Data Technology to Reduce Supermarket Refrigeration Leak Rates

April 12, 2022
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Kersey has worked in various sectors before coming to the U.S. Environmental Protection Agency (EPA). Most recently, he worked for 3.5 years at the California Air Resources Board implementing an incentive program for cleaner agricultural equipment and ensuring that Cap-and-Trade incentive programs benefitted disadvantaged communities. Prior to that, he worked with state agencies to plan hydrogen fueling infrastructure for fuel cell electric vehicles. He holds a Bachelor of Science (BS) in Mechanical Engineering, a BS in Materials Science & Engineering, a Masters of Science (MS), and a PhD in Environmental Engineering, all from the University of California, Irvine.
Questions and Webinar Feedback

Question and Answer Session
- Participants are muted
- Questions will be moderated at the end
- To ask a question, enter your comment into the chat box

Feedback Form
- We value your input!
- The link to a feedback form will appear in the chat window

Call-in Details       1-202-991-0477     ID: 505 066 655#
Webinar Materials

Recording and Slides

- Webinar is being recorded
- Materials will be posted on the GreenChill website under Events and Webinars: www.epa.gov/greenchill
- To receive notification when materials are posted email: EPA-GreenChill@abtassoc.com
GreenChill is a voluntary partnership program that works collaboratively with the food retail industry to reduce refrigerant emission and decrease stores’ impact on the ozone layer and climate system.

GreenChill works to help food retailers:
- Lower refrigerant charge sizes and eliminate leaks
- Transition to environmentally friendlier refrigerants
- Adopt green refrigeration technologies and best environmental practices

www.epa.gov/greenchill
GreenChill’s Mission: Reduce Refrigerant Emissions

**Corporate Emissions Reductions Program**

Commit: Partners measure corporate-wide emissions, set annual goals, and report annually on progress.

**Demonstrate**

Individual stores earn GreenChill certification for meeting highest standards: low charge size, use of less harmful refrigerants, and low leak rates.

**Store Certification Program**

Share: Promote advanced refrigeration technologies, strategies, and practices through social media, webinars, and guidelines.

**Advanced Refrigeration Program**
Learn More

www.epa.gov/greenchill
GreenChill@epa.gov
Upcoming GreenChill Webinars

- **May 3: Advancements in Flammable and Next Generation Refrigerants**
  - Presenters from Chemours will discuss advancements in flammable and next generation refrigerants.

- **June 21: Solutions to Meeting Food Retailer Equipment Specifications**
  - Presenters from the North American Sustainable Refrigeration Council will present on food retail refrigeration leaks: exploring the true cost and equipment specification solutions.

- All GreenChill webinars are at 2-3 PM Eastern
- To be added to our webinar invitation list, email EPA-GreenChill@abtassoc.com
Today’s Speakers...
Clay Rohrer
Director Connected Solutions
Hussmann Corporation
Phone: 636-359-9327
Email: clay.rohrer@hussmann.com

Clay has worked for 23 years in the Refrigeration Industry, 14 years with Hussmann, in a variety of roles in engineering, innovation, and business management. Most recently, Clay has focused his career on transforming the refrigeration business from emergency break fix to a data driven performance based approach.
Nathan Hevesy
Commercial Director, Retail Services Technology
Hussmann Corporation
Phone: 678-480-8902
Email: nathan.hevesy@hussmann.com

Nathan has worked for more than 15 years at Hussmann in a variety of roles including program and project management, branch operations leadership and currently as Director commercializing Hussmann’s cloud based predictive analytics solution. He has a strong belief in our vision of a 5% industry refrigerant leak rate and the idea that actions drive behaviors. He began his career with Ingersoll Rand and has a BS in Industrial Engineering from Purdue University and a Master of Business Administration (MBA) from Georgia Tech.
Dan Byerley
Product Manager, Retail Services Technology
Hussmann Corporation
Phone: 484-889-8124
Email: daniel.byerley@hussmann.com

Dan has worked for 6 years with Hussmann, serving in project and product management roles. Throughout his career, he has extensive experience in providing a data-first approach and in challenging the status quo of traditional business operations. He holds a BS in Mechanical Engineering from Clemson University.
Data Technology to Reduce Supermarket Refrigeration Leak Rates
$627,060
$627,060

Same margin dollars as $16.5M in sales for the average grocery store.
$627,060

Annual maintenance budget for a dozen mid-size grocery stores.
$627,060

Employing 5-6 technicians annually.
$627,060

The 2-year refrigerant material cost savings

21-store regional retailer

Predictive analytics on their refrigeration system
Agenda for Today

1. Market Trends
2. Goals
3. How we Get There
4. Case Studies
5. What’s Next?
Market Trends

Retail Grocery Priority Drivers

Below the Surface

There are pressures threatening retail
- Rising input costs (energy, materials)
- Skilled labor scarcity driving wages higher and quality lower
- Rise of environmental, social, and governance (ESG) responsibilities

Consider the Future

Backroom operations will become essential to sustain high revenue growth
Market Trends

What has happened to refrigerant?

- **25%**
  - Average leak rate of U.S. supermarkets

- **>200%**
  - Price increase, weighted average for usage, for refrigerant in 2021 vs. 2020

- **128 lbs**
  - Average pounds (lbs.), per leak event, for large national grocers (2021 Hussmann serviced customers)

Refrigerant phase outs and supply chain factors have resulted in record prices

**Refrigerant inflation year-over-year 20’ vs ‘21**

- R22: 221%
- R404A: 247%
- R407A: 226%
- R407C: 250%
- R407F: 118%
- R408A: 106%
- R448A: 17%
- R449A: 18%

**Cost per average leak event (128 lbs.) year-over-year ‘20 vs. ‘21**

- R22: $12,000
- R404A: $10,000
- R407A: $8,000
- R407C: $6,000
- R407F: $4,000
- R408A: $2,000
- R448A: $1,000
- R449A: $0
What is happening with labor (and its effect on refrigerant leaks)?

12.2hrs
Labor hours on work orders with refrigerant (45% more than work orders without)

60k
Estimated technician gap in the heating, ventilation, air conditioning and refrigeration (HVAC-R) Industry 2020

Technician wage increase from 2018 baseline

Wage increases have exploded in the post-COVID era
The industry technician gap continues to widen

Is labor a realistic solution to solve the refrigerant leak rate problem?
Opportunities & Goals

What are our companies facing in the future?

ESG PROMISES

MATERIAL INFLATION

LABOR SCARCITY

MARGIN SQUEEZE

A 5% leak rate for our industry helps resolve these major market opportunities
How can software analytics be used to reduce leak rates?

*Leak Detection and Predictive Analytics for Commercial Refrigeration*

1. **You have assets.**
2. **Assets generate performance data.**
3. **Software analyzes and enhances the data.**
4. **Software generates prioritized refrigerant leak events.**
5. **Save money and move towards a 5% leak rate.**

Simple | Automated | Effective
The How

Analytics & Automation Driven Receiver Level Leak Detection

“Always on” automated detection supplying leak rates and priority leaks for work orders

Validation through trending ensures the right leak gets repaired

Features, Benefits, Advantages

Real Time Multi-layer Trending Algorithms
Result: Quicker detection, more accuracy, data driven leak management

Calculated Risks and Priority Levels
Impact: Prioritized work orders with known timelines

Leak Repair Validation 24/7/365
Impact: You know you found the “right” leak

Can Comply with California Air Resources Board (CARB) and Save you Money
Impact: Labor savings from waived leak inspections

Analytics and advanced refrigerant leak detection can save thousands of pounds of refrigerant from entering the atmosphere and can save thousands of dollars in costs for retailers and contractors.
Case Study Example

Removing the “Saw Tooth Effect” from your Liquid Levels

Challenge

- This rack had a 600% annual leak rate which cost in excess of $25,000 in replacement refrigerant

Tasks & Actions

- Utilize the technology to find the leaks at the peaks, not the valleys
- Provide prioritized, by leak rate, events to the right technicians

Analysis & Results

- Finding leaks early is one key part of the equation – Catch them at the peaks
- Post leak repair liquid level trending will verify if the “right” leak was fixed
- 24/7/365 event generation will catch the sawtooth effect

The Business Case

The return on investment is even more significant when you include the labor and material inflation to the savings tallied from leak repairs.
Case Studies

**National retailer experiencing high leak rates in sites**

**Challenge**
- Refrigerant leak controller alarms at 0-5% liquid level (critical)
- High refrigerant $$ loss, high labor costs to charge systems

**Tasks & Actions**
- Installed StoreConnect (SC) and setup advanced refrigerant leak detection.
- Setup rules of engagement with service provider to drive service events for leaks that are prioritized by leak rate and risk

**Analysis & Results**
- StoreConnect notified service organization well in advance to take corrective action
- Technician found leak and repaired at site
- 14 days later StoreConnect confirms technician fixed the right leak

**The Business Case**
A 30% leak rate reduction on average saves $3,000 not counting labor. This leak resulted in greater than a $6,500 savings with an return on investment with this technology in less than one year!
### Case Study Results: Southeast regional retailer improvement in 21 store group

#### Actual Refrigerant Qty Used

<table>
<thead>
<tr>
<th></th>
<th>2019 Baseline</th>
<th>2020 SC Yr 1</th>
<th>2021 SC Yr 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RF Qty</strong></td>
<td>33,173</td>
<td>19,438</td>
<td>15,555</td>
</tr>
<tr>
<td><strong>RF Costs</strong></td>
<td>$ 663,460</td>
<td>$ 388,760</td>
<td>$ 311,100</td>
</tr>
</tbody>
</table>

#### % Variances

<table>
<thead>
<tr>
<th></th>
<th>Yr 1 vs. Baseline</th>
<th>Yr 2 vs. Baseline</th>
<th>2021 vs. 2020 Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RF Qty</strong></td>
<td>-41%</td>
<td>-53%</td>
<td>-20%</td>
</tr>
<tr>
<td><strong>RF Costs</strong></td>
<td>-41%</td>
<td>-53%</td>
<td>-20%</td>
</tr>
</tbody>
</table>

#### All Other Sites

<table>
<thead>
<tr>
<th></th>
<th>2019 Baseline</th>
<th>2020 SC Yr 1</th>
<th>2021 SC Yr 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RF Qty</strong></td>
<td>159,802</td>
<td>112,564</td>
<td>119,818</td>
</tr>
<tr>
<td><strong>RF Costs</strong></td>
<td>$ 3,196,040</td>
<td>$ 2,251,280</td>
<td>$ 2,396,360</td>
</tr>
</tbody>
</table>

#### % Variances

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</thead>
<tbody>
<tr>
<td><strong>RF Qty</strong></td>
<td>-30%</td>
<td>-25%</td>
<td>6%</td>
</tr>
<tr>
<td><strong>RF Costs</strong></td>
<td>-30%</td>
<td>-25%</td>
<td>6%</td>
</tr>
</tbody>
</table>

#### Cumulative 2 Yr Savings vs. Baseline

- Lbs 31,353
- $ Savings $ 627,060
- % Savings $ 627,060
- % Savings (not including inflation impact)

#### StoreConnect

- 2 Yr Costs $ 111,300
- StoreConnect PRO - 21 Stores
- Refrigerant Only (labor not included)

#### Adv. Leak Detection

- 2 Yr Savings $ 627,060
- Refrigerant Only (labor not included)

RF: Refrigerant
## ESG Can Be Profitable

### A Collective Vision for our Industry

What would a 5% leak rate mean for our industry?

<table>
<thead>
<tr>
<th>10.8M</th>
<th>$217M</th>
<th>$5.4B</th>
<th>31.2B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lbs. of refrigerant material saved at 5% leak rate vs. current state</td>
<td>BOTTOM LINE IMPACT</td>
<td>Annual refrigerant material saved at 5% leak rate vs. current state</td>
<td>The equivalent grocery sales to obtain the same bottom line margin impact as savings $217M in refrigerant, annually</td>
</tr>
</tbody>
</table>
Industry Wide 5% Leak Rates ARE Possible

Thank You!
Contacts and Upcoming Webinars

**Presenter Contacts**
- Clay Rohrer, Hussmann  
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- Nathan Hevesy, Hussmann  
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**Upcoming Events**

<table>
<thead>
<tr>
<th>Date</th>
<th>Webinar Topic</th>
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<tbody>
<tr>
<td>5/3/2022</td>
<td>Advancements in Flammable and Next Generation Refrigerants</td>
</tr>
<tr>
<td>6/21/2022</td>
<td>Food Retail Refrigeration Leaks: Exploring the True Cost and Equipment Specification Solutions</td>
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</table>

Join our webinar invitation list or request today’s slides: **EPA-GreenChill@abtassoc.com**  
Access past webinar slides: **www.epa.gov/greenchill/events-and-webinars**