An Energy Management Update

Jim Green
Bridge Group Meeting
January 2012
The Good News

• July 19 to December 5 - 13 instances of alarms on 2\textsuperscript{nd} and 3\textsuperscript{rd} shift where District serious problems with freezers, incubators, cold rooms, RAR areas, etc were discovered and resolved.

• On average, the “off hours” FM District & BSAC Team “saved” a potentially priceless box full of research once every 10 days.

• Typical Problems:
  o Freezer doors ajar / frosted up
  o Refrigeration system failures
  o Incubator O\textsubscript{2} or CO\textsubscript{2} failures
  o RAR room air handler malfunctions
<table>
<thead>
<tr>
<th>Date</th>
<th>Department</th>
<th>Location</th>
<th>Issue Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8/2012</td>
<td>Crops Research</td>
<td>Walk in Cooler #XX in Room Y</td>
<td>(Researcher) has removed the product. Please repair Monday.</td>
</tr>
<tr>
<td>1/8/2012</td>
<td>Nils Hasselmo</td>
<td>Incubators 4J &amp;4K in Room XXX in alarm.</td>
<td>Incubator has been in alarm for over 30 minutes. Mechanic called back and said it is low on CO2. (Researcher) contacted and will resolve issue.</td>
</tr>
</tbody>
</table>
The Bad News

• Over the same July to December period there were 23 instances of alarms which turned out to be “False” and self-inflicted problems (e.g. freezers being defrosted, incubators turned off, equipment moved, construction projects underway, etc).

• Anecdotal evidence (spot checks) shows a number of researchers believe their equipment is alarmed and being monitored ……when it’s not.

• Lab contact lists on file and posted on equipment are not always updated on a routine basis.
<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Name</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/23/2011</td>
<td>5:42:00 PM</td>
<td>KE</td>
<td>Room yyy - Incubators</td>
<td>Mechanic responded and found both units empty with the doors open.</td>
</tr>
<tr>
<td>11/25/2011</td>
<td>4:17:00 PM</td>
<td>Moos</td>
<td>Incubator J Rm XX-YYY</td>
<td>Mechanic on duty went down and found the occupant/customer was doing maintenance on the incubator.</td>
</tr>
</tbody>
</table>
At least once a month, freezers with this tag attached are discovered running with product inside.
<table>
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<tr>
<th>Date/Time</th>
<th>User</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 NOV 2011 12:09:00 AM</td>
<td>Hasslemo</td>
<td>Freezer High Temp Room XXX - Freezer # X</td>
<td>Contacted K. O'Brien at 00:40. Freezer has 2 Cat Tags on it and has product inside the Freezer.</td>
</tr>
</tbody>
</table>
At the VERY LEAST......

Let's give ourselves a fighting chance!

The contact info on the equipment has to be correct.
Could this happen?

Freezer turned off for defrost

BSAC gets alarm, investigates and determines freezer is has been turned off.
Could this happen?

Researcher turns off freezer

BSAC gets Alarm, determines freezer is off

Alarm / Point is moved to Maintenance List. therefore…
Alarm is no longer being monitored by BSAC
Could this happen?

Researcher turns off freezer

BSAC gets Alarm, determines freezer is off

Point moved to Maintenance List

Researcher turns freezer back on and **incorrectly** assumes the alarm is being monitored By BSAC
Could this happen?

Researcher turns off freezer

BSAC gets Alarm, determines freezer is off

AH : 14701 -80 Freezer
EquipmentID : -80 Freezers
Maintenance Code : Electronic Note

Point moved to Maintenance List

Researcher turns freezer on

Freezer breaks, all the research material inside is destroyed
Could this happen?

Researcher turns off freezer

BSAC gets Alarm,

Mechanic finds freezer empty and unplugged

Alarm is put on the “ignore list”

Researcher turns freezer back on & loads it up

Freezer breaks

No alarm at BSAC because point is still on “Ignore List"
Could this happen?

BSAC gets Alarm, determines freezer is off

AH : 14701 -80 Freezer
EquipmentID : -80 Freezers
Maintenance Code : Electronic Note

Point moved to Maintenance List

Research material is lost.

Lots of people are upset!!!

Researcher turns off freezer

No alarm indication at BSAC because point is still on ML

Freezer breaks

Research material is lost.
The Critical Alarm Tag (CAT)

BSAC gets Alarm, determines freezer is off
Point moved to “Ignore List”

Researcher turns off freezer

WARNING
The Alarm for this equipment is not being monitored
Call to have alarm reactivated
On Fri, Jan 13, 2012 at 10:47 AM, Scott Elton wrote:

Hi Bill - Do you know why our steam bill for the Social Sciences Building was so much greater compared to Dec?

Are we leaking somewhere?

In Nov it was $4,000 at Soc Sci and $1,600 at Heller. In Dec it was $12,000 at Soc Sci and $3,000 at Heller.

Is there somebody at Energy Management I should ask?

Thanks,
Scott
115 CHILDREN'S REHABILITATION CENTER: 70,852 Square Feet

**ELECTRICITY**

**CITY WATER**

**STEAM**

**CHILLED WATER**

- **KWHRS**
- **CCF**
- **LBS**
- **TON/HRS**

- **2011**
- **2012**
Actual vs. “Expected” Consumption

Monthly Continuous
All Fuel, Per Square Foot

Electric, Natural Gas, Steam/Hot Water, Baseline - Weather Normalized (May 2010 - Apr 2011)
## Building Energy Report Card

<table>
<thead>
<tr>
<th>Bldg</th>
<th>Name</th>
<th>Bldg Type</th>
<th>KBTU/GSF</th>
<th>2011</th>
<th>Target</th>
<th>% of Target</th>
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<tr>
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<td>98.10</td>
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<td>86.82%</td>
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<td>113.22</td>
<td>108.79%</td>
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<tr>
<td>064</td>
<td>COFFMAN MEMORIAL UNION</td>
<td>Union</td>
<td>103.08</td>
<td>105.86</td>
<td>108.54</td>
<td>97.53%</td>
</tr>
<tr>
<td>066</td>
<td>AMUNDSON HALL</td>
<td>Lab</td>
<td>254.60</td>
<td>254.43</td>
<td>199.70</td>
<td>127.49%</td>
</tr>
<tr>
<td>067</td>
<td>FIELD HOUSE</td>
<td>Gym</td>
<td>60.94</td>
<td>95.16</td>
<td>113.41</td>
<td>83.91%</td>
</tr>
<tr>
<td>068</td>
<td>CENTENNIAL HALL</td>
<td>Residence Hall</td>
<td>104.88</td>
<td>115.50</td>
<td>118.19</td>
<td>97.73%</td>
</tr>
<tr>
<td>069</td>
<td>VARIETY CLUB RESEARCH CENTER</td>
<td>Lab</td>
<td>262.74</td>
<td>256.15</td>
<td>173.70</td>
<td>147.47%</td>
</tr>
<tr>
<td>070</td>
<td>BOYTON HEALTH SERVICE</td>
<td>Hospital</td>
<td>184.41</td>
<td>250.19</td>
<td>123.49</td>
<td>202.60%</td>
</tr>
<tr>
<td>071</td>
<td>FORD HALL</td>
<td>Classroom</td>
<td>109.02</td>
<td>100.79</td>
<td>138.91</td>
<td>72.56%</td>
</tr>
<tr>
<td>072</td>
<td>BIERMAN FIELD CLUBHOUSE</td>
<td>Gym</td>
<td>135.90</td>
<td>94.05</td>
<td>109.09</td>
<td>88.21%</td>
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<tr>
<td>073</td>
<td>JOHNSTON HALL</td>
<td>Admin</td>
<td>72.21</td>
<td>68.24</td>
<td>108.40</td>
<td>61.10%</td>
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<tr>
<td>074</td>
<td>MAYO BUILDING &amp; ADDITIONS</td>
<td>Hospital</td>
<td>197.37</td>
<td>199.76</td>
<td>133.87</td>
<td>149.22%</td>
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<tr>
<td>093</td>
<td>1901 UNIVERSITY AVENUE SE</td>
<td>Admin</td>
<td>69.25</td>
<td>67.38</td>
<td>99.05</td>
<td>68.03%</td>
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<tr>
<td>095</td>
<td>EASTCLIFF</td>
<td>#/NA</td>
<td>104.05</td>
<td>88.69</td>
<td>98.27</td>
<td>90.25%</td>
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<tr>
<td>098</td>
<td>UNIVERSITY STORES SOUTH</td>
<td>Admin</td>
<td>86.75</td>
<td>91.53</td>
<td>236.49</td>
<td>38.70%</td>
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<tr>
<td>099</td>
<td>COMO RECYCLING FACILITY</td>
<td>Warehouse</td>
<td>43.37</td>
<td>49.92</td>
<td>100.53</td>
<td>49.65%</td>
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<tr>
<td>103</td>
<td>TRANSPORTATION &amp; SAFETY BUILDING</td>
<td>Admin</td>
<td>300.94</td>
<td>320.24</td>
<td>103.42</td>
<td>309.65%</td>
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<tr>
<td>105</td>
<td>TERRITORIAL HALL</td>
<td>Residence Hall</td>
<td>95.39</td>
<td>105.52</td>
<td>120.70</td>
<td>87.42%</td>
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<tr>
<td>107</td>
<td>MASONIC MEMORIAL BUILDING</td>
<td>Hospital</td>
<td>223.40</td>
<td>181.78</td>
<td>163.02</td>
<td>111.51%</td>
</tr>
<tr>
<td>109</td>
<td>VFW CANCER RESEARCH CENTER</td>
<td>Lab</td>
<td>405.91</td>
<td>250.21</td>
<td>208.77</td>
<td>119.60%</td>
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<tr>
<td>110</td>
<td>FRONTIER HALL</td>
<td>Residence Hall</td>
<td>127.19</td>
<td>120.77</td>
<td>121.58</td>
<td>99.33%</td>
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<tr>
<td>111</td>
<td>DIEHL HALL</td>
<td>Lab</td>
<td>252.14</td>
<td>258.91</td>
<td>190.67</td>
<td>135.79%</td>
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<tr>
<td>112</td>
<td>RAPSON HALL</td>
<td>Classroom</td>
<td>98.78</td>
<td>100.73</td>
<td>202.60</td>
<td>49.72%</td>
</tr>
<tr>
<td>113</td>
<td>FOOD OPERATIONS BUILDING</td>
<td>Admin</td>
<td>135.98</td>
<td>143.15</td>
<td>112.87</td>
<td>126.83%</td>
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<tr>
<td>115</td>
<td>CHILDREN'S REHABILITATION CENTER</td>
<td>Admin</td>
<td>169.25</td>
<td>141.02</td>
<td>163.80</td>
<td>96.09%</td>
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<tr>
<td>119</td>
<td>STEAM UTILITIES BUILDING</td>
<td>Maintenance</td>
<td>354.02</td>
<td>412.88</td>
<td>133.07</td>
<td>310.27%</td>
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<td>121</td>
<td>UNIVERSITY STORES NORTH</td>
<td>Warehouse</td>
<td>61.69</td>
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<td>122</td>
<td>KOLTHOFF HALL</td>
<td>Lab</td>
<td>612.05</td>
<td>605.14</td>
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<tr>
<td>125</td>
<td>SHEPHERD LABORATORIES</td>
<td>Lab</td>
<td>407.40</td>
<td>407.76</td>
<td>212.20</td>
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<td>1425 UNIVERSITY AVENUE SE</td>
<td>Admin</td>
<td>32.06</td>
<td>29.75</td>
<td>186.19</td>
<td>15.98%</td>
</tr>
</tbody>
</table>
The primary use of building

All the different flavors of energy used in the building converted to 1,000s of kBTUs - divided by building square feet

The State Energy Code

Comparison of actual to the Energy Code

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Steam Tiered Shutdown

St Paul Steam Consumption

12/28
12/29
12/30

12:00:00 AM
1:00:00 AM
2:00:00 AM
3:00:00 AM
4:00:00 AM
5:00:00 AM
6:00:00 AM
7:00:00 AM
8:00:00 AM
9:00:00 AM
10:00:00 AM
11:00:00 AM
12:00:00 PM
1:00:00 PM
2:00:00 PM
3:00:00 PM
4:00:00 PM
5:00:00 PM
6:00:00 PM
7:00:00 PM
8:00:00 PM
9:00:00 PM
10:00:00 PM
11:00:00 PM
Steam Tiered Shutdown

Minneapolis Steam Consumption

12/28
12/29
12/30
Steam Tiered Shutdown
Questions?