

# Axiom Cloud: Apps for Commercial Refrigeration Facilities Analyzer™ Case Study - Compressor Floodback Detection



## OPPORTUNITY

Unplanned refrigeration system downtime, component failures, overtime repairs, and refrigerant leaks can be a very costly aspect of operating mission critical supermarket refrigeration systems. For example, one compressor failure can cost \$8,000 to \$10,000 once a rushed replacement compressor and overtime labor are included.

At this site in Northern California, Facilities Analyzer identified a compressor floodback issue (liquid refrigerant droplets entering the compressors) that the existing alarm strategy missed. Floodback can reduce lubrication in the compressors, which is a major cause of compressor failure. It can also lead to liquid slugging, which causes damaging high pressures inside the compressor and ultimately leads to complete compressor failure.

## SOLUTION

Axiom Cloud's Facilities Analyzer app computes and trends the superheat in the suction header using suction pressures and temperatures reported by the Refrigeration Monitoring and Control System (RMCS). Unlike a traditional threshold alarm, Facilities Analyzer's floodback detection feature accounts for weather and heat load when detecting anomalies in superheat values. If the app's algorithms indicate a floodback risk associated with low superheat values, a series of actions are triggered.

In this instance, Facilities Analyzer identified which circuit was causing the floodback condition by relating superheat variation to individual EEPR positions during case defrost cycles. Then, the app notified the refrigeration service technicians of the location of the fault and recommended follow up actions. Following a technician visit, Facilities Analyzer ensured that the root cause of the issue had been repaired.



Facilities Analyzer processes thousands of data streams to identify anomalies, diagnoses their root cause, and confirm the proper resolution.

## RESULTS

Facilities Analyzer recognized the potential floodback issue before any alarms were initiated, correctly identified the appropriate circuits for remedies, and informed the maintenance provider. These actions prevented an imminent compressor failure, which often results in tens of thousands of dollars in repair costs and product loss.

### Customer type

Retail grocery, 53,000 ft<sup>2</sup>

### Location

Northern California, USA



### Apps provided

- Facilities Analyzer
- Virtual Technician
- Virtual Battery

### Feature in this case study

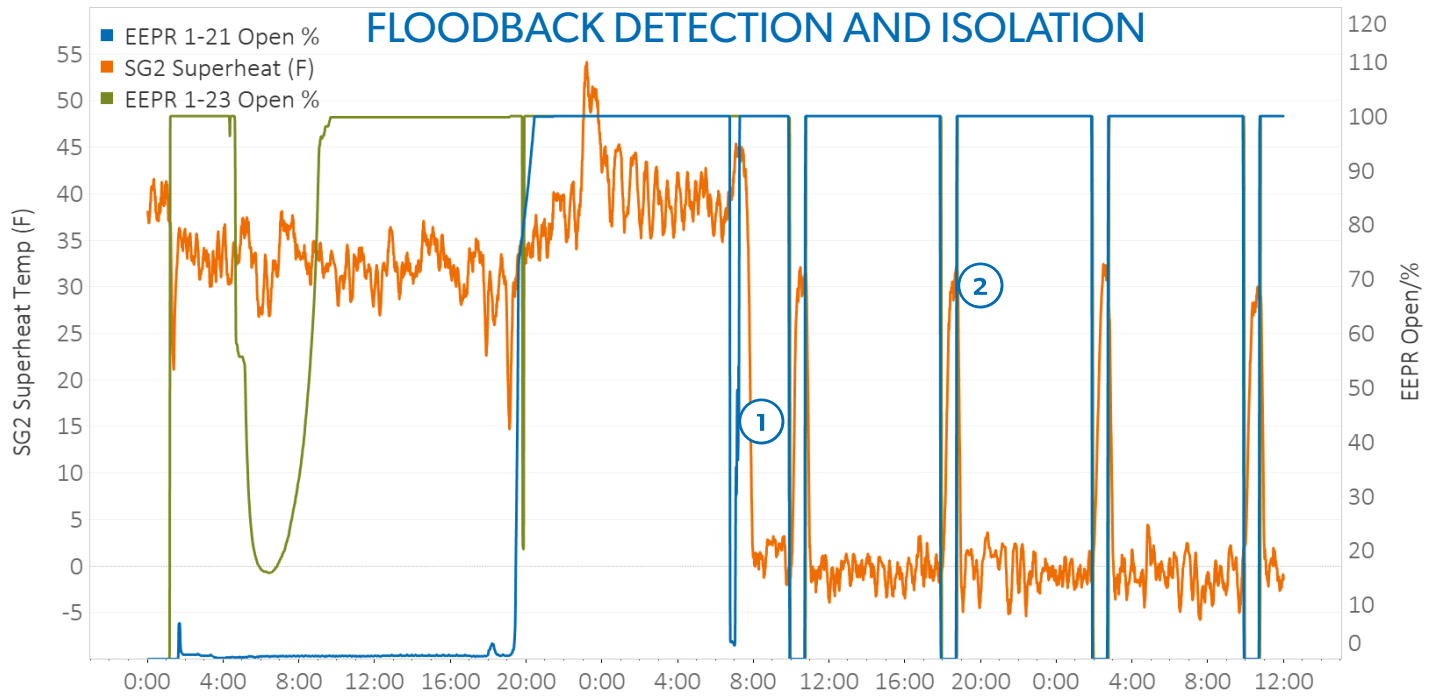
Compressor Floodback detection and isolation

### Refrigeration system architecture

Tyler central parallel racks  
Micro Thermo Controller  
MT: 1705 MBH, 262 HP, 404A  
LT: 220 MBH, 74 HP, 404A

Estimated benefit of Facilities Analyzer at this site

\$89,000 over 5 years



### Superheat reduction ①

Facilities Analyzer detected the onset of floodback in SG2 suction header, identified by a sudden reduction in superheat that was not correlated to weather, load, or other known factors. The store's existing alarms did not detect this dangerous condition.

### Circuit detection ②

Facilities Analyzer isolated the faulty circuit by detecting that SG2 suction superheat returned to an acceptable value when Circuits 1-21 went into defrost. The EEPR open/close cycles of the remaining circuits (not shown) did not correlate with the superheat trends above.

### Alert the tech ③

Facilities Analyzer notified the maintenance provider of the root cause (rather than just the symptoms), location, and urgency of the problem.

### Confirm repairs ④

After the maintenance provider addressed the immediate issue, Facilities Analyzer ensured that the appropriate measures were taken and the floodback was no longer present.

## WHAT FACILITIES ANALYZER DID

- ✓ Detected the problem early, before any significant damage
- ✓ Diagnosed the root cause and located the faulty circuit
- ✓ Notified the maintenance provider with specific corrective action
- ✓ Ensured the proper corrective action was taken

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Axiom Cloud's mission is to use software and automation to transform how the world's cooling systems are powered, operated, and maintained. To learn more more about our Facilities Analyzer, Virtual Technician, or Virtual Battery apps, send us an email or visit our website.



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