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The Premier Energy Training Workshop and Trade Show for Federal Agencies

A River of Energy Solutions

Operation & Maintenance Session 4

Intro to Energy Concepts

Defense Commissary Agency

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DeCA's Mission is to Deliver a Premier Commissary Benefit to the Armed Forces Community

- Exciting shopping experience
- Delivering more than 30% savings
- Fostering recruitment, retention, and readiness
- Supporting warfighters' peace of mind by providing their families secure and affordable access to American products

Your Commissary … It's Worth the Trip!

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DeCA Locations

	FY 2011
• DeCA	
– Regional offices	3
– Commissaries	249
– Country & US territory locations	14
– Central distribution centers (CDC)	10
– Central Meat Processing Plant	1

- Facilities
  - 350+
  - Construction dates vary from 1906 to 2011
  - Sizes vary from 1,000 square feet (sf) to 200,000+ sf
  - 17+ million square feet

DeCA Energy Management

- Don’t forget our mission
- Determine what is using the energy
- Each store/CDC reports energy bills (usage and costs) to DeCA Headquarters on a quarterly basis
- We develop an Energy Use Index (EUI) for each location, which is all energy (kBTUs) divided by facility square footage (kBTUs/sf)
- We do the same for water usage - Annual Water Usage - gallons per square foot (Gal/sf)
- We compare all location EUIs and investigate anomalies
- We evaluate energy technology to meet our mission and goals

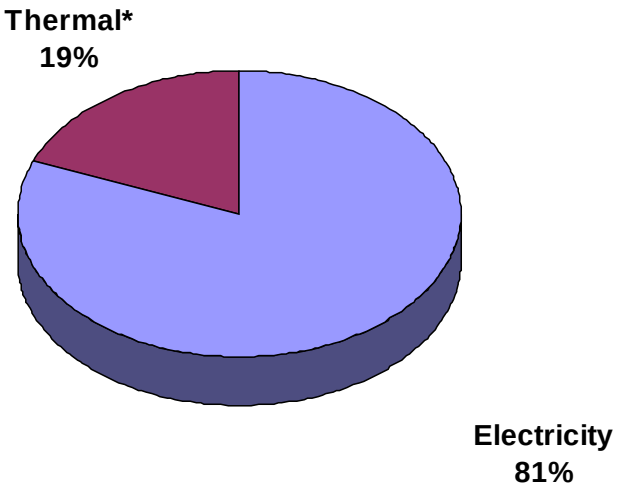
Energy Challenges

- Open refrigeration
- Market driven requirements such as more preprocessed/prepackaged foods, which require more refrigeration
- Maintenance – A “good” maintenance person can “jump out” or “override” anything
- Employees – Can also “jump out or override” anything.

2010 Energy Use

The average commissary EUI is approximately 150 kBTU/sf/yr

	kBTU/sf/yr
Electricity	**118.3**
Thermal*	**27.4**
Total	**145.7**



* Includes natural gas, steam, propane, fuel oil, hot water, etc.

The average commissary water usage is approximately 17 gal/sf/yr

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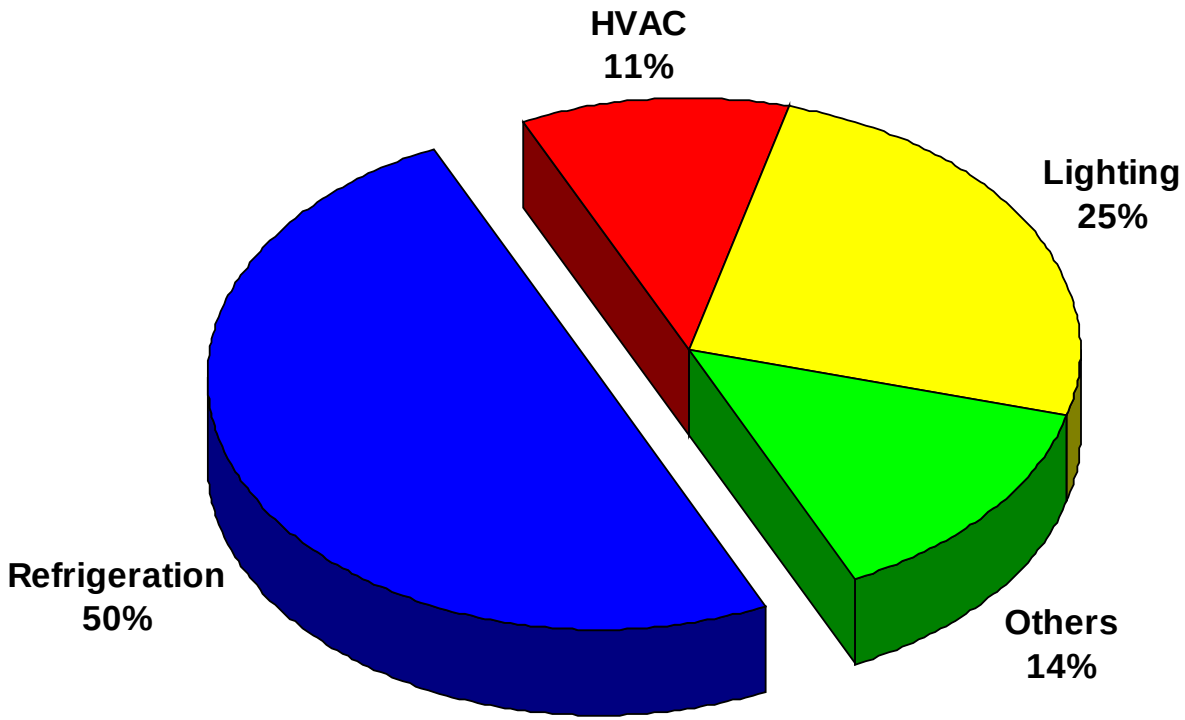
Where is the energy going at a typical Commissary?



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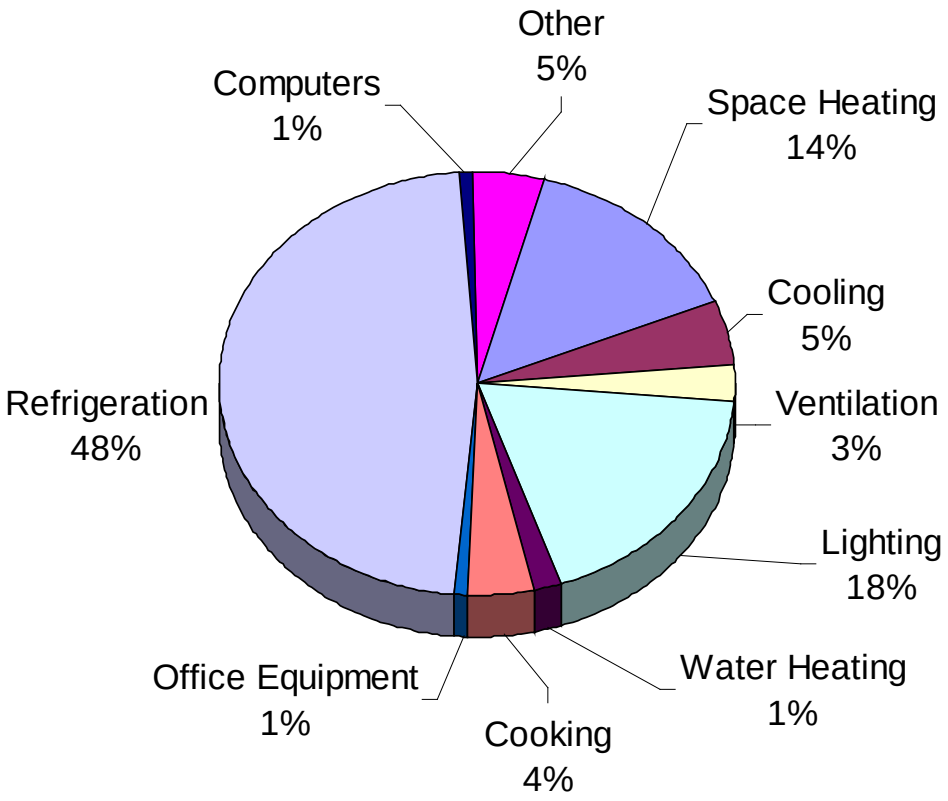
2003 Commercial Buildings Energy Consumption Survey (CBECS)

Energy Consumption for Food Sales (2003 CBECS)
Total Energy Intensity - 199.7 (kBTU/sf)



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DeCA Standards

- Heat Recovery/Reclaim
  - HVAC
  - domestic hot water
- Maintain Sales Area Humidity/Dew Point below 52°F
  - desiccant wheels
  - dual path systems
- Refrigeration Monitoring Control System (RMCS)
  - monitors and controls refrigeration, HVAC, and lighting
  - monitors utilities at some locations
- Energy Star Equipment
- Return Air Beneath Display Cases
- ECM Motors
- Maximize Day Lighting
- Using EPA SNAP Refrigerants
- Antisweat Heater Controls
- T-8 and T-5 Lighting
- Night Curtains
- Low Water Flow Devices
- LED Lighting for Low Temperature Glass Door Display Cases and Walk-Ins
- Maximize Glass Door Display Cases for Frozen Products
- Occupancy Sensors
- Multiplex Compressors

DeCA Standards

How to keep the torch lit as it is passed along?

- “Commissioning” - It is Important!
- Having it installed correctly is the first step
- How it will be used and maintained is the next adventure!

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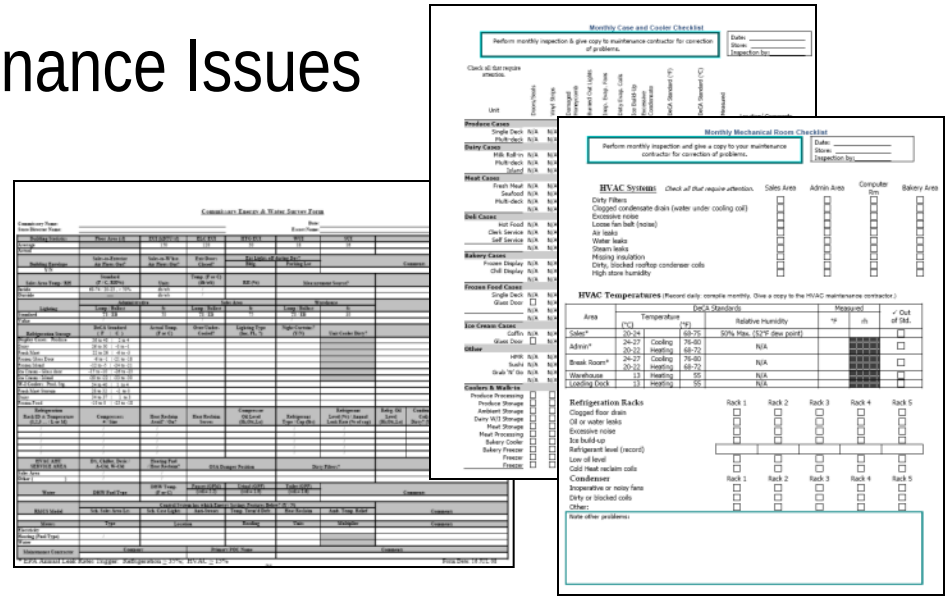
Ways to Enhance Energy Savings

- *Commissioning*
  - *New Equipment*
  - *New Construction*
- Training – Get the word out!
- Review Energy and Water Consumption
- Re-Commissioning or Retro-Commissioning – Walk the Facilities!
  - Review Facility Operations
  - Review Building Automation Control Systems (BACS)
  - Review Maintenance
- Evaluate new technology or trends

Energy Awareness Training

- Training – Get the word out!
- Educate the Employees
  - About Energy Conservation & Goals
  - About Typical Maintenance Issues
- Develop Checklists



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Review Utility Consumption

- Correct data is Important! – Utility providers make mistakes
  - Review energy and water consumption
  - Review square footage of the facilities
- Trend and verify Energy Usage Index (EUI) data is within ordinary ranges

Review Energy Bills and Data

(Cont)

Gas Meter
Document meter reading

Gas Meter
Know location of meter

Review Energy Bills and Data

(Cont)

Electric Meter
Record meter Reading

Gas Meter
Record Meter Reading

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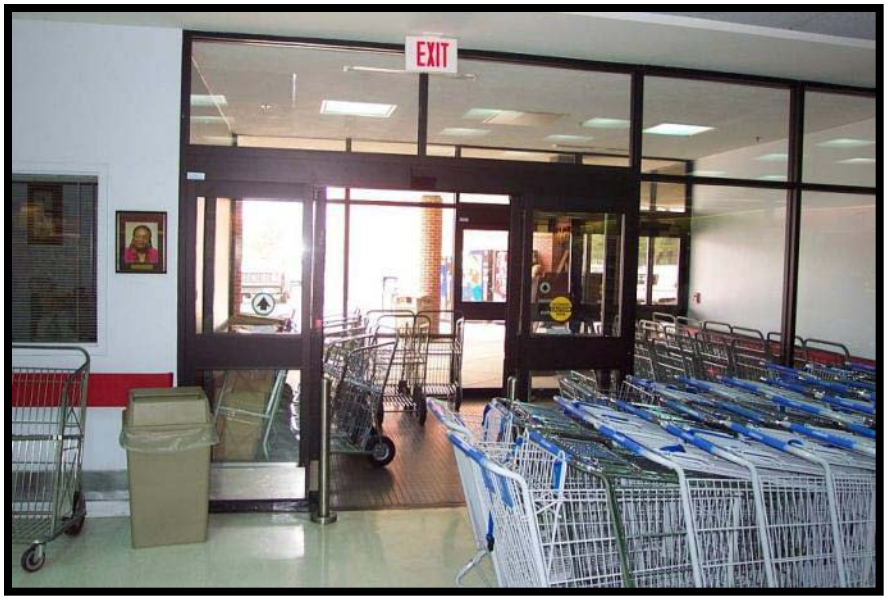
Review Facility Operations

- Doors not closed or blocked open! – Front doors from baggers, sales/warehouse doors & Walk-in boxes from stockers.
- Environmental barriers removed or damaged – missing dairy curtains in walk-in boxes, damaged Walk-in doors, to doors to expanded sales area.
- Wrong temperature florescent lamps.
- Overstocked cases.
- Store or stockers are by-passing the lighting controls
- Items are not turned off during closed hours (lights, ceiling fans, ventilation, etc.)
- Heaters running and exterior ventilations are running or open.
- Unit Heaters and exhaust fan thermostats are not labeled and don't have proper set points.
- Warehouse exhaust fans are removing the air conditioning from sales area to warehouse. Exhaust fans are running and exterior louvers are not working.

Review Facility Operations

(Cont)



Exterior doors locked “Open”

Extended sales areas tend to have “Open” doors or no doors.

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Review Facility Operations

(Cont)

Overstocking

Blocking display case return air "Waterfall effect"

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Review Facility Operations

(Cont)

Blocking display case return air “Waterfall effect”

Bags blocking return air on display cases

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Review Facility Operations

(Cont)

Placed vendor cooler next to the thermostat and humidistat

Overstocking

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Review Facility Operations

(Cont)

What do these control?

Good signage

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Review Facility Operations

(Cont)

Snowing in freezer. Notice the snow shovels in the corner

Doors removed to warehouse area.

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Review Facility Operations

(Cont)

Poor location of lighting override switches

Storing items in the mechanical rooms that block access to HVAC equipment

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Review Facility Operations

(Cont)

Make sure mechanical timers have correct time

Make sure mechanical timers are working properly! (Pins not installed)

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Review Facility Operations

(Cont)

Sink left running

Look for oil or water on the floor

Review Facility Operations

(Cont)

Make sure lights in sales area go to 50% when stocking

Check for unnecessary lights that are running outside sales hours.

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Review Facility Operations

(Cont)

Check for unnecessary lights on during daylight when not needed.

HID fixtures that have greatly exceeded life expectancy.

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Review Facility Operations

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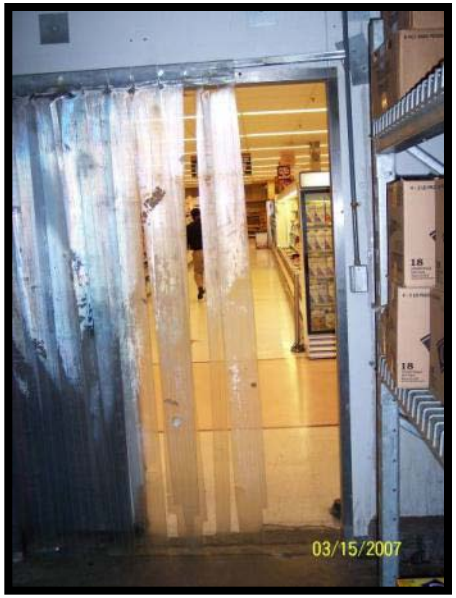

Check for missing strip curtains

Large and conflicting exit signs

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Review Facility Operations

(Cont)

Heat tape on freezer condensate line not working

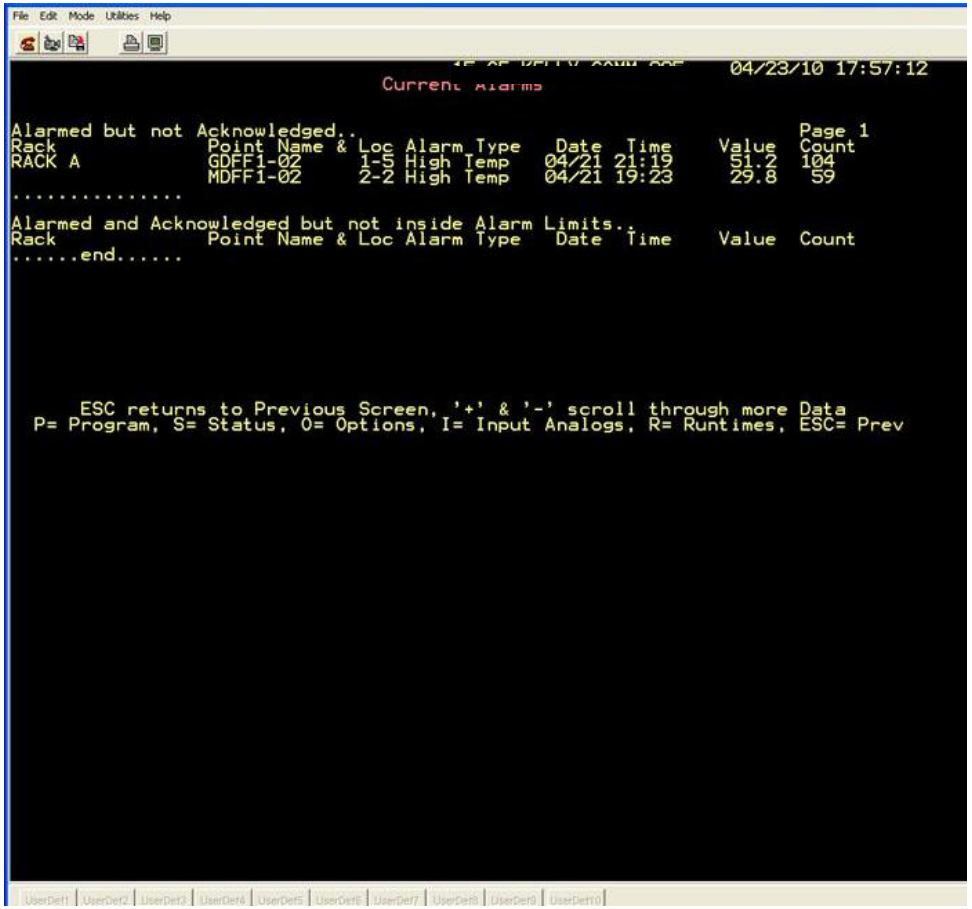
Putting bucket under evaporator and not using the shelf is NOT the correct solution.

Review Building Automated Controls

- Are things actually turning on or off when the system calls for it?
  - Lighting
  - HVAC
  - Heat Recovery
- Review set points
- Too many alarms ultimately train people to ignore the alarms

Review Building Automated Controls

(Cont)



Alarms are not being acknowledged

Review Building Automated Controls

(Cont)

In Field Change!
Silence Alarm

In Field Change!
Lighting Overridden!

Review Building Automated Controls

(Cont)

Controls put in manual or "hand"

Validate set points and readings

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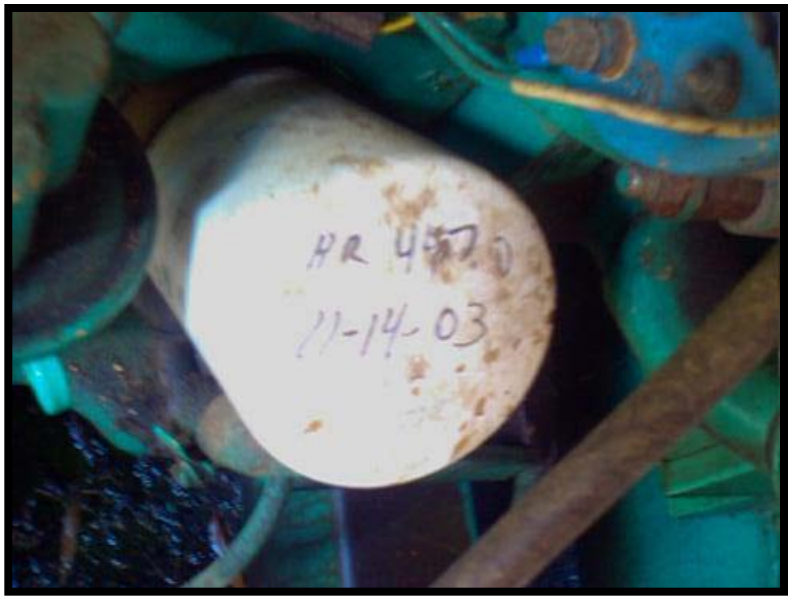
Review Maintenance

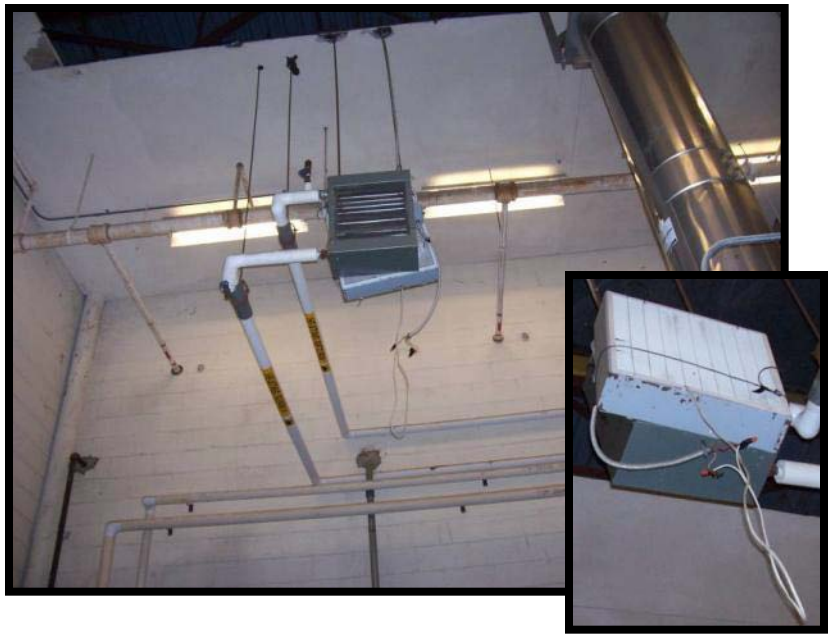
- T-12 Lamps in T-8 Fixtures.
- HID light fixture lamps are well beyond their expected life.
- Wrong lamp temperatures are being used in the store. The DeCA standard is 3500ºK with the exception of 3000ºK over meat display cases.
- Outside air damper closed.
- Heat Reclaim not working.
- Exterior lights on during daylight hours - Photocells failed and not replaced or timers not set.
- Anti-sweat heaters are on 24/7.
- Humidity in refrigerated space caused by various reasons.
- Desiccant units are not working or turned off.
- Damaged refrigerated door seals
- Low Refrigerant levels.
- Compressors are short cycling.

Review Maintenance

(Cont)



Generator oil filter.
Picture taken March 12, 2009



When something just doesn't look right!

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Review Maintenance

(Cont)

Dirty air filters

Dirty evaporator

Review Maintenance

(Cont)

Dirty HVAC coil

Dirty Evaporator

Review Maintenance

(Cont)

Broken honeycombs

Hot water heat reclaim is valved off (NOT WORKING!)

Review Maintenance

(Cont)

High sales floor humidity or wrong anti-sweat settings.

The Most Common Source of Frost in Display Cases is from HIGH SALES FLOOR HUMIDITY!

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Review Maintenance

(Cont)

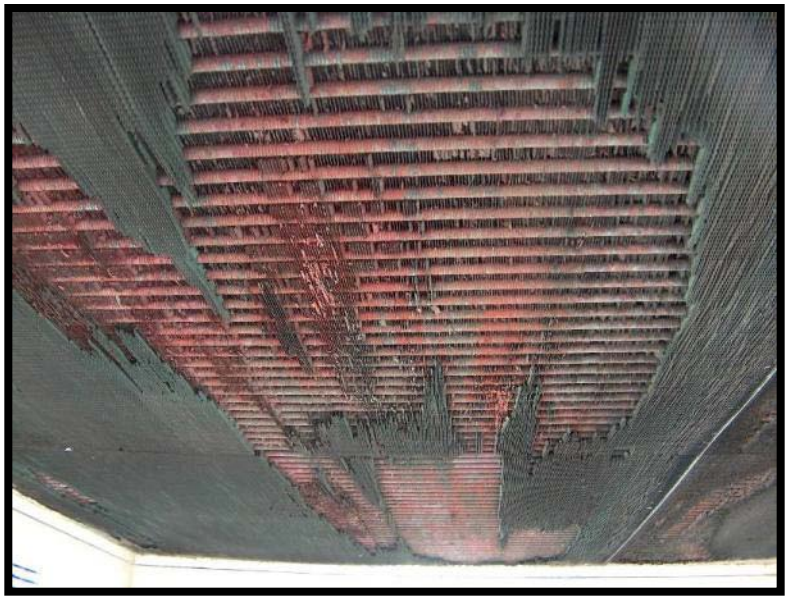
Bad door seals

Bad door seals

Review Maintenance

(Cont)

Dirty condenser coil



Bad condenser coil

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Review Maintenance

(Cont)

No automatic shutoff device!

When Working

Refrigeration lines are hot to touch and hot water pipe (Top center) will be hot.Cold water pipe at bottom could be hot or cold depending on hot recirculation water loop!

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Review Maintenance

(Cont)

Different temperature fluorescent lamps

T-12 lamps in T-8 Fixtures

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Review Maintenance

(Cont)

Dirty filters in HVAC system

Frozen HVAC coil

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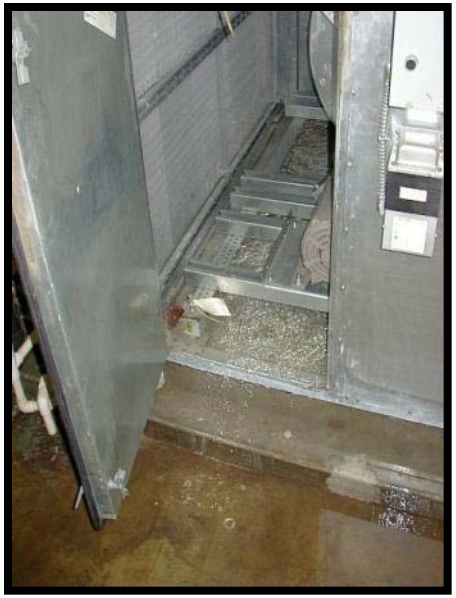
Review Maintenance

(Cont)



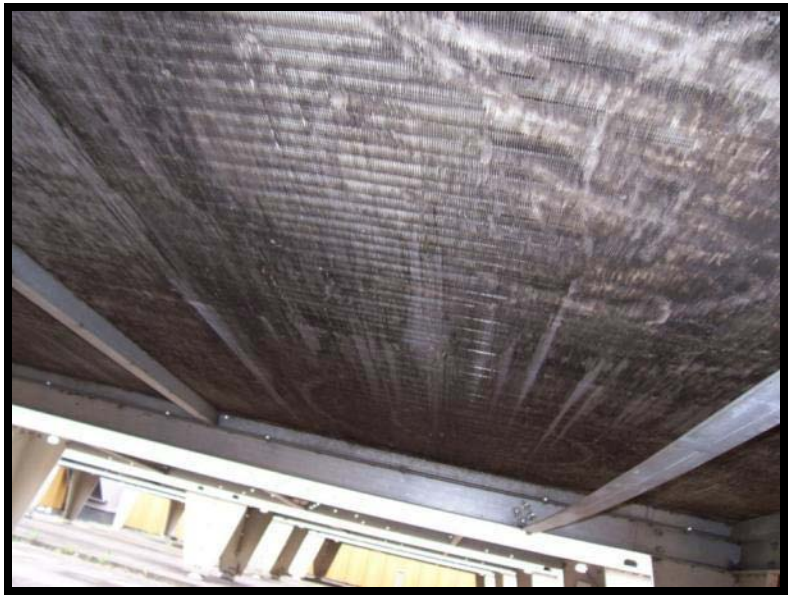
Clogged condensate drain

Check float valve

Review Maintenance

(Cont)

Obstructed Condenser



What happens when a condenser is cleaned with high pressure sprayer?

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Review Maintenance

(Cont)

Something doesn't look right!
No water connected to tank!

Missing linkages

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Review Maintenance

(Cont)

Disconnected linkages

Pretty Pipes – No insulation on Hot Water pipes

Evaluate new technology or trends and strive for better solutions

- Things tend to get better and cheaper
- Solid state lighting is rapidly evolving and improving.
- Building controls are improving
- ECM motors are getting larger
- Better sustainability

Strive for Better Solutions

Strip Curtains

Flexible Doors

Strive for Better Solutions

(Cont)

Incandescent Walk in Freezer Lights
((39) 150 watt fixtures)

LED Walk in Freezer Lights
((10) 86 watt LED fixture)

Strive for Better Solutions

(Cont)

High Intensity Discharge (HID) Lighting
(458 watt fixtures)

Fluorescent Lighting
(324 watt fixtures)

Strive for Better Solutions

(Cont)

Open Dairy Boxes

Glass Door Dairy Boxes

Strive for Better Solutions

(Cont)

Open Coffin Cases

Covered Coffin Cases

Questions?

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