

MI DEQ & RETAP Pollution Prevention (P2) Training

Vehicle Maintenance

Cam Metcalf, Executive Director

Richard Meisenhelder, P2 Specialist

Lori Hoetker, Technical Coordinator

Kentucky Pollution Prevention Center (KPPC)



Vehicle Maintenance Wastes

- Batteries
- Antifreeze
- Asbestos brake pads
- Refrigerants
- Used oils and filters
- Solvents
- Aqueous wastes
- Paint wastes
- Carburetor cleaner
- Solid wastes



Good Housekeeping

- Leads to pride & commitment
- Keep it clean in the first place
- Use of drip pans
- Waste, leaks & spills easier to spot
- Dry cleanup



Storage & Paint Mixing



Recycling

- Antifreeze
- Brake fluid
- Parts washing solvents
- Radiator fluid and flushing liquids
- Carburetor cleaner
- Transmission fluid
- Used oil
- Used oil filters

Batteries

- Lead acid batteries contain sulfuric acid as well as lead.**
- Send to a permitted secondary lead smelter, a recycler, or a collection center that utilizes a smelter or recycler.**
- Store batteries upright, covered, on an impermeable surface, where they won't freeze, and check for leaks.**
- Install longer life batteries.**

Antifreeze

- Antifreeze treatment will depend on manufacturer's warranty requirements!**
- Reuse good antifreeze.**
- Options for Recycling:**
 - Use a Closed-loop/on-vehicle or a Batch system off-vehicle antifreeze recycling unit (on-site).**
 - Recycle on-site by a mobile antifreeze recycling service.**
 - Send off-site for recycling.**

Asbestos Brake & Clutch Pads

- ❑ Utilize pre-ground ready-to-install parts.**
- ❑ Use HEPA-equipped exhaust systems for machinery used on asbestos products.**
- ❑ Use slow lathe-turning instead of grinding brake linings.**
- ❑ Send employee work clothes and shop towels to commercial laundry equipped to wash asbestos-contaminated materials.**

Refrigerants

- Separate EPA-certified recycling or recovery equipment for each refrigerant.**
- Reuse recycled refrigerants where feasible.**
- Perform leak tests.**



Used Oils

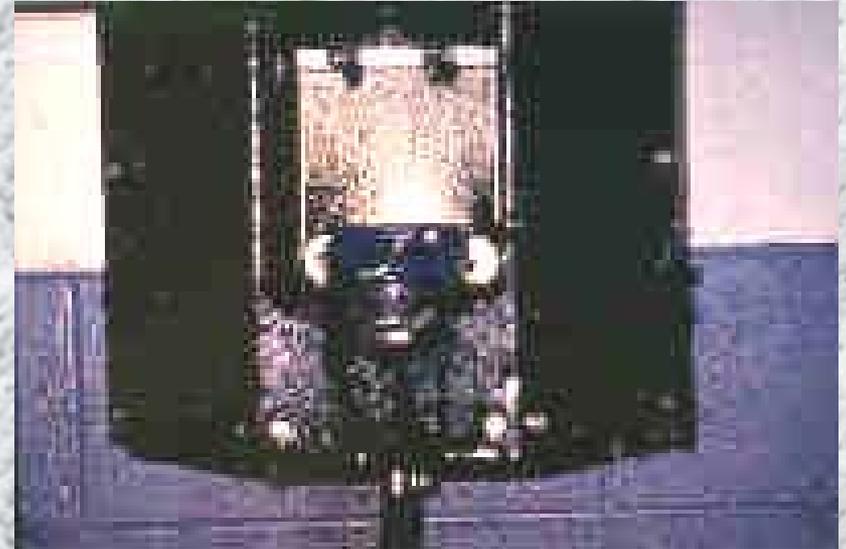
- Used oil
- Oil filters
- Absorbents
- Contaminated oils
- Compressor oil
- Hydraulic oil
- Transmission fluid



Used Oil

- Purchase oil in bulk.**
- Promote long-life oils (reduce filter waste too).**
- Options for Used Oil:**
 - Send off-site for recycling.**
 - Send to a re-refining facility and use re-refined oils.**
 - Burn on-site for energy recovery or send to a fuel blender.**

Oil Filter Crusher



- Hot drain oil filter
- Crush oil filter
- Recycle oil & metal

AA Oil Filter Crusher (Self-made)



Solvent Wastes

- Parts washing**
 - Ignitable/D001 Listed
 - Listed: F001-F005
- Painting wastes**
 - Thinners/MEK, Xylene
 - Paint
 - Paint booth filters
- Carburetor cleaners**
 - Methylene chloride
 - Phenol
 - Petroleum distillates filters
- Brake cleaners**
 - Chlorinated



Parts Washing Solvent Wastes

- Better operating procedures
- Distillation unit
- Alternative cleaners
- Filter unit
- Recycling service



Better Operating Procedures

- ❑ Keep lid closed when not in use.
- ❑ Install rolling/sliding covers.
- ❑ Improve freeboard ratio (100%).
- ❑ Remove redendant degreasers.
- ❑ Implement regular maintenance program.
- ❑ Develop operator training:
 - ❑ Correct placement of parts in baskets
 - ❑ Discourage use of hand sprayer

Solvent loss from evaporation, equipment leaks, spills, and inappropriate usage ranges from 25-40%!

Better Operating Procedures (Continued)

- Change out solutions as needed, not at a scheduled time.**
- Clean parts with a dirty solution first, followed by clean.**
- Filter solution.**
- Use a solvent recycle service or a solvent distillation system.**
- Use funnels or pumps for fluid transfer.**
- Use high-quality (soft) wash water in aqueous wash systems.**
- Install skimmers & timers on aqueous wash systems.**

Alternative Cleaning Methods

- Wiping
- Wire brushing
- Grinding or machining
- Sand blasting/Hydro-blasting
- Plastic bead or sponge blasting
- Immersion & spray cleaning (aqueous & semi-aqueous)
- Ultrasonic cleaning
- Re-circulating spray cabinet

Alternative Cleaning Methods (Continued)

- Hot tanks, Hot soap washers, “Jet” washers**
 - Less hazardous waste, employee exposure, fire hazard**
 - Reduced cost of cleaning materials**
- Aqueous parts washer**
 - Less employee exposure and fire hazard**
 - Heat and filtering can aid efficiency**
- Enzyme washers**
 - Less employee exposure, fire hazard, fluid disposal**
- Bake-off ovens (for heat-intolerant parts)**
 - Less employee exposure, waste**

Aqueous Parts Washers



Semi-Aqueous Acceptance

Health & Safety Trade-offs

- Flash Points
- Terpenes contain d-limonene

Environmental Trade-offs

- Terpenes have high BOD & COD
- May require pretreatment prior to discharge

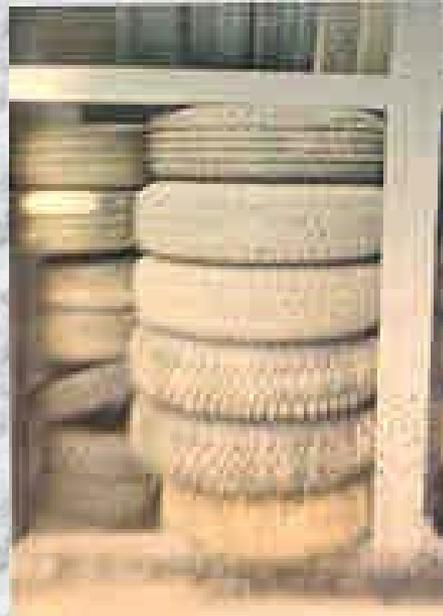
Operational Trade-offs

- New operating or maintenance skills/training
- More process controls may be needed
- Quality & operating rates may be affected

Material Substitutions

- Procurement P2/Supplier Partnerships & Buy Recycled**
- Less-toxic, lower-emitting substitutes (citrus-based for parts, water-based for carburetor cleaner)**
- May effect process elsewhere**
- May require equipment modifications**
- Will require re-training**

Identify Solid Wastes



Used tires

Filters

Plastics

Drums/Pales

Aerosol cans

Shop towels



Plastics

❑ What types?

❑ \$0.03/lb. or
\$60/Ton



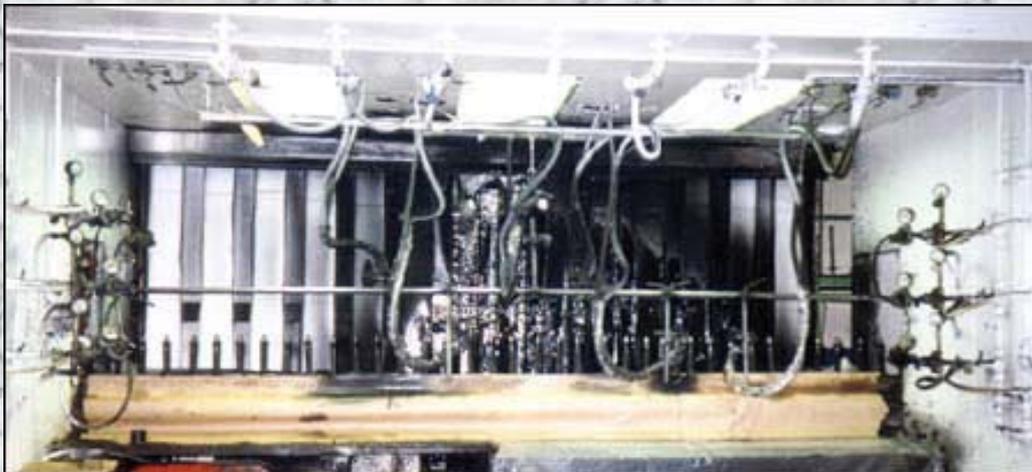
Aerosol Cans

- Utilized for brake & carburetor cleaner
- Completely empty (hold can upside down while spraying!) before discarding.
- Options:
 - Use mechanical or refillable pressurized spray cans instead.
 - Recycle metal from cans, if available.

Shop Towels

- Use reusable cloth towels.
- Wring out towels to reuse the liquid.
- Solvent-laden towels must be wrung out or centrifuged before sending to a laundry.
- Use non-chlorinated cleaning solvents.

P2 4 U!!!



MI DEQ & RETAP Pollution Prevention (P2) Training

Next Steps: P2 for Vehicle Maintenance

Cam Metcalf, Executive Director

Richard Meisenhelder, P2 Specialist

Lori Hoetker, Technical Coordinator

Kentucky Pollution Prevention Center (KPPC)

