Controlled Atmosphere Storage Technology

• Landmark advance in apple storage technology
  – Extended seasonal availability of apples
  – Improved quality and nutritional value of our products to consumers
  – Provided for profitable expansion of apple industry
• However, there are no “perfect technologies”
  – Requires air tight storage rooms
  – Low oxygen environments
  – Confined space hazards
• Recent industry fatalities. . . . .
Michigan, USA

<table>
<thead>
<tr>
<th>Date</th>
<th>October, 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Berrybrook Farms</td>
</tr>
<tr>
<td>Victim</td>
<td>59 year old with 15 years of storage experience</td>
</tr>
</tbody>
</table>

**Circumstances**
- Attempting to gather apple sample from CA room
- Sample on forklift indicated he had already collected one sample
- Unable to hold breathe during second entry into room
- Found dead in room
Germany

<table>
<thead>
<tr>
<th>Date</th>
<th>January, 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victim</td>
<td>29 year old fruit company employee</td>
</tr>
</tbody>
</table>
| Circumstances | • Entered closed CA room on weekend to collect samples  
                        • Became unconscious and later died  
                        • 52 year old male also entered CA room to look for employee lost consciousness  
                        • Was revived by emergency medical personnel and recovered |
## Chile

### Date

<table>
<thead>
<tr>
<th>March, 2009</th>
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### Victims

- 18 year old
- 19 year old

### Circumstances

- Both employees new to QC Department
- Found with weak vital signs in CA room by maintenance manager
- Had entered CA room without authorization to collect samples
- Both died at local hospital
These Are Not the First CA Fatalities

• Will they be the last?
  – It’s really up to you
• Who were the victims?
  – Some lacked training
  – Others knew the risks, but were complacent
    • Believed “it can’t happen to me”
  – There are safer methods of handling samples
• Teach and train for SRM
  – Situational awareness
  – Risk assessment
  – Management of risk
Safe Handled of Samples Without Entering CA Room
SITUATIONAL AWARENESS
Closed or Venting Rooms
SITUATIONAL AWARENESS

Posted Warning Signs
RISK ASSESSMENT
No early warning signs under typical CA conditions!

<table>
<thead>
<tr>
<th>Oxygen Content</th>
<th>Signs and Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 – 19%</td>
<td>Decreased ability to work strenuously. May impair co-ordination and may induce symptoms in persons with coronary, pulmonary, or circulatory problems.</td>
</tr>
<tr>
<td>12 – 15%</td>
<td>Respiration deeper, increased pulse rate and impaired co-ordination, perception and judgment.</td>
</tr>
<tr>
<td>10 – 12%</td>
<td>Further increase in rate and depth of respiration, further increase in pulse rate, performance failure, giddiness, poor judgment and blue lips.</td>
</tr>
<tr>
<td>8 – 10%</td>
<td>Mental failure, nausea, vomiting, fainting, unconsciousness, ashen face, blue lips.</td>
</tr>
<tr>
<td>6 – 8%</td>
<td>8 minutes may be fatal in 50 – 100% of exposures; 6 minutes may be fatal in 25 – 50% of exposures; 4 – 5 minutes recovery with treatment.</td>
</tr>
<tr>
<td>4 – 6%</td>
<td>Coma in 40 seconds, convulsions, respiration ceases, death.</td>
</tr>
</tbody>
</table>
Check Oxygen Concentrations Before Entry
Remote Room Monitors or Portable Sensors
A Darwin Award Candidate!

Who could be so foolish??
Don’t Let It Be You!
We don’t want to tell you how to run your business. . . .

We just want to keep our customers and their employees safe.

Thanks for listening