Illness Event

- March 2010, private industry produce inspector at a cold storage facility in Los Angeles County complained of dizziness and headaches to his physician
- Another inspector at the same facility reported similar symptoms
- Physician suspected methyl bromide (MeBr) from occupational exposure

Fumigation at the Port

- 3 Hour Fumigation
  - Under Supervision of USDA
  - Chilean false red mite, Brevipalpus chilensis.
- Label Requires Aeration Until Levels Below 5 ppm
- USDA Plant Quarantine Requirements Specify
  - 2 hours active aeration
  - 2 hours passive aeration
- Excessive Off-gassing Suspected to Cause Illness
  - 9 hour aeration
  - Concentrations between pallets at berth

2010 Investigation

- Fumigation
- Trailer Transport
- Cold Storage Facilities
Fumigation at the Port

The cold storage facility receives fruit, primarily break-bulk grapes, that have been fumigated at the Port of Los Angeles in Long Beach at Berths 54/55.

Fumigation Site Aeration

Shroud lifted

Tarpaulin Fumigation

Trailer/Transport of Fumigated Fruit to Cold Storage Facilities
### Sampled Trailers for MeBr at the Port and Cold Storage Facilities

- **Pre-load Trailer at Port**
- **Post-load Trailer at Port**
- **Pre-aeration Trailer at CSF**
- **Post-aeration Trailer at CSF**

### Trailer Aeration Requirement
- Excessive concentrations in trailers (10 – 15 ppm)
- Implemented 15 minute aeration of trailers before unloading at cold storage facilities
- Lower Concentrations pre-unloading with new requirement (<0.4 – 4 ppm)
- Ave. % reduction = 81%

### Cold Storage Facilities (CSF)
- End of 2010 season
- Concentrations on loading docks and chillers: from <0.4 ppm to 4 ppm

### 2011 Monitoring (Dec 14 - April 18 only)
- 6 Cold Storage Facilities in LA County
- All facilities implemented some form of ventilation during 2011 Chilean grape season
- 1 Cold Storage Facility in the Central Valley
Sample Types

- Colorimetric Sensidyne® grab samples
- 7 Cold storage facilities
- Area samples = 315

- 8-hour integrated samples with charcoal sorbent tubes
- 2 Cold storage facilities

Cold Storage Facilities

Cold Storage Chiller Room
### Cold Storage Area Samples

<table>
<thead>
<tr>
<th>Sample Site</th>
<th>Number of Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Break Rooms</td>
<td>2</td>
</tr>
<tr>
<td>Chillers</td>
<td>223</td>
</tr>
<tr>
<td>Loading Docks</td>
<td>57</td>
</tr>
<tr>
<td>Non-Grape Chillers</td>
<td>7</td>
</tr>
<tr>
<td>Offices</td>
<td>2</td>
</tr>
<tr>
<td>Other Facility Areas</td>
<td>4</td>
</tr>
<tr>
<td>Repack/Inspection Areas</td>
<td>10</td>
</tr>
<tr>
<td>Pan/Coils/Metal Shelving of Refrigeration Unit</td>
<td>10</td>
</tr>
</tbody>
</table>

### Methyl Bromide Occupational Exposure Standards

- **Cal/OSHA**
  - PEL: 1 ppm TWA
  - Ceiling TLV: 20 ppm
- **Fed/OSHA**
  - No PEL
  - Ceiling TLV: 20 ppm
- **Pesticide Label**
  - 5 ppm
- **American Conference of Industrial Hygienists**
  - 1 ppm TWA

### Maximum, Average, and Minimum MeBr Concentration by Sample Site

<table>
<thead>
<tr>
<th>Sample Site</th>
<th>Maximum (ppm)</th>
<th>Average (ppm)</th>
<th>Minimum (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Break Rooms</td>
<td>19</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Chillers</td>
<td>19</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Loading Docks</td>
<td>19</td>
<td>5</td>
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<td>10</td>
</tr>
</tbody>
</table>

### Ave. MeBr Concentrations in CSF After Receiving Fumigated Grapes

- **Fed/OSHA Ceiling Threshold Limit Value (TLV)**
- **Cal/OSHA Permissible Exposure Limit (PEL)**
### Time Weighted Average (TWA) Results for 8-Hour Integrated Sampling in Cold Storage Facility

<table>
<thead>
<tr>
<th></th>
<th>TWA (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiller</td>
<td>11.39</td>
</tr>
<tr>
<td>Loading Dock</td>
<td>1.82</td>
</tr>
<tr>
<td>Fork Lift</td>
<td>4.25</td>
</tr>
<tr>
<td>Repack Area</td>
<td>3.55</td>
</tr>
</tbody>
</table>

- All sample locations exceeded 1 ppm PEL.
- Sampling started three (3) hours after receiving fumigated grapes.

### Mitigation - Cold Storage Facility Ventilation

Fans on walls between loading dock and chiller simultaneously ventilate and cool the rooms.

Louvers on chiller man doors installed to remove contaminated air via positive pressure air exchange.
Notification - Cold Storage Facilities

Possible Hazardous Chemicals May Be Found in This Workplace

Description of the hazard
Possible human health effects from overexposure
Notice NOT to spend unnecessary amount of time inside cold storage.
What to do if overexposed: Where to find information about MeBr.

Warning
Possible human health effects from overexposure
Notice NOT to spend unnecessary amount of time inside cold storage.
What to do if overexposed: Where to find information about MeBr.

Cuidado
Possible human health effects from overexposure
Notice NOT to spend unnecessary amount of time inside cold storage.
What to do if overexposed: Where to find information about MeBr.
Other Mitigation

- Carbon Filtration Scrubbing Systems
  - e.g. Nordiko™
- Cold Storage Administrative Controls
- Work Hour Restrictions
- Work Location Restrictions
- Break Location Restrictions
- Ventilation Evaluation / Assessments
- Permit Conditions
- Port Fumigation
- Approved Cold Storage Facilities
- Change in Grape Packaging

Other Mitigation: Carbon Filtration Scrubbing System

Other Mitigation: Administrative Control

e.g. Relocate QC inspection to locations with constant air exchange other than chillers

Other Mitigation: Alternative Grape Packaging

- Packing materials may influence desorption
- Surround grapes with multiple plastic layers with low permeability
- Use of porous corrugated cardboard lugs (most commonly used) that have greater MeBr sorption than plastic containers
Regulatory Solutions

- **Limited SCOPE**: Grapes and Kiwis a) imported from Chile and b) fumigated with Methyl Bromide (MeBr) upon arrival in California
- Holding commodity at fumigation site until off-gassing process is complete not an option
- CSFs are not under DPR’s regulatory authority

Regulatory Plan

- Collaborative Effort
- Fumigators
- CSFs
- Commodity owners
- Others
- Buy-in to adopting Best Management Practices

Regulatory Structure

**STRATEGY**: Encourage Cold Storage Facilities to adopt Best Management Practices to protect workers

- Must address the many different entities handling imported commodities
- Allow flexibility - various mitigation measures & combinations of mitigation
- Ensure equitable compliance – deter free riders
BMP Evaluation Form

- Site Characteristics
- Notification of Workers
- Monitoring Capability
- Record Keeping
- Access by DPR / CACs
- Source Reduction
- Engineering Controls
- Worker Management

Status

Half way through the 2012 Season
- Cooperation
- Compliance
- Future Mitigation Plans
- Future Enforcement Plans

Questions? Comments?

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