Enterprise-wide Links Between Chemical Product Proliferation and Hazard Assessment

Spring 2007
10,000 Generations (100,000 Years) to get to 2 Billion People

100 Years to go to 10 Billion People
Development Rate of Synthetic Chemicals

>100,000 Synthetic Chemicals

>3,000,000 Chemical Products

Source: www.healthgoods.com
Bench Chemistry

- 200,000 Bench Chemists
- Toxicology Training?
- 200 per Year!!!
- Focus is on Disclosure
- Not Health Protection
Green the Workplace!

DOLPHIN® SAFE SOURCE®
Chemical choices for a sustainable future
Customers

[Logos of various companies listed under Customers]
MSDS Give Visibility of Products Used
Most Chemicals Flying Under the Radar

- **Number of Chemical Products**
  - Low
  - High

- **Volume of Chemicals**
  - Low
  - High

- **Process, Maintenance, Repair & Operations**
  - $\text{Millions}$

- **Ten’s $\text{Millions}$**
  - Process Chemicals

Confidential - Do Not Distribute
Local Site Buying Creates Product Proliferation
Chemical Product Overlap* Across Sites

* Percent Products Used at 2 or More Sites
Chemical Product Overlap* Across Sites

Opportunity to Commonize

* Percent Products Used at 2 or More Sites
Product Proliferation

The graph illustrates the increase in average products per use category as the number of company sites increases. The categories are: 1 to 10, 10 to 20, 20 to 30, 30 to 60, and 60+ sites. The data shows a significant rise in the number of products per use category as the number of sites increases.
200 Field Studies: Findings

- Enterprise Wide Chemical Data
  - Product Counts range from 5,000 to 50,000

- ~700 Different “Use Categories”
  - High Number of Products Each Category of Use
  - High Price Variability between Products
  - Uncontrolled Toxicity – It’s Unknown
# Large Enterprise Forest Products

## Product Proliferation

<table>
<thead>
<tr>
<th>Product</th>
<th>Products</th>
<th>Manufacturers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhesive (Multipurpose)</td>
<td>462</td>
<td>116</td>
</tr>
<tr>
<td>Caulk</td>
<td>109</td>
<td>41</td>
</tr>
<tr>
<td>Glass Cleaner</td>
<td>226</td>
<td>113</td>
</tr>
<tr>
<td>Grease</td>
<td>873</td>
<td>186</td>
</tr>
<tr>
<td>Hand Cleaner</td>
<td>297</td>
<td>107</td>
</tr>
<tr>
<td>Paint Remover</td>
<td>60</td>
<td>51</td>
</tr>
<tr>
<td>Threadlock</td>
<td>243</td>
<td>23</td>
</tr>
<tr>
<td>Toilet Cleaner</td>
<td>104</td>
<td>56</td>
</tr>
</tbody>
</table>
## Large Enterprise Forest Products

### Product Proliferation

<table>
<thead>
<tr>
<th>Product</th>
<th>Products</th>
<th>Manufacturers</th>
<th>Goal Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhesive (Multipurpose)</td>
<td>462</td>
<td>116</td>
<td>5</td>
</tr>
<tr>
<td>Caulk</td>
<td>109</td>
<td>41</td>
<td>5</td>
</tr>
<tr>
<td>Glass Cleaner</td>
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<td>104</td>
<td>56</td>
<td>5</td>
</tr>
</tbody>
</table>

*Based on Lower Toxicity & Price*
## Mining Operations: 22 Sites

### Product Proliferation

<table>
<thead>
<tr>
<th>Product</th>
<th>Products</th>
<th>Manufacturers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhesive (Multipurpose)</td>
<td>74</td>
<td>35</td>
</tr>
<tr>
<td>Caulk</td>
<td>24</td>
<td>14</td>
</tr>
<tr>
<td>Glass Cleaner</td>
<td>62</td>
<td>42</td>
</tr>
<tr>
<td>Grease</td>
<td>282</td>
<td>64</td>
</tr>
<tr>
<td>Hand Cleaner</td>
<td>87</td>
<td>38</td>
</tr>
<tr>
<td>Paint Remover</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Threadlock</td>
<td>58</td>
<td>3</td>
</tr>
<tr>
<td>Toilet Cleaner</td>
<td>34</td>
<td>19</td>
</tr>
</tbody>
</table>
## Assigning Product Category of Use

<table>
<thead>
<tr>
<th>Adhesive Type</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrylic Adhesive</td>
<td>Glue</td>
</tr>
<tr>
<td>Adhesive Additive</td>
<td>Instant Adhesive</td>
</tr>
<tr>
<td>Adhesive High Temp</td>
<td>Insulating Adhesive</td>
</tr>
<tr>
<td>Adhesive Promoter</td>
<td>Melt Adhesive</td>
</tr>
<tr>
<td>Adhesive Remover</td>
<td>Mount</td>
</tr>
<tr>
<td>Adhesive, Multi-Purpose</td>
<td>Pipe Cement</td>
</tr>
<tr>
<td>Adhesive, Spray</td>
<td>Pipe Joint Compound</td>
</tr>
<tr>
<td>Anaerobic Adhesive</td>
<td>Pipe Repair</td>
</tr>
<tr>
<td>Carpet Adhesive</td>
<td>Pipe Sealant</td>
</tr>
<tr>
<td>Ceramic Adhesive</td>
<td>Plastic Adhesive</td>
</tr>
<tr>
<td>Contact Adhesive</td>
<td>Polyurethane Adhesive</td>
</tr>
<tr>
<td>Contact Cement</td>
<td>PVC Cement</td>
</tr>
<tr>
<td>Dental Adhesive</td>
<td>Rubber Cement - Adhesive</td>
</tr>
<tr>
<td>Disc - Film Adhesive</td>
<td><strong>Threadlocker</strong></td>
</tr>
<tr>
<td>Epoxy Adhesive</td>
<td>Water Based Adhesive</td>
</tr>
<tr>
<td>Floor Adhesive</td>
<td>Weatherstrip Adhesive</td>
</tr>
<tr>
<td>Foam Adhesive</td>
<td>Wood Adhesive</td>
</tr>
</tbody>
</table>
**Ingredient Makeup is the Key!**

<table>
<thead>
<tr>
<th>CAS</th>
<th>Ingredient</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>67-64-1</td>
<td>ACETONE</td>
<td>40.0-50.0 PCT</td>
</tr>
<tr>
<td>71-43-2</td>
<td>BENZENE</td>
<td>0.001-0.01 PCT</td>
</tr>
<tr>
<td>106-97-8</td>
<td>BUTANE</td>
<td>5.0-35.0 PCT</td>
</tr>
<tr>
<td>141-78-6</td>
<td>ETHYL ACETATE</td>
<td>1.0-10.0 PCT</td>
</tr>
<tr>
<td>75-28-5</td>
<td>ISOBUTANE</td>
<td>5.0-35.0 PCT</td>
</tr>
<tr>
<td>64742-89-8</td>
<td>LIGHT ALIPHATIC SOLVENT NAPHTHA</td>
<td>1.0-10.0 PCT</td>
</tr>
<tr>
<td>74-98-6</td>
<td>PROPANE</td>
<td>5.0-35.0 PCT</td>
</tr>
</tbody>
</table>
How To Evaluate Products

**Toxic Points**
- International Agency for Research on Cancer (IARC)
- European Union Annex I Chemical Listing
- National Toxicology Program (NTP)
- California Proposition 65
- OSHA
- EPA
- German Ministry of Labor (MAK)

**Environmental Points**
- US Clean Air Act (Ozone Depleting)
- US Clean Air Act (HAPs)
- US RCRA
- SARA 313
- European Union Annex I Chemical Listing
Dolphin Findings - Toxicity Ranges

Toxic Points*

*Based upon raw scoring methodology
Assigning Market Price per Product
Dolphin Safe Source™ Tool

• Decision Making Tool
• Innovation Platform
• Rank Toxic and Environmental Hazards
  – Indirect/MRO (Maintenance Chemicals)
  – Process, Raw Chemicals
• Integrated Market Price with MRO Chemicals
### Gasket Maker

#### Copper Coat Gasket Compound
- **Manufactured by:** K&W PRODUCTS
- **Toxicity Scores:** 0.5
- **Environmental Score:** 1.6
- **Cost:** $6.43 per oz

#### K&W Copper Coat Gasket Compound
- **Manufactured by:** CRC
- **Toxicity Scores:** 1.9
- **Environmental Score:** 2.8
- **Cost:** $6.43 per oz

#### K&W Copper Coat Gasket Compound 401405, 401516, 841504
- **Manufactured by:** CRC
- **Toxicity Scores:** 1.9
- **Environmental Score:** 2.8
- **Cost:** $6.43 per oz

#### Form-A-Gasket 1, 80001, 80002, 80003
- **Manufactured by:** PERMATEX INDUSTRIAL
- **Toxicity Scores:** 0.3
- **Environmental Score:** 0.4
- **Cost:** $6.64 per oz

#### Copper Coat Gasket Maker 401560
- **Manufactured by:** CRC
- **Toxicity Scores:** 0.1
- **Environmental Score:** 0
- **Cost:** $6.65 per oz

#### 3D Aviation Form-A-Gasket 31PT, 80017
- **Toxicity Scores:** 2.2
- **Environmental Score:** 0.9
- **Cost:** $6.68 per oz

---

**Method of scoring for grid:**

- Toxicity

---

**Click here to Return to the Home Page**

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Gasket Maker

COPPER COAT GASKET COMPOUND
Manufactured by: K&W PRODUCTS
Toxicity Score: 0.5
Raw Toxicity Score: 2
Environmental Score: 1.6
Cost: $6.43 per oz

K&W COPPER COAT GASKET COMPOUND
Manufactured by: CRC
Toxicity Score: 1.9
Raw Toxicity Score: 3
Environmental Score: 2.8
Cost: $6.43 per oz

K&W COPPER COAT GASKET COMPOUND 401405, 401516, 841504
Manufactured by: CRC
Toxicity Score: 1.9
Raw Toxicity Score: 3
Environmental Score: 2.8
Cost: $6.43 per oz

FORM-A-GASKET 1, 80001, 80002, 80003
Manufactured by: PERMATEX INDUSTRIAL
Toxicity Score: 0.3
Raw Toxicity Score: 3
Environmental Score: 0.4
Cost: $6.64 per oz

COPPER COAT GASKET MAKER 401560
Manufactured by: CRC
Toxicity Score: 0.1
Raw Toxicity Score: 1
Environmental Score: 0
Cost: $6.65 per oz

3D AVIATION FORM-A-GASKET 31PT, 80017
Toxicity Score: 2.2
Raw Toxicity Score: 3
Environmental Score: 0.9
Cost: $6.68 per oz

Products listed above are compared in the grid to the right. Use the 'Grid View' selector below to see the different methods of comparison. The grid can be used to select products by clicking individual points or by drawing a box around points of interest.

Method of scoring for grid:
Toxicity

Click here to Return to the Home Page

Click here to use the CAS Calculator Tool
Gasket Maker

COPPER COAT GASKET COMPOUND
Manufactured by: K&W PRODUCTS

K&W COPPER COAT GASKET COMPOUND
Manufactured by: CRC

K&W COPPER COAT GASKET COMPOUND 401405, 401516, 841504
Manufactured by: CRC

FORM-A-GASKET 1, 80001, 80002, 80003
Manufactured by: PERMATEK INDUSTRIAL

COPPER COAT GASKET MAKER 401560
Manufactured by: CRC

3D AVIATION FORM-A-GASKET 31PT90017

Sort by:
Cost

Search the list below for:

Cost Range
Toxicity Range
Low Cost
Low Toxicity

Products listed above are compared in the grid to the right. Use the ‘Grid View’ selector below to see the different methods of comparison. The grid can be used to select products by clicking individual points or by drawing a box around points of interest.

Method of scoring for grid:
Toxicity

- Toxicity Score

Click here to Return to the Home Page

Click here to use the CAS Calculator Tool
HI-TACK GASKET SEALANT, 30526
Manufactured by: LOCTITE

<table>
<thead>
<tr>
<th>CAS</th>
<th>Compound</th>
<th>Contribution</th>
<th>Tox.</th>
<th>Em.</th>
</tr>
</thead>
<tbody>
<tr>
<td>69476-86-8</td>
<td>LIQUID PETROLEUM PROPELLANT</td>
<td>35-46%</td>
<td>1.8</td>
<td>0</td>
</tr>
<tr>
<td>67-64-1</td>
<td>ACETONE</td>
<td>22-36%</td>
<td>0.3</td>
<td>0.6</td>
</tr>
<tr>
<td>75-09-2</td>
<td>METHYLENE CHLORIDE</td>
<td>10-20%</td>
<td>2.2</td>
<td>1.8</td>
</tr>
<tr>
<td>141-78-4</td>
<td>ETHYL ACETATE</td>
<td>1-5%</td>
<td>0</td>
<td>0.2</td>
</tr>
<tr>
<td>8022-32-4</td>
<td>V M &amp; P NAPHTHA</td>
<td>1-5%</td>
<td>0.2</td>
<td>0</td>
</tr>
</tbody>
</table>

(Click and hover over the rows above to see more information)

Products listed above are compared in the grid to the right. Use the 'Grid View' selector below to see the different methods of comparison. The grid can be used to select products by clicking individual points or by drawing a box around points of interest.

Method of scoring for grid:
Toxicity

Use the CAS Calculator

Confidential - Do Not Distribute
HI-TACK GASKET SEALANT, 30526
Manufactured by: LOCTITE

<table>
<thead>
<tr>
<th>CAS</th>
<th>Compound</th>
<th>Contribution</th>
<th>Toxic</th>
<th>Emol</th>
</tr>
</thead>
<tbody>
<tr>
<td>69476-86-8</td>
<td>LIQUID PETROLEUM PROPELLANT</td>
<td>35-45 %</td>
<td>1.8</td>
<td>0</td>
</tr>
<tr>
<td>67-64-1</td>
<td>ACETONE</td>
<td>25-30 %</td>
<td>0.3</td>
<td>0.6</td>
</tr>
<tr>
<td>78-93-2</td>
<td>METHYLENE CHLORIDE</td>
<td>10-20 %</td>
<td>2.2</td>
<td>1.8</td>
</tr>
<tr>
<td>141-78-8</td>
<td>ETHYL ACETATE</td>
<td>1-5 %</td>
<td>0</td>
<td>0.2</td>
</tr>
<tr>
<td>8022-32-4</td>
<td>VM &amp; P NAPHTHA</td>
<td>1-5 %</td>
<td>0.2</td>
<td>0</td>
</tr>
</tbody>
</table>

(Click and hover over the rows above to see more information)

Toxicity

- Toxicity Score

Click here to Return to the Home Page

Use the CAS Calculator
Focusing on Hazard Reduction

Green Zone
One Standard Deviation From The Mean For All Products in Dolphin’s Database for a Specific Category

Toxicity vs Environmental

Products listed above are compared in the grid to the right. Use the 'Grid View' selector below to see the different methods of comparison. The grid can be used to select products by clicking individual points or by drawing a box around points of interest.

Method of scoring for grid
Toxicity vs Environmental

- Toxicity Score

Click here to Return to the Home Page

Use the CAS Calculator
Case Study: Mid-Sized NA Mining Company

• Annual Revenue: $4.5 Billion
• Employees: 8,100
• Site Count: 22
• Chemical Products: 11,000
• Chemical Count Reduction Potential: 4,000
• Toxic Reduction: 50% – 60%
• Annual MRO Chemical Cost Savings of 30 to 40% Potential on $12 Million Spend
## Case Study: Mining Operation: 22 Sites

<table>
<thead>
<tr>
<th>Case Study Selected Categories</th>
<th>Estimated Company Spend</th>
<th>% Savings Potential</th>
<th>$ Savings Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-seize</td>
<td>$98,748</td>
<td>45%</td>
<td>$44,436</td>
</tr>
<tr>
<td>Gasket maker</td>
<td>$6,846</td>
<td>45%</td>
<td>$3,080</td>
</tr>
<tr>
<td>Gasket remover</td>
<td>$20,923</td>
<td>59%</td>
<td>$12,344</td>
</tr>
<tr>
<td>Gasket sealant</td>
<td>$83,279</td>
<td>74%</td>
<td>$61,626</td>
</tr>
<tr>
<td>Hand cleaner</td>
<td>$92,600</td>
<td>34%</td>
<td>$31,280</td>
</tr>
<tr>
<td>Insect repellent</td>
<td>$9,341</td>
<td>16%</td>
<td>$1,494</td>
</tr>
<tr>
<td>Instant adhesive</td>
<td>$80,847</td>
<td>60%</td>
<td>$48,508</td>
</tr>
<tr>
<td>Thread sealant</td>
<td>$65,350</td>
<td>70%</td>
<td>$45,745</td>
</tr>
<tr>
<td>Threadlocker</td>
<td>$19,950</td>
<td>49%</td>
<td>$9,775</td>
</tr>
</tbody>
</table>

Potential for $3.5 to $4.5 million in annual cost savings over their 342 product categories
Summary of Dolphin Safe Source Benefits

- Reduced Chemical Spend
- Reduced Product Count
  - Reduced EHS Costs (Fewer MSDS to Process and Manage)
  - Supports Lean and Six Sigma Initiatives
  - Reduced MRO Chemical Waste
- Supports Sustainability and Green Initiatives
- Reduced Toxic Hazards in Workplace
Case Study: Mid-Sized NA Mining Company

Average Toxicity Reduction 60% per Category
New Documentary

• View at:
  www.DolphinSafeSource.com