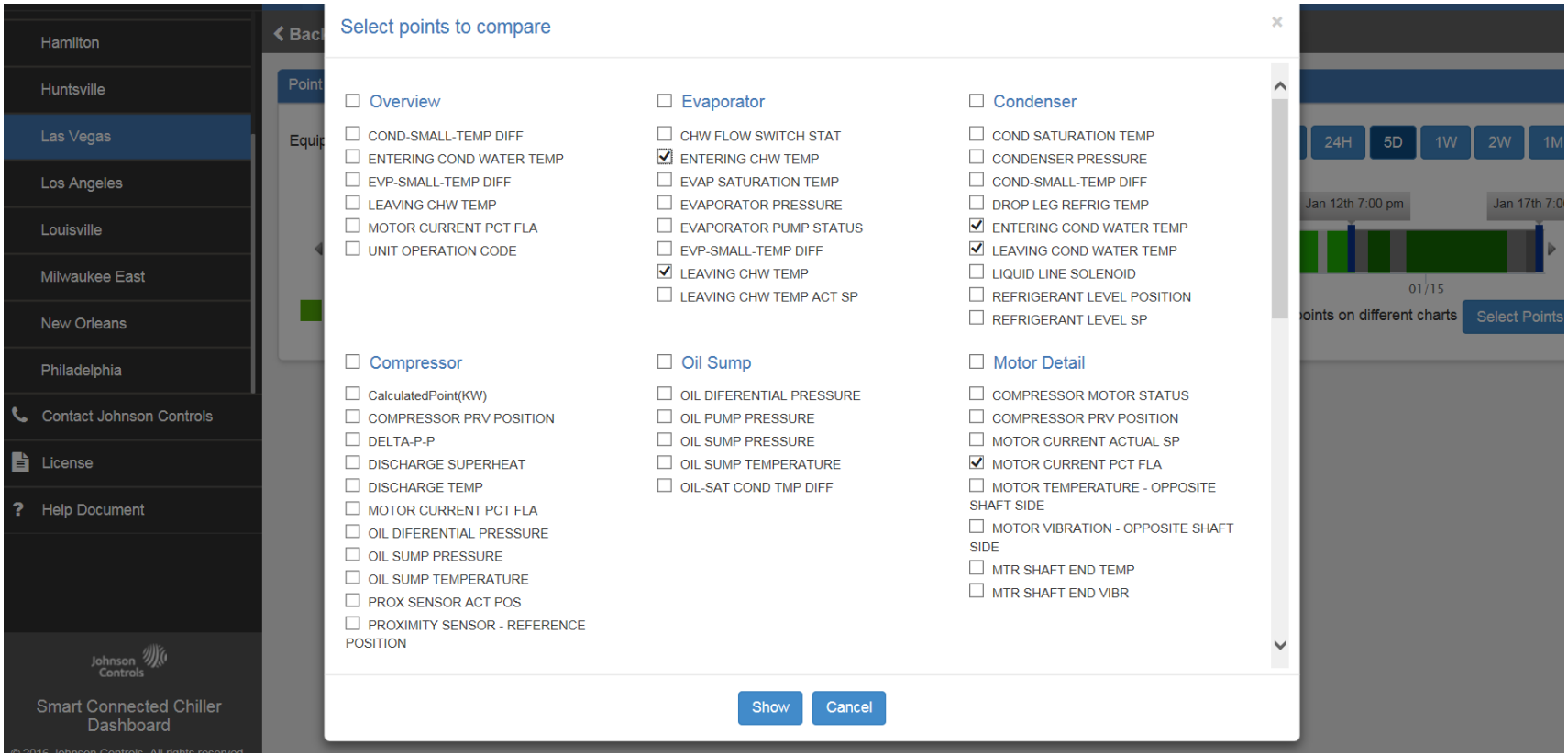


Checking Set Points vs. Actuals

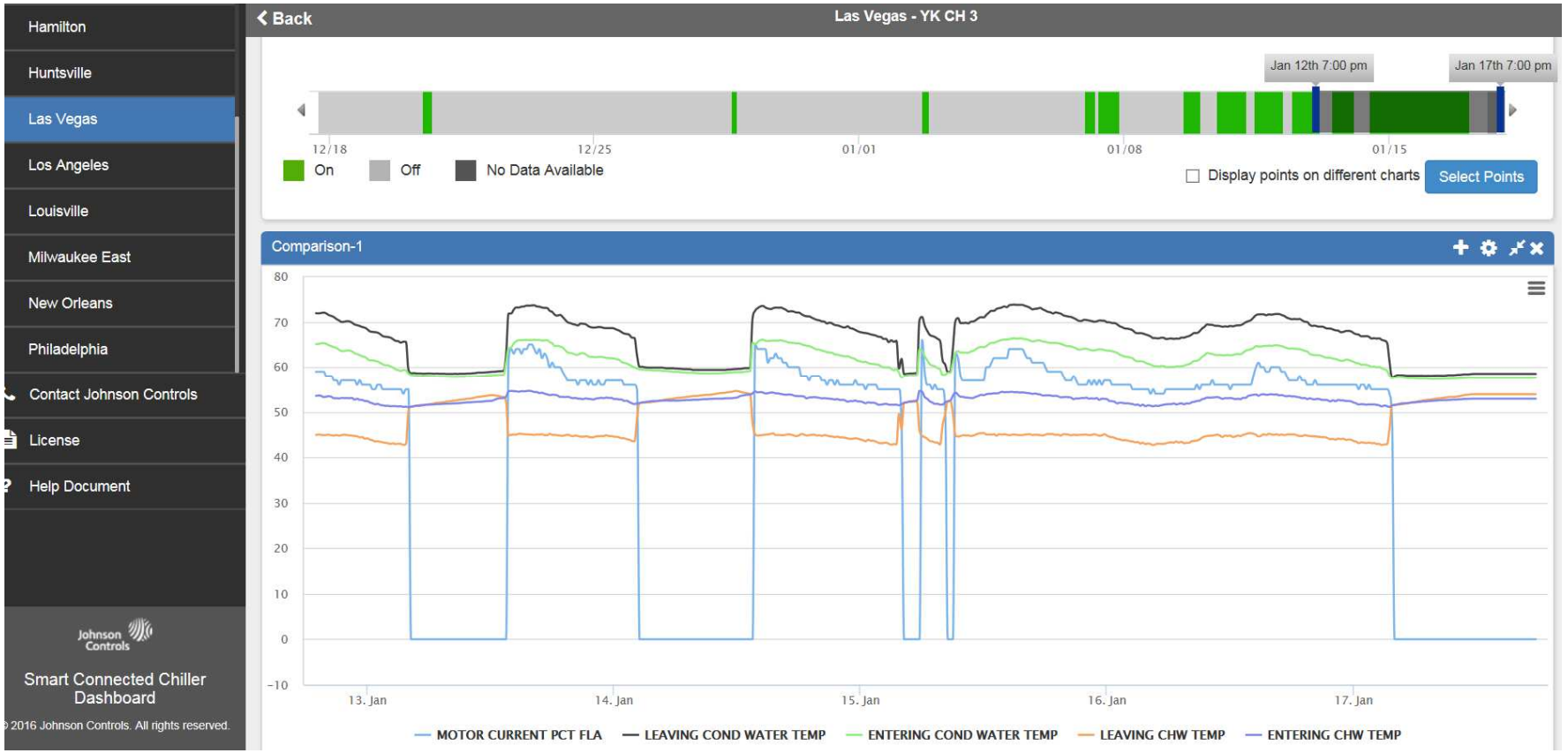


Check Set Points vs Actuals

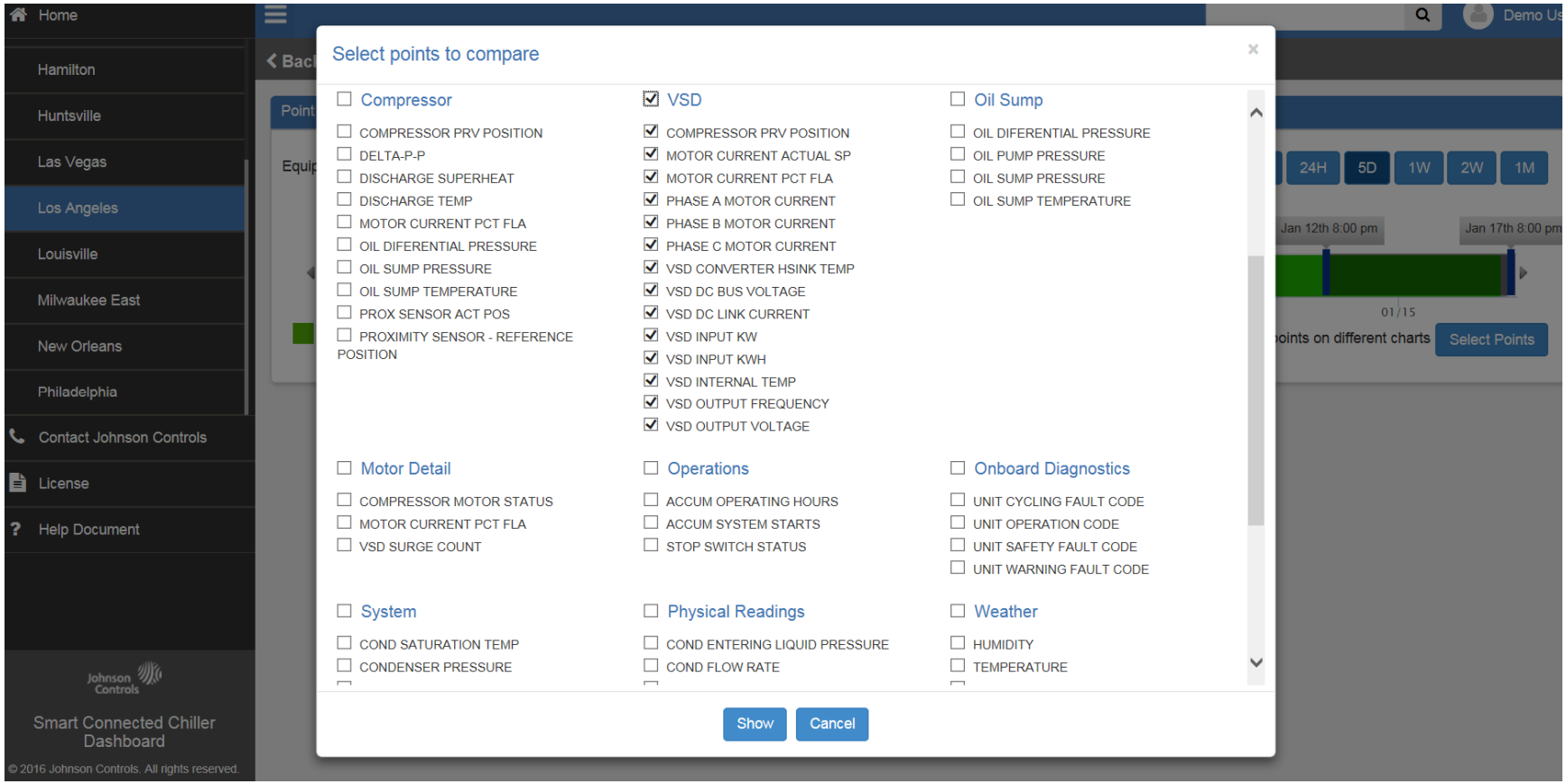
Load Testing the Chiller



Load Testing the Chiller



Chiller Ramp-up/Ramp Down



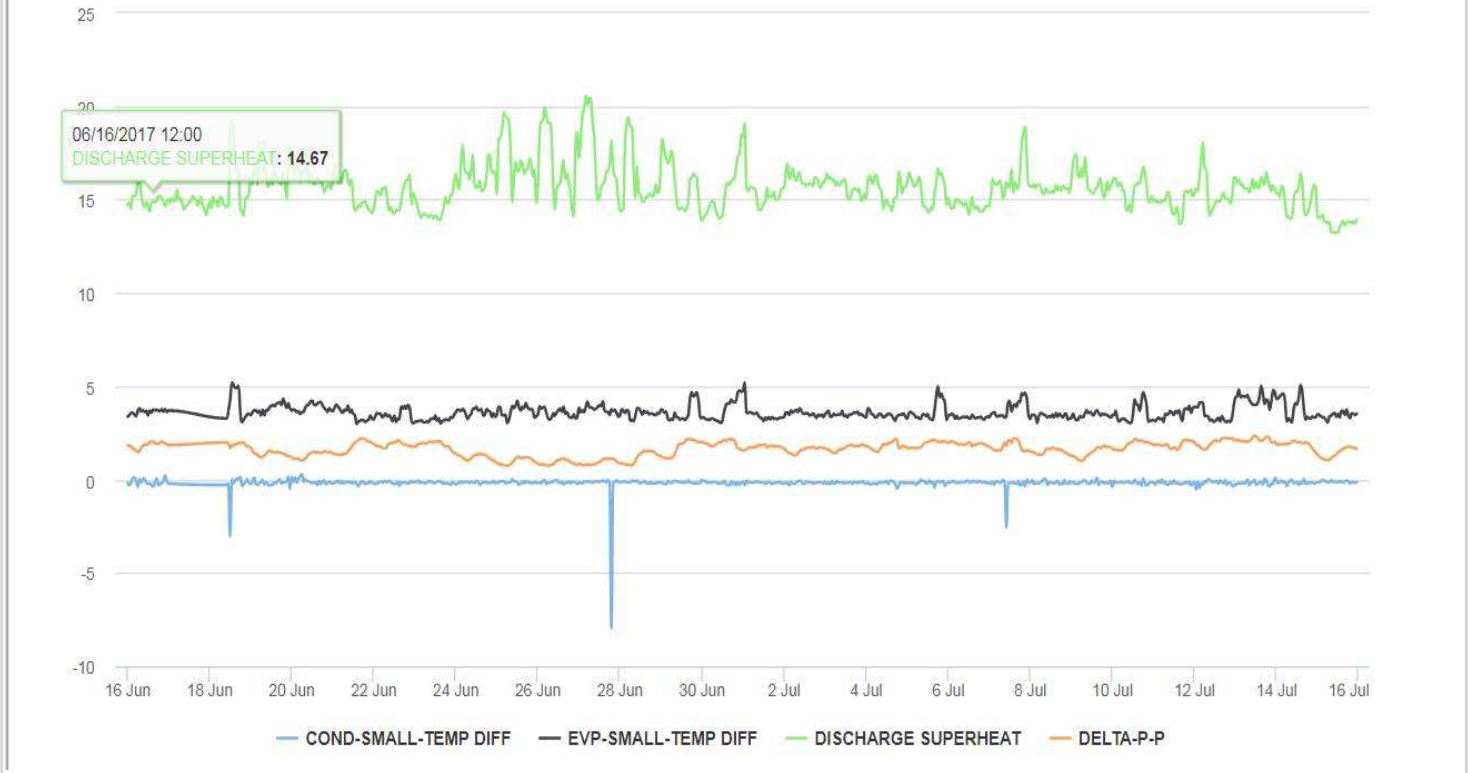
Chiller Ramp-up/Ramp Down

Trimming Refrigerant Charge for Optimum Efficiency

Low Condenser Refrigerant Level	Alert	This chiller has operated for an extended period of time during the reporting period with a slightly lower than normal condenser refrigerant level. Common causes of this condition include: 1. Insufficient charge 2. Low load operation 3. Refrigerant level control system in manual override 4. Refrigerant level control system mechanical malfunction Operation with this condition can lead to: 1. Increased chiller energy consumption 2. Reduced chiller cooling capacity 3. Chiller inability to meet chilled water set point 4. Nuisance shutdowns 5. Tube leaks

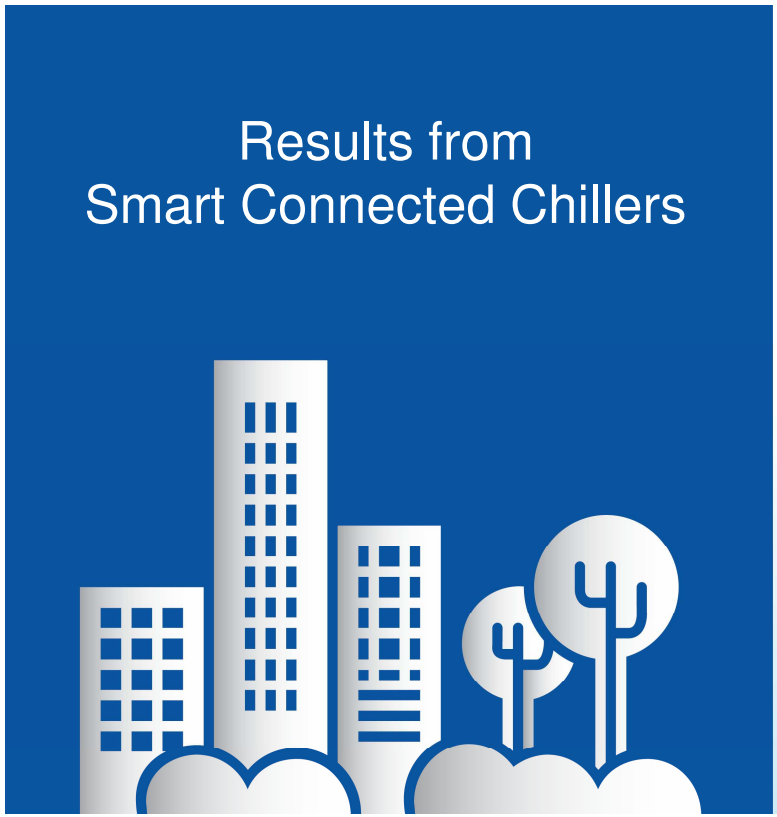
Trimming Refrigerant Charge for Optimum Efficiency

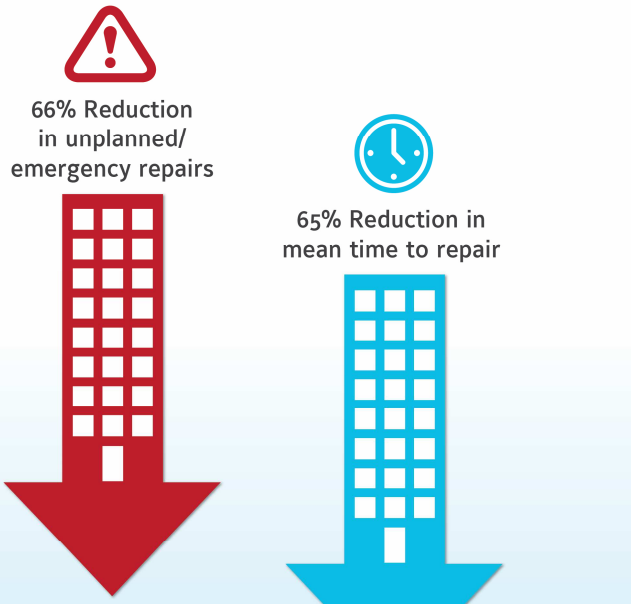
- Design condenser small temp diff = 1.0
- Normal discharge super heat about 10ºF



DEMO

How Might You Benefit From Connected Chillers?





Source: Johnson Controls, Inc. Engineering Analysis

THANK YOU

LEARN MORE:

www.johnsoncontrols.com/smartconnectedchillers

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