Safer Products That Work: Cleaners and Degreasers for Industrial Maintenance and Auto Repair
Agenda

- Introduction
- Project Overview
- Finding Greener Options
- Case Studies
- Results
- Greener Products
- Wrap-Up
What is MnTAP?

• Minnesota Technical Assistance Program (MnTAP)
  • Strengthening Minnesota businesses by improving efficiency while saving money through energy, water, and waste reduction

• Confidential, non-regulatory assistance to Minnesota businesses

• Most services offered at no-cost.

• Intern Program
Why Industrial Maintenance and Automotive Repair?

- Most businesses perform degreasing for equipment maintenance or production processes.
- Small degreasing operations add 14% of all industrial VOC air pollution in Minnesota.
- Small businesses can have a significant combined impact because they are so widespread throughout the state.
- VOC emissions from auto maintenance and repair activities are estimated at 958,000 lb/yr.
- Common methods include aerosol degreasing cleaners, and manual parts washers.
VOC Reduction

- Volatile organic compounds (VOCs) are a large group of solvents and chemicals that are transformed into smog when they evaporate.
- Minnesota meets the EPA’s recently updated air quality standards, some areas of the state are very close to the limits.
- MnTAP is working to proactively improve Minnesota’s air quality by reducing VOCs.
- It is easier to make voluntary changes to improve air quality now, rather than be faced with more regulation later.
Ground Level Ozone

• When VOCs react with sunlight, they form ozone, a component of smog.

• Unlike the beneficial “ozone layer” in the upper atmosphere, ozone at ground level is harmful to people and ecosystems.

• Breathing ozone can cause health problems, especially for children, the elderly, and people with lung problems such as asthma.

• Different VOCs form different amounts of ozone, depending on their chemistry.

• The measurement of how much ozone a chemical may form is called its Maximum Incremental Reactivity, or MIR value.
Health Effects

• General health effects of cleaning and degreasing chemicals
  • Developmental
  • Reproductive
  • Endocrine
  • Flammable
  • Respiratory
  • Neurotoxicity
  • Eye and skin irritation
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Format of Pilot Projects

• Finding greener, safer products
• Industrial and Automotive businesses eligible
• Looking for products with
  • Few Volatile Organic Compounds
  • Zero Hazardous Air Pollutants
  • Zero Minnesota Chemicals of Concern
Format of Pilot Projects

• Once an acceptable alternative product was found, the company received a free supply (approx. 1-3 months) of the new product(s).

• MnTAP provided hands-on technical support for any process changes needed to make sure the new products meet all expectations and process needs.
Overview

• Projects completed or in progress at 23 companies
  • 6 industrial
  • 17 automotive

• 35 changes implemented at 9 companies
• 7 companies still in testing phase
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How do I find safer products?

• **Databases:**
  - TURI – Check out their [Cleaner Solutions Database](#)
  - EPA’s [Safer Choice](#) Label and product list

• **Avoid or minimize:**
  - [Hazardous Air Pollutants](#) (HAP’s)
  - [Chemicals of Concern](#)
  - Strong [Ozone Generators](#) (lbs.O₃/lbs.product)
  - Volatile Organic Compounds (VOC’s)

• Ask MnTAP for help!
Product Comparison - Penetrants

- **Product A**
  - VOC Content: 12%
  - MIR Value: 0.11 lbs O₃/lb
  - Ingredients on EPA Safer list and MN Chemicals of Concern

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS Number</th>
<th>MIR Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquefied petroleum gas</td>
<td>68476-85-7</td>
<td>14%</td>
</tr>
<tr>
<td>Propane</td>
<td>74-98-6</td>
<td>5%</td>
</tr>
<tr>
<td>Propane, 2-methyl</td>
<td>75-28-5</td>
<td>6%</td>
</tr>
<tr>
<td>Butane</td>
<td>106-97-8</td>
<td>1%</td>
</tr>
<tr>
<td>Canola Oil</td>
<td>120962-03-0</td>
<td>70%</td>
</tr>
<tr>
<td>Soy lecithin</td>
<td>8002-43-5</td>
<td>4%</td>
</tr>
</tbody>
</table>

- **Product B**
  - VOC Content: <50%
  - MIR Value: 2.3 lbs O₃/lb
  - Hazardous Air Pollutant and MN Chemical of Concern

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS Number</th>
<th>MIR Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distillates hydrotreated light</td>
<td>64742-47-8</td>
<td>49%</td>
</tr>
<tr>
<td>Solvent naphtha, heavy</td>
<td>64742-94-5</td>
<td>23.9%</td>
</tr>
<tr>
<td>Distillates hydrotreated</td>
<td>64742-52-5</td>
<td>23.5%</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>91-20-3</td>
<td>2.1%</td>
</tr>
<tr>
<td>Dinonylphenol, phosphated</td>
<td>39464-64-7</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

Finding Greener Options
Which products were they?

A: Pam Cooking Spray

B: PB B’laster
### Other Penetrant Results

<table>
<thead>
<tr>
<th>Product</th>
<th>Active Ingredient</th>
<th>VOC%</th>
<th>Ozone (lbs O₃/lb Product)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pam Cooking Spray with heat</td>
<td>Canola Oil / Hydrocarbon</td>
<td>0</td>
<td>0.11</td>
</tr>
<tr>
<td>WD-40</td>
<td>Hydrocarbon</td>
<td>49.5</td>
<td>0.32</td>
</tr>
<tr>
<td>Zep 45 Dual Force</td>
<td>Hydrocarbon</td>
<td>0.19</td>
<td>0.94</td>
</tr>
<tr>
<td>Liquid Wrench L106 or L104</td>
<td>Hydrocarbon</td>
<td>0</td>
<td>0.32</td>
</tr>
<tr>
<td>Liquid Wrench L112</td>
<td>Hydrocarbon</td>
<td>0</td>
<td>0.78</td>
</tr>
<tr>
<td>Sea Foam Deep Creep</td>
<td>Hydrocarbon / Isopropanol</td>
<td>0</td>
<td>0.87</td>
</tr>
<tr>
<td>WD-40 Dirt and Dust Release</td>
<td>Heptane</td>
<td>93.2</td>
<td>0.89</td>
</tr>
<tr>
<td>Fluid Film Rust and Corrosion</td>
<td>Hydrocarbon</td>
<td>25</td>
<td>0.9</td>
</tr>
<tr>
<td>CRC 5-56</td>
<td>Hydrocarbon</td>
<td>35</td>
<td>0.93</td>
</tr>
</tbody>
</table>
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Aggressive Hydraulics in East Bethel, MN

- Hydraulic Cylinder Manufacturer
- Cleans oil and chips from steel cylinders prior to assembly
Aggressive Hydraulics
Lake Elmo Repair in Lake Elmo, MN

• Automotive Repair Shop
• Use brake cleaners and engine degreasers to clean car parts enabling them to be repaired or removed.
Lake Elmo Repair
Lakeland Tool and Engineering in Anoka, MN

• Manufacturer of injection molded plastics.
• Solvent based aerosols used for mold cleaning.
• Lacquer thinner used as a paint gun solvent.
Lakeland Tool & Engineering
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Employee Exposure

• Monitor chemicals in the air to understand employee exposure before and after change in product

• First site: O-Reilly Low VOC Brake Cleaner switched to O-Reilly Ultra-Low VOC Brake Cleaner.
  • acetone from 7.2 to 16 ppm
  • heptane from < 0.09 to 0.1 ppm
  • toluene from 8.6 to .33 ppm
Air Quality

• 2018 Pounds VOC Reduction
• 3764 Pounds Ozone Potential Reduction
• 178 Pounds HAP Reduction
• 645 Pounds Solid Waste Reduction
  • By replacing 2500 aerosol cans with re-usable containers.

• $7500 in product savings
  • Most companies found that alternatives had comparable costs to their original products.
  • Some companies found the greener products much less expensive.
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Brake Cleaners

- Non-Chlorinated means NO Perc or TCE – Hazardous Air Pollutants
- Look for: Non-Chlorinated Low VOC, California or 50 State Compliant
- Avoid SDS that list xylene, methanol, toluene or ethylbenzene
- Consider non-aerosol aqueous cleaners, or refillable cans

**Suggested products:**

<table>
<thead>
<tr>
<th>Product</th>
<th>Active Ingredient</th>
<th>VOC%</th>
<th>Lb Ozone/lb Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>O’Reilly Ultra Low VOC 46580</td>
<td>Acetone</td>
<td>7.5</td>
<td>0.377</td>
</tr>
<tr>
<td>CRC Brakleen 05050</td>
<td>Acetone</td>
<td>9.2</td>
<td>0.435</td>
</tr>
<tr>
<td>Mag1 MG750579</td>
<td>Acetone/Heptane</td>
<td>38</td>
<td>0.59</td>
</tr>
</tbody>
</table>
General Cleaners

• Companies often use “orange” or “citrus” products thinking these are safer or “green” products because they are made from oranges
  - D-Limonene, the active ingredient, has a high MIR value of 4.55
• Often effective alternatives are available with much lower ozone potential and health effects
• Suggested products:

<table>
<thead>
<tr>
<th>Product</th>
<th>Active Ingredient</th>
<th>VOC%</th>
<th>Lb Ozone/Lb Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple Green MAX Automotive</td>
<td>Alcohol / glycol ether</td>
<td>10</td>
<td>0.02</td>
</tr>
<tr>
<td>Zep Tuff Green Concentrate</td>
<td>glycol ether</td>
<td>7.5</td>
<td>0.14</td>
</tr>
<tr>
<td>Dubois Treo General Purpose Cleaner Concentrate</td>
<td>Sodium Carbonate</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>SuperClean Degreaser</td>
<td>Na-metasilicate / glycol ether</td>
<td>2.5</td>
<td>0.07</td>
</tr>
</tbody>
</table>
Parts Washers

• Many companies use mineral spirits, which are hard to replace because they are so inexpensive, with relatively low volatility and MIR value.

• Some companies successfully using bioremediating parts washers.

• Suggested products:

<table>
<thead>
<tr>
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<th>Active Ingredient</th>
<th>VOC%</th>
<th>Lb Ozone/lb Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>SafetyKleen Armakleen 4 in 1</td>
<td>Aqueous detergents</td>
<td>0.45</td>
<td>0.008</td>
</tr>
<tr>
<td>Smartwasher/OzzyJuice Degreasing Solutions</td>
<td>microbes</td>
<td>&lt; 0.1</td>
<td>0</td>
</tr>
<tr>
<td>Cuda Super Clean AP-1000</td>
<td>Aqueous detergents</td>
<td>2</td>
<td>0.06</td>
</tr>
</tbody>
</table>
Consumer Confusion

• O’Reilly Non-Chlorinated Brake Cleaner – 72408
  • Toluene 30-40%
  • Methanol 30-40%
  • Acetone 20-30%
  • Carbon Dioxide 0-15%

• O’Reilly Low VOC Brake Cleaner - 00482
  • Heptane 50-55%
  • Toluene 20-25%
  • Acetone 15-20%
  • Carbon Dioxide 0-15%

• O’Reilly Ultra Low VOC Brake Cleaner - 46580
  • Acetone 80-85%
  • Heptane 5-10%
  • Carbon Dioxide 0-15%
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Poll

As a result of this information, will your site consider adopting low-VOC degreasing solvents?
Please type questions into chat and we will get to as many as possible.
This webinar was produced with funding from the Environmental Protection Agency as part of a 2014 grant to find low hazard degreasing solvents in Minnesota businesses.
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Contact MnTAP for assistance with finding greener cleaners for your facility: 1-800-247-0015
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Minnesota Technical Assistance Program

*Strengthening Minnesota businesses by improving efficiency while saving money through energy, water, and waste reduction*

Thank You!

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