

Pollution Prevention for the Automotive Maintenance and Repair Industry



Pollution
Prevention
Institute

Kansas State University

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Pollution Prevention for the Automotive Maintenance and Repair Industry

If you are a vehicle maintenance repair shop owner or manager, this manual is designed for you. It covers pollution prevention (P2) strategies that can be implemented in your shop to reduce waste streams normally associated with hazardous waste generation.

Hazardous waste is expensive and associated with long- and short- term liabilities, health issues, and time-consuming compliance requirements that can reduce bottom-line profits for shop owners.

Pollution prevention (P2) can help your shop reduce—

- hazardous waste
- waste disposal costs
- raw material purchases
- short-term liabilities associated with employee health issues
- long-term liabilities from improper hazardous waste disposal

Our manual introduces the concept of pollution prevention, gives an overview of hazardous waste definitions, and briefly discusses hazardous waste generator requirements in the state of Kansas. Waste streams from normal shop operations are discussed with accompanying pollution prevention options. Success stories from shops using these techniques are included to show how others have reduced their waste streams and their regulatory requirements by using P2 technologies.

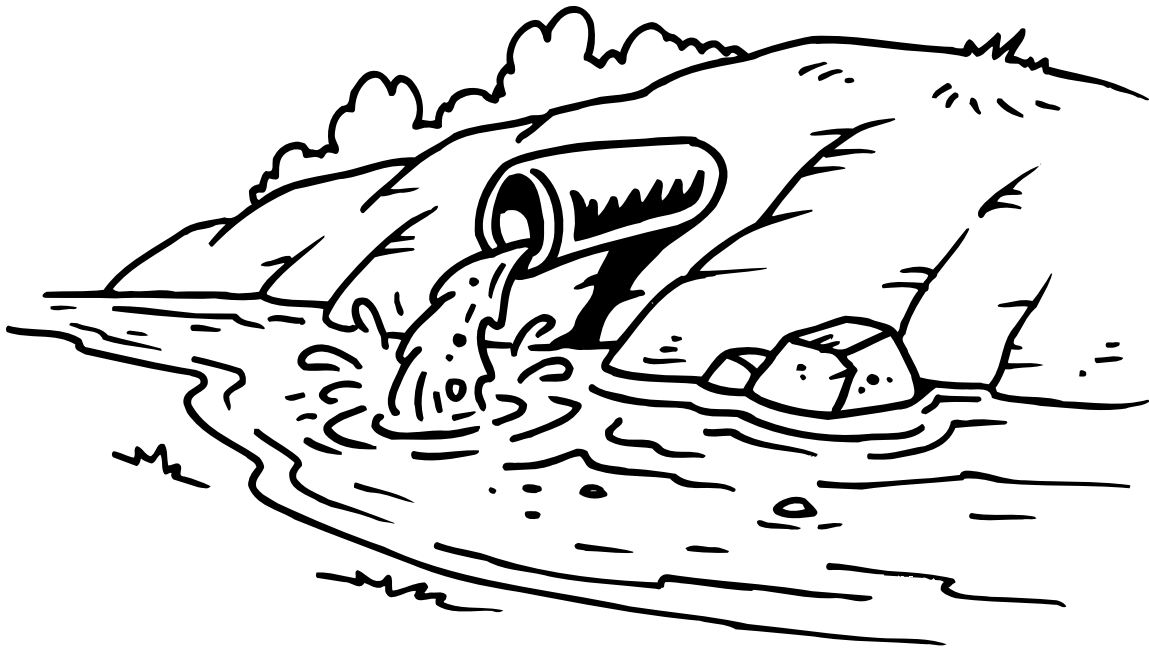
Definition of Pollution

Webster's Dictionary defines pollution as the process of contaminating or making an environment unfit with man-made waste. Laws have been put into effect in the last 30 years to help protect our environment. Many of these laws were in response to catastrophic events that led to new laws to protect human

health and the environment. Air pollution is regulated by the Clean Air Act and its amendments, water pollution by the Clean Water Act and the Safe Drinking Water Act, and solid pollution by numerous laws including the Resource Conservation and Recovery Act (RCRA).

History of the Development of Pollution Prevention

Congress began addressing pollution in the late 1800s. The Rivers and Harbors Act of 1899 made dumping waste in the Mississippi River illegal. Since then numerous laws and agencies have been created to deal with environmental issues. The vast majority of environmental legislation has focused on identification and cleanup of pollution, such as the Resource Conservation and Recovery Act of 1976.



However, in 1990, beginning with the Pollution Prevention Act, EPA shifted focus from "end-of-pipe" pollution treatment and cleanup to policies, technologies, and processes which prevent and minimize the generation of pollution. The underlying theory behind pollution prevention is that it is economically more sensible to prevent wastes rather than develop expensive and risky treatment and control procedures to insure that waste does not threaten human health and the environment.

Section I: Pollution Prevention Strategies

Reducing your hazardous wastes can help you comply with hazardous waste regulations. You can also save money by reducing your waste disposal costs. Waste reduction can also help you to reduce your liability since it reduces the chances that your waste will be improperly disposed to the environment and

require cleanup. Finally, reducing your hazardous waste will help protect your employees' health and safety because it will reduce exposure to hazardous substances, especially when you include employee training or material substitution in your waste reduction program.

The following strategies are options you may use to reduce amounts or toxicity of wastes in your shop.

Change the Material

It may be possible to change to less hazardous materials in the product without impacting the desired performance. This can be done, in some cases, in a

manner that reduces the amount of cleaning solvents and other hazardous chemicals that are used in your shop.

An example of material substitution practice is substituting a water-based cleaner for low-flash solvent for parts cleaning.

Change the Technology

This approach includes—

- layout changes to improve work flow
- increased automation
- improved operating conditions
- incorporation of new technology

For example, use of automatic hot soap parts washers or other aqueous cleaning systems can eliminate hazardous solvent use for cleaning. Another example involves the automotive paint and

repair industry where use of high volume, low pressure (HVLP) paint guns reduces overspray, which reduces the amount of paint and solvents wasted into the environment.

Change the Operating Practice

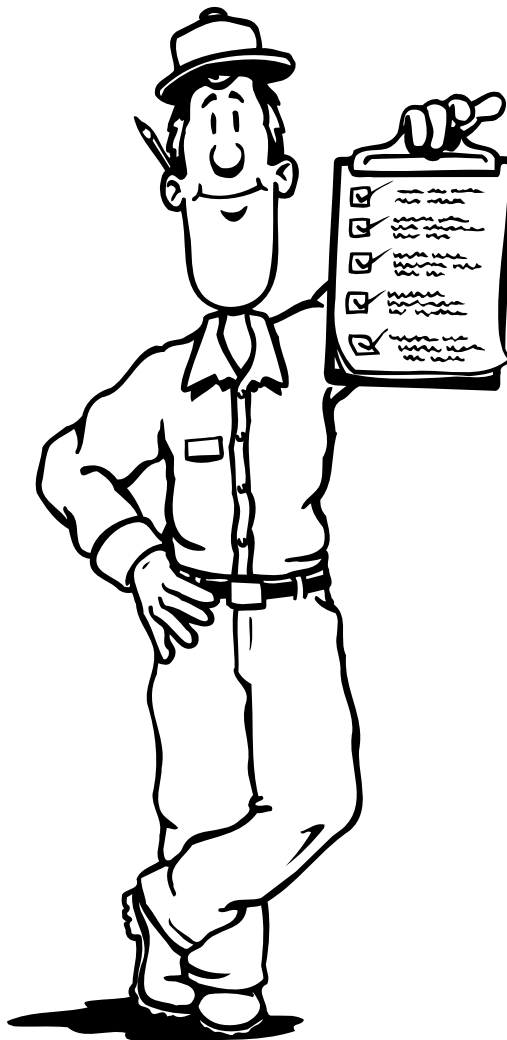
This approach includes—

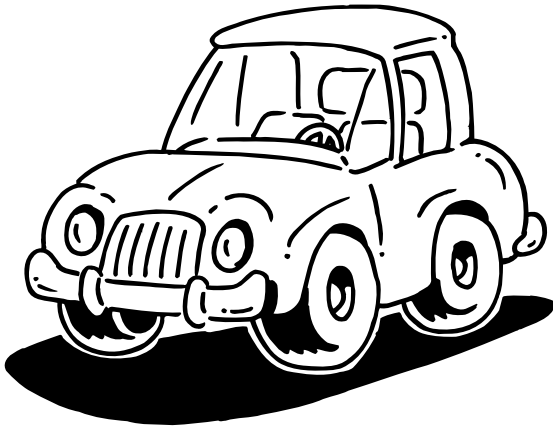
- operating and maintenance procedures
- management practices
- waste stream segregation
- production scheduling
- inventory control
- training

Covering solvent tanks when not in use minimizes emissions due to evaporation. Drip pans and splash guards are low cost, and help reduce handling costs from cleanup of spills and leaks. Also, use of partially used solvents for "dirty" operations, while saving clean solvents for final cleaning, is a more cost-effective use of resources and will minimize the environmental impact.

Inventory control can be used to limit waste from disposing of out-of-date products.

Scheduled maintenance practices will minimize emissions from leaks, weak seals, and inefficient equipment.





Principles of a Waste Reduction Program

To be successful in the automotive maintenance and repair business, shop owners have to remain competitive. Reducing unnecessary waste and its associated costs should be an integral component of your plan.

It's not hard to organize a plan, but it will take some time to get it started. It may be a project that involves everyone if you have a small shop, or this task could be given to one key person if you are a large shop, but it will need someone committed to saving your shop money and reducing liabilities.

When starting your program, keep the following principles in mind:

- Be committed! Owners and managers must be committed to waste reduction before employees will buy into it, and they are the ones that will ultimately make it work!
- Know the type of waste in your shop, where it comes from, how much of it there is, and whether it's considered hazardous or not. Keep hazardous wastes segregated from nonhazardous to prevent contamination and to promote easier, cheaper disposal.
- Know how much your waste is costing you. If it's hazardous, do you know what your waste hauler is doing with it? If not, you should!
- Train all employees and family members involved in proper management techniques for waste; keep everyone informed of your waste reduction methods and goals.
- Good housekeeping practices are a must in any waste reduction program—invest in training and equipment that will prevent the spill before it happens.
- Keep informed! Regulations, new technologies, and new products can affect how you operate. Use the resources available to you, such as the Pollution Prevention Institute at Kansas State University, trade magazines, and associations.

Section II: Is My Waste Hazardous?

The state of Kansas' regulatory requirements for hazardous waste generators are different than other states. There are three categories of hazardous waste generators, each based on how many pounds of hazardous waste is generated during a one-month calendar period and how much material is accumulated at your facility.

To calculate your generator status, you need to know what materials are considered hazardous waste in your shop.

Hazardous waste is classified by its *hazardous characteristics* or as a "listed" waste.

Remember: Shop owners are responsible for determining if their waste streams are hazardous or non-hazardous.

Characteristic Hazardous Waste

Some hazardous waste streams are classified according to a recognizable "hazard" always associated with them. If a

material is a *characteristic hazardous waste*, it will have one or more of the following characteristics:

Corrosivity

A waste can be hazardous because of its corrosive nature. This is based on pH value, which can be easily tested at your facility with litmus paper, a color indicator of pH value.

Liquids with a pH value of 7.0 are neutral; 0-7 are considered acidic; and 7-14 are classed as caustics. Materials with pH values

of less than 2.0 and greater than 12.5 must be treated as a hazardous waste due to their highly corrosive nature.



Characteristic Hazardous Waste (continued)

Ignitability

An ignitable hazardous waste is a material that has a flash point of less than 140° F, or spontaneously combusts upon exposure to the environment. In the automotive shop, most hazardous wastes associated with ignitables come from part-washing solvents, solvent-soaked rags, and cold-batch cleaners.



Reactivity

Reactive wastes may react violently with air or water, are unstable in normal environmental conditions, react with water or corrosives to produce toxic gases, or are explosive.

Toxicity

A toxic characteristic leaching procedure, TCLP, commonly called a "T-clip" test, is required by a certified lab to determine whether or not the waste material is hazardous due to toxicity. If the waste material exceeds the regulatory limits of specific constituents, it must be labeled with the appropriate waste code and shipped to a qualified treatment, storage, and disposal (TSD) facility.



"Listed" Hazardous Waste

The Environmental Protection Agency has assigned certain materials to specific "lists" because of their predictable hazardous nature in specific processes.

Four "lists" of hazardous waste are designated by the letters "F," "K," "P," and "U." These letters are used in the shipping waste identification form.

Some wastes are considered hazardous because they come from a generic process normally associated with hazardous wastes, such as degreasing processes. These are on the "F"-listed waste list. If the waste comes from a specific process like the pesticide industry or wood preservative industry, then it will be a "K"-listed hazardous waste.

Two other lists which are commercial chemical products and are intended to designate the chemicals themselves as hazardous waste at the time of disposal. The wastes may be off-spec chemicals of commercial or technical grade; obsolete, expired, or out-of-date products; or any spill cleanup materials associated with these chemicals.

These wastes are divided into two lists according to the quantity at which they are regulated. The "P"-listed wastes, those considered acutely toxic, are regulated when you have accumulated more than 2.2 pounds on site per month. The "U"-listed wastes are regulated when you have accumulated more than 55 pounds on site in one month.

Please see the *Kansas Hazardous Waste Generator Handbook* for "listed" hazardous waste lists, and TCLP constituents and their regulated levels.

<p style="text-align: center;">Examples of Listed Hazardous Waste:</p> <p>"F001": Spent halogenated solvents used in degreasing, such as methylene chloride</p> <p>"K032": Wastewater treatment sludge from the production of chlordane</p> <p>"P029": Discarded copper cyanide</p> <p>"U002": Discarded acetone</p>

Section III: P2 Options, Case Studies, and Best Management Practices

Pollution prevention technologies in the automotive maintenance and repair industry provide shop owners a variety of choices to reduce their waste streams. Responsibility for waste generation has also become more of a public issue because of limited landfill space. The public and businesses have had to find ways to reduce their waste streams.

Automotive repairs and maintenance work can generate problem wastes for shop owners. Maintenance work performed by repair shops consists of fluid changes, repair and rework of fixable components, and replacement of non-functional non-repairable parts.

Mechanical repairs usually require cleaning and dismantling of the engine and other heavily soiled components. These procedures leave shop owners with fluids such as antifreeze, engine oil, transmission fluids, cleaning solvents, and non-repairable vehicle parts for disposal.

This manual provides guidance to help shop owners handle these wastes in cost-effective and environmentally sound ways.

Major waste streams from auto repair shops consist of:

- parts washers' solvents and sludges
- motor oil
- antifreeze engine coolant
- other engine fluids such as transmission fluid, battery fluid, and brake fluid
- shop cleanup materials from spills and leaks
- refrigerants
- waste water
- non-repairable parts
- aerosol cans
- miscellaneous cleaners

This manual looks at each of these waste streams and provides alternatives that are practical to implement and use to minimize your hazardous waste generation and compliance requirements.

Parts Cleaning

Many different kinds of parts washers are available for vehicle parts washing today. Some of these use traditional petroleum-based solvents, or water-based solvents, and others are combinations of solvents or enzymes used to break down the soils washed from the parts.

Parts may be cleaned by high pressure "jet" sprayers; enclosed hot soap parts washers; aqueous, semi-aqueous, and solvent washers; bake-off ovens; or "hot" tanks. Parts cleaning can generate problematic waste for auto shops. Cleaning wastes can be hazardous due to the nature of the solvent or from the contaminants in the soils washed from the vehicle parts.

Solvents that contain chlorine or other hazardous air pollutants (HAPS) have become more heavily regulated and should be avoided if possible. Besides oil and grease removed from the part,

heavy metal contamination from cadmium, lead, or other metals may cause your solvent stream to become a hazardous waste when its useful life is over.

Solvent parts washers are also associated with air emissions due to evaporative loss of solvent "drag-out" associated with improperly drained parts.

To reduce pollution from the parts-washing process, shop owners should consider the following options:

- Use a less hazardous cleaning system (most desirable option of waste reduction).
- Use less toxic solvents.
- Maximize solvent life.

***Remember:** Always evaluate a new technology for use in your own shop operations. Does it clean the soils you normally have? Do you have the space? Is the payback period within your means?*

Use a Less Hazardous Cleaning System

Hot Tanks, "Jet" Washers, and Hot Soap Washers

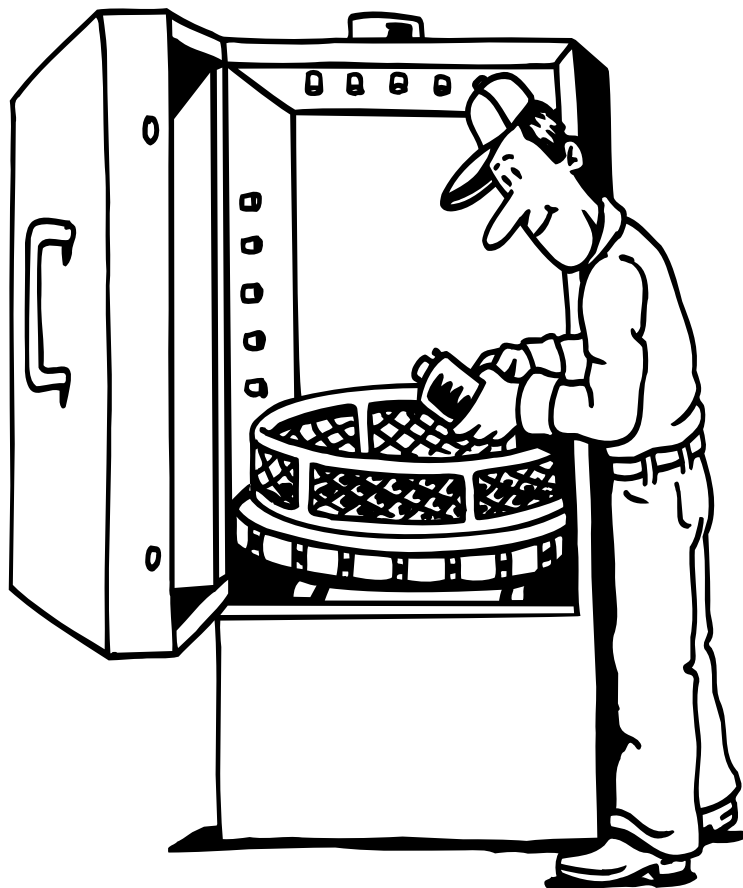
Hot tanks and hot soap washers are heated systems that contain a hot aqueous detergent or caustic solution to clean the parts. The part is submerged into a tank with air or mechanical agitation, or is sprayed with a high pressure stream within an enclosed container to remove the soils.

"Jet" washers use a very high pressure stream of water, sometimes heated, to dislodge the soils from the parts. Some shops use their jet washers without detergents.

P2 Opportunities

These machines offer the following advantages:

- reduce cost of cleaning materials
- produce less hazardous waste for disposal
- require less "hands-on" labor
- decrease fire hazard from flammable solvents
- reduce employee exposure to hazardous solvents



Waste Streams

Oils should be removed by a skimmer or other method before disposal, and can be disposed with your waste oil. Aqueous solutions can become hazardous due to heavy metal contamination from engine soils, and testing is recommended before disposal.

Hot tank solutions, usually very caustic, may need to be tested for heavy metal contamination and neutralized if the wash solution pH is above 12.5. You must obtain permission from your POTW to pour these solutions down the drain after they have been neutralized.

Sludge from these washers may need to be tested for hazardous constituents, usually heavy metals, before disposal.

Many hot soap parts-washer cabinets are equipped with evaporator units, but evaporators have not been approved for use by Kansas Department of Health and Environment, unless they are completely enclosed systems. To know if the evaporator is approved, call KDHE's Bureau of Waste Management at 785-296-1603.



***Remember:** You must always check with your POTW before discharging a waste stream to them. They may ask that you test once, or on a periodic basis, in order to characterize this waste stream. Ask them to provide you with written permission to discharge to their facility.*

Hot soap washer fluid or other shop wastes should not be discharged to septic systems or storm sewers because it may interfere with the bacterial activity of the septic system or cause environmental damage in stormwater discharge areas, respectively. If connection to a city sewer is not possible, the water may be collected in a tank and hauled to your local POTW for treatment. Or, an evaporator system may be installed to eliminate the wastewater stream, leaving only the sludge from the washer bottoms.

Cost

Small hot soap washers that accommodate smaller engine parts start at \$2,500; medium-and larger-sized units that will accommodate transmissions and engine blocks start at \$5,500. They are available with recirculating systems

for maximum water and detergent use, or with evaporator systems to eliminate wastewater from the machine, leaving only a sludge residual. Evaporator models are usually more expensive.

Aqueous Cleaning with Conventional Parts Washers

Aqueous systems used with conventional parts washers are economical, free-standing washers that can use detergents or biodegradable cleaners to effectively remove oily soils. The solutions may be used in conventional parts washers with common household detergents, alkaline cleaners, or microbial components, and may require the addition of a rust inhibitor for corrosion control.

Water-based parts washers offer shops the opportunity to reduce adverse worker health exposures and amounts of hazardous waste generation. A study

conducted in one air district of Los Angeles where VOCs in cleaning fluid were limited to 50gms/l, shows all the shops involved in the feasibility study were able to convert to water-based cleaners as viable alternatives to mineral spirits. Non-emulsifying detergents should be used with these washers to allow oil and grease to "settle" out for removal, and should be heated and equipped with filtration devices to prolong the life of the cleaning solution. Overall costs for using aqueous cleaners were less than those associated with traditional solvent cleaning systems.

P2 Opportunities

Aqueous parts washers offer the following P2 advantages:

- are available as a heated system for increased cleaning efficiency
- can be equipped with a filtering mechanism to prolong life of the solution, making them very economical to use
- pose less health risks to employees
- eliminate fire hazards

Waste Streams

Oils should be removed by a skimmer or other method before disposal, and can be disposed with your waste oil.

Spent aqueous wash solutions and the sludge can contain high levels of heavy metals from engine soils, especially if used for long periods of time, and should be tested before disposal. If heavy metal wastes' TCLP content is higher than regulatory levels, solution

or sludge must be disposed as a hazardous waste.

Hot tank solutions, usually very caustic, may need to be tested for heavy metal contamination and neutralized if the wash solution pH is above 12.5. Again, you must obtain permission from your POTW to pour these solutions down the drain.

Cost

Conventional sink-on-a-drum units are available at comparable prices to other solvent sinks. Units with oil skimmers, heaters, and filtration systems are more

expensive, starting around \$1,200 but enhance cleaning power, lower change-out frequency, and prolong the life of the cleaning solution.

Remember: Always evaluate a new technology for use in your own shop operations. Does it clean the soils you normally have? Do you have the space? Is the payback period within your means?

Enzyme Washers

Enzyme units use a mixture of microbial enzymes and cleaner in an aqueous solution. The cleaners' active enzymes actually digest the oils and other soils washed from parts, allowing the solution to be used indefinitely, requiring only the addition of more enzyme, cleaner, and water to maintain cleaning power. These systems are much gentler on the mechanics' hands, warm in winter, and are very safe to use.

P2 Opportunities

Some parts may take a bit longer to clean but most workers agree it's not significant and is worth the time to avoid the health hazards associated with breathing solvent fumes.

Waste Streams

Waste parts-washing fluid disposal virtually goes to zero with the use of these units, making them very economical to use. Sludge may accumulate after several years use and will need to be tested for heavy metals accumulation before disposal.

Costs

Enzyme cleaners are competitively priced and reduce costs of hazardous waste disposal significantly compared to mineral spirit cleaners.

Bake-Off Ovens

Bake-off ovens provide a safe alternative to parts cleaning but are limited in use to parts that are heat tolerant. The

oven heats the part to a very high temperature which "burns" the soils off, leaving a small amount of residue.

P2 Opportunities

Bake-off ovens create very little solid waste and are associated with very little air emissions.

Waste Stream

Residue of dust can usually be sent to landfills for disposal, although this waste stream should be characterized with a TCLP test for heavy metals before going to a landfill.



Cost

Costs for bake-off ovens large enough for engine blocks and transmissions start at \$7,500. These ovens operate between 600° and 1000°F, use natural gas or propane, and cost approximately \$2-4.00 per cycle of operation, depending on local fuel costs.

Use a Less Hazardous Solvent

Parts washing in the past has typically used petroleum-based solvents to remove soils prior to working the part. Many of these solvents are considered hazardous because of their low flash points and may contain compounds that are considered dangerous to the environment and human health. Some low flash solvents deplete upper atmosphere ozone and are being phased out of the market. Using less toxic solvents is an important way to reduce pollution

and reduce risks to employees. The following list identifies hazardous materials found in some solvents:

- carbon tetrachloride
- methylene chloride
- trichloroethylene (TCE)
- toluene
- tetrachloroethylene (perc or PCE)
- methyl ethyl ketone
- xylene

Remember: Always ask vendors for a material safety data sheet (MSDS) before new products are brought on site for trial purposes. Inspect the MSDS for regulated or hazardous solvents and make sure the vendor will take back the unused product! This can reduce the amount of hazardous materials you may need to dispose of and keeps your inventory investment to a minimum.

If petroleum-based solvents must be used for parts cleaning, always use the least toxic material that will do the job, such as naphtha, mineral spirits, or Stoddard solvent. These solvents are still associated with hazards such as flammability and adverse health effects, and will need to be disposed of as a hazardous material because their flash points are below 140°F.

Consider using a high flash solvent, greater than 140°F, for parts cleaning. Higher flash solvents can be heated slightly to increase their cleaning efficiency and are associated with less vapor loss.

Maximize Solvent Life

No matter what type of parts washer system you use, making the most of your cleaning solution is an integral step in preventing unnecessary waste

generation. Longer solution life means less cleaning materials used; the money goes in your pocket, *not down the drain!*

P2 Opportunities

Cleaning solution or solvent life can be extended by following these easy procedures:

- Mechanically clean as much soil off the part with a wire brush or reusable rag.
- Determine level of cleanliness needed; don't do excessive cleaning—it costs your shop time and money.
- Use solution until it is no longer useful; don't change out solutions on a scheduled basis, but on an "as needed" basis.
- Set up a two-stage cleaning system; clean parts in dirtiest solution first, then transfer to a final clean washer.
- Keep parts washers covered when not in use to reduce evaporative losses.
- Drain all parts thoroughly to reduce drag-out losses of cleaning fluids; install a drainage shelf if necessary.
- Filter solution to remove contaminants.
- Remove sludge and free-floating oil from cleaning systems frequently to extend solution life.
- Use a solvent recycle service. These services are usually associated with a service contract that will bring out new solvent and remove the old solvent. Although these services are costly, many shops like the convenience.
- Recycle your solvent on site with a solvent distillation system.



Cost

Traditional solvents can be recycled at your facility. Consider a solvent distillation system to reduce solvent purchases; solvent stills start at approximately \$2,000.

Filtration units for conventional parts washers are available starting at \$200–300.

Recommended Best Management Practices for Parts Washing



- Use the least hazardous material for cleaning.
- Reduce aerosol can use; use refillable pressurized cleaning systems for on-the-vehicle cleaning needs.
- Always use the least toxic material—check the material safety data sheets *before* products are purchased.
- Establish sound operating practices to extend solvent/cleaning solution life.
- Establish a spill prevention and control program.
- Change solvent out on an as-needed basis by cleaning performance, not according to a pre-set schedule.
- Do as much mechanical cleaning with a wire brush or recyclable rags, to reduce sludge generation and extend solvent life.
- Buy in bulk whenever possible. Bulk products are usually lower in cost and reduce packaging waste. Work with vendors to establish container recycle where possible.
- Recycle all materials where possible. In many small town and rural areas of Kansas, it may not be possible. Work with your trade associations to explore shops that may wish to recycle.
- Labeling raw materials and hazardous waste can save your company time and money. Hazardous waste must always have the appropriate labels.

Waste Fluids

Waste fluids from vehicle operations can become contaminated with metal from engine wear and tear, and are considered hazardous when present in certain quantities. Recycling of these fluids is the most economical approach to reduce such waste. Many of these other fluids, if contaminated with regulated solvents such as some chlorinated cleaners, must be disposed of as a hazardous waste if present in regulated levels.

Used Oil

Motor oils consist of blended, refined, and synthetically produced oils and can contain heavy metal contaminants from engine wear as waste oil. Much waste is generated in shops from oil or other spill-related cleanup materials. Opportunities exist to reduce waste by changing basic operating and housekeeping practices—a no cost-method of P2 with high returns.



P2 Opportunities

- Burn used oil on site for energy recovery. Used oil burners must have a capacity of no more than 0.5 million BTU per hour and must be exhausted to the outside of the building. As of late 1998, used oil burners can now take used oil from other businesses, if the used oil is determined through proper testing to be "on-spec."

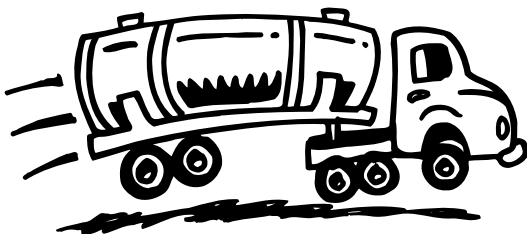
This testing is required to protect burners of used oil from receiving an oil/solvent mixture that could blow up the heater or release toxic air pollutants. The generator of the oil or the person receiving the oil must have it tested to verify the following:

- a minimum flash point of 100°F
 - total halogen content of less than 1000 ppm (parts per million)
 - arsenic content less than 5 ppm
 - cadmium content less than 2 ppm
 - chromium content less than 10 ppm
 - lead content less than 100 ppm
-
- It can be recycled or used for fuel blending, and does not require a hazardous waste manifest when shipped from your shop for this purpose.
 - Bulk oil is cheaper than quart containers and can significantly reduce the amount of solid waste leaving your shop. Bulk oil can be dispensed more efficiently through hard-piped delivery systems, reducing spills and cleanup wastes associated with individual bottle use. Currently no recycling options exist for one-quart used oil containers.
 - Consider using re-refined oils; many customers are willing to use recycled products if they know they are available and if they know the facts about a recycled product's quality.
 - Bulk waste containers should be covered and marked with a "Used Oil" label, to prevent contamination with hazardous materials.

Waste Streams

Used oil is not considered a hazardous waste in the state of Kansas as long as it is recycled. It must, however, be disposed of in an environmentally sound manner. Improperly disposed oil can destroy plants and animal habitat areas. Used oil and other auto fluids should

never be mixed with known hazardous waste; if this happens, the entire mixture becomes a hazardous waste. Spills from oil or other "oily" wastes should be cleaned up and recovered for reuse or recycle; liquids of any kind should not be sent to landfills.



Cost

Costs for used oil pickup will vary in different areas. Waste oil burners start at about \$5000 and can be equipped with boilers for hot water generation.

Transmission, Brake, and Other "Oily" Fluids

These fluids consist of blended oils and can contain heavy metal pollutants. Use drip-proof catch pans to catch fluids, and store in bulk containers

equipped with secondary containment and level indicators. Used oil haulers may allow this to be mixed with used oil.

P2 Opportunities

Transmission fluids and other hydraulic fluids should be captured for re-refining or fuel-blending programs. Some fuel-blending facilities will allow these fluids to be mixed with used oil.

Wastes Streams

Many waste oil haulers will allow these fluids to be recycled with used oil. Always check with your hauler for permission to do this. Never dispose of in the environment or in landfills.

Cost

Costs for recycle of mixed oily waste will depend upon hauler and location.

Recommended Best Management Practices For "Oily" Wastes

The following recommended best management practices will help reduce the amount of oily waste at your shop:

- Always use drip pans to catch fluids from vehicles and to hold parts until they can be put in a parts washer.
- New containers should be drained thoroughly before disposal.
- Use secondary containment and cover drums to prevent possible storm water contamination if materials are stored outside.
- Spills will inevitably occur when fluids are poured into storage drums. A wide-top funnel can be used to facilitate pouring.
- Use a float-type level indicator (drum fill gauge) in the small bung hole to indicate the level of fluid in the drum (indicator will "pop up" when almost full), or try using a dip stick or flashlight to determine level in the drum prior to adding more.

- Keep used oil separate from solvent waste streams so the used oil stream does not become hazardous.
- Recapture spilled materials. When spills do occur, use a dust pan and squeegee to scrape up excess fluids from the floor prior to using an absorbent material. Special oil-absorbing mops are available that could be used just for oily spills.
- Oil filters should be drained 24 hours (or crushed) prior to disposal in the local landfill, if allowed by the landfill.
- Secure waste drums, to prevent someone else from putting their waste in them.



Used Antifreeze

Antifreeze mixtures for engine coolant usually contain ethylene glycol, a poisonous compound that should be handled carefully to avoid possible ingestion by animals or humans. Engine coolant can be contaminated with lead and other heavy metals, and should never be poured on the ground or in waterway.



P2 Opportunities

- Save good antifreeze in clean containers and reuse in vehicle when possible.
- Engine coolants can be economically recycled on site and reused in vehicles. This reduces the amount of waste leaving your shop and can drastically reduce raw material purchases to increase your bottomline profits. Recycling efforts such as this can enhance your public image as an environmentally conscious shop owner.
- Have your antifreeze recycled on site by a mobile antifreeze recycle service that comes to your shop. Make sure they are properly disposing of filters to avoid potential liabilities in the future.

Waste Streams

Filters from coolant recyclers should be dry and tested for heavy metal contamination before disposal. Testing for heavy metal contamination may be done as a composite sample (piece of each filter) collected over a period of time.

This will offer the most economical way to be sure your filters are safe for landfill disposal. If your filters contain heavy metals above threshold limits, they must be disposed of as a hazardous waste. In some cities, the public owned treatment works (POTW) may allow

antifreeze solution to go to the sanitary sewer; however, this is the least preferred method of disposal. Call your local wastewater treatment operator for information on accepted practices in your area. Always obtain written permission to pour any waste down the sanitary sewer. Never pour antifreeze on the ground or in waterways, as it is very toxic!

***Remember:** Ethylene glycol antifreeze is toxic to humans and animals. Always store in a covered, secure drum and never pour into the environment.*

Cost

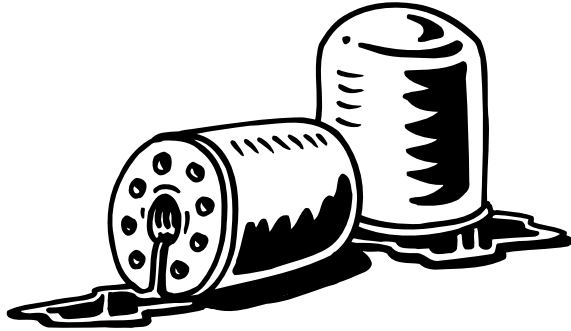
Antifreeze recyclers start at \$2,000 and can be purchased as on-car filtration units or as batch processors. Some shops may choose to have a recycling service come to their facility; prices vary but may be as high as \$100 per 55-gallon drum of antifreeze.

Costs of mobile antifreeze recycling services vary. Check with the vendor in your area. See the vendor list provided in Section VI.

Other Wastes

Oil Filters

Used oil filters should be hot-drained and crushed when possible for complete removal of oil and volume reduction before disposal. Liquids of any sort are prohibited in landfills; make sure there is no "free" oil in your discarded oil filters.



P2 Opportunities

- recycle casings; usually a fee associated with this service
- hot drain and crush to reduce oil content and volume
- promote long-life oils to clients to reduce number of oil changes needed and filters replaced

Waste Streams

Some landfills require a special permit from KDHE to dispose of oil filters. Oil filters may be disposed of in landfills only after they are thoroughly drained. Because they may retain two to four ounces of oil after hot draining, crushing oil filters will effectively

remove all liquid present and reduce the volume going to the landfill. Some household hazardous waste (HHW) facilities will take oil filters for recycle; check with your local HHW before disposal.

Cost

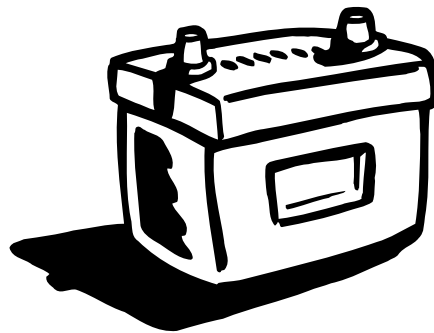
Filter crushers are available and start at about \$3000. Filter separator systems are available that separate the filter into

recyclable components and recover waste oil, starting at \$6000.

Batteries

Used lead-acid batteries are not considered hazardous waste as long as they are recycled. Split or broken batteries must be handled as a hazardous waste, due to sulfuric acid and lead contents. It is important to store used batteries in a place protected from the weather where they won't freeze. Secondary containment should be used to prevent hazardous material leaks into the environ-

ment; materials used to clean these leaks become hazardous waste and require disposal as such.



P2 Opportunities

- Recycle batteries with a reputable recycler.
- Store properly to avoid unnecessary waste generation.

Waste Streams

Leaking batteries must be handled as a hazardous waste.

If not recycled, lead-acid batteries must be disposed of as hazardous waste.

Cost

Batteries can usually be recycled at no cost. Broken batteries must be handled as a hazardous waste and will cost much more to dispose of.

Recommended Best Management Practices for Batteries

- Avoid stacking batteries on each other. Stack only within racks to reduce breakage.
- Store batteries inside on a bermed, impermeable surface for secondary containment and to reduce rupture or cracking from freezing.
- Keep a neutralizer, such as simple baking soda, on hand in case a spill occurs.

Aerosols

Aerosol products are used in the shop for on-the-vehicle degreasing. The propellant and sometimes the product inside can be a hazardous material, which must be removed before disposal.

Many aerosol products are very volatile and evaporate readily into the air, and can be an explosion hazard as well as an inhalation hazard for employees.

P2 Opportunities

- Use refillable pressurized containers. These containers are available in different sizes, and use compressed air.
- purchase bulk product at a cheaper price, and you won't be paying for propellant.
- Use a portable wash unit. Spray can be applied to the part and the catch basin will recover the overspray.
- Determine cleaning needs and consolidate aerosol inventory.
- Recycle metal from cans, if this service is available in your area.

Waste Streams

Aerosol cans should be voided of hazardous or flammable propellant by spraying until no more pressure or product comes from them.

Cost

Refillable pressurized containers range in price from around \$30 to \$60 and can be pressurized with air from a shop compressor.

Brake washers are available from \$500 to \$900.

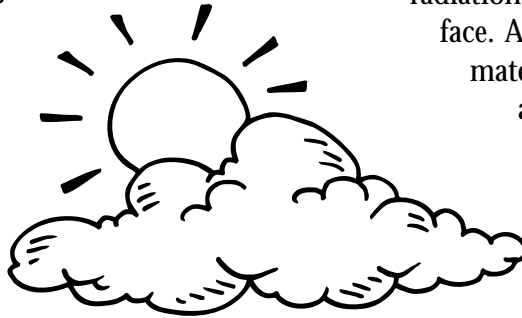
Recommended Best Management Practices for Aerosol Cans

If you do use aerosol cans, the following practices can reduce the hazards associated with them:

- Use all of the product in the can.
- Spray until no propellant remains in can; this can often be facilitated by holding can upside down while spraying.
- Establish an approval process for solvents in aerosol form. Consult MSDSs before product is purchased.
- Find substitutes for halogenated cleaners where possible.

Refrigerants

Refrigerants are used in automobile air-conditioning systems. Mobile air-conditioning systems have primarily used CFC-12 as a cooling material, which is associated with the breakdown of the ozone layer around the Earth. The ozone layer is an



important layer of the Earth's atmosphere that blocks carcinogenic radiation from the Earth's surface. All ozone-depleting materials from automobile air-conditioning systems must be captured and reused, without being released to the atmosphere.

P2 Opportunities

- Purchase refrigerant in bulk to reduce cost.
- Encourage customers to repair leaks instead of "topping off" a leaking system.
- Reuse recycled refrigerants in other vehicles, where compatible.
- Ship off site for recycling.
- Protect against leaks and recycle refrigerant where possible to reduce ozone-layer depletion.

Recommended Best Management Practices for Refrigerants

- Label all refrigerants removed from vehicles to avoid cross contamination.
- Identify retro-fitted vehicles.
- Encourage customers to have leak tests and repair all leaks.
- Determine appropriate refrigerant needs from manufacturer before servicing.

***Remember:** All shops must have Section 609 certified operators and recycle equipment that can recover the refrigerant and reprocess it through an oil separator, filter, and dryer for reuse. Intentional venting of ozone-depleting refrigerants to the atmosphere is prohibited by law, with fines up to \$25,000 per day.*

Case Studies

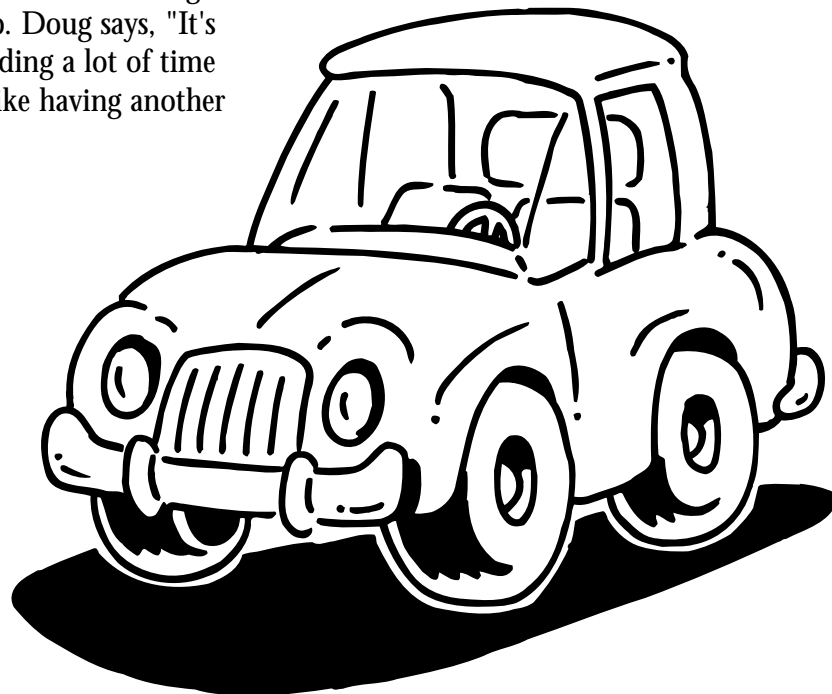
Parts Washing Case Study

Doug Rosencutter, owner of Doug's Service Center Inc., Topeka, Kansas, switched from a solvent-based parts washing system to a side-loading, hot soap parts washer. Costs associated with parts washing, including labor, went from \$6960 a year to \$1218 per year—an 82% reduction in cost of cleaning parts! Payback period was a little over half a year, and now Doug doesn't have to deal with a hazardous solvent waste stream.

The machine has been in service for over two years now and really seems to have become one of the shop team members. Doug and his highly qualified service technicians think it's a great addition to the shop. Doug says, "It's great! We were spending a lot of time cleaning parts. It's like having another



worker around the shop. We just put the parts in it, turn it on, and leave it. The parts come out very clean with no oil or grease residue, and it requires no labor—it's just like having another hand around!" (If you would like to talk to Doug about his hot soap parts washer, he can be contacted at 913-271-6757.)



Hot Soap Parts Washing vs. Solvent Sink Washing

Current Parts-Cleaning Expenses with Solvent Sinks	
A. Number of parts washers in use	1
B. Cost of each tank per month (rent, raw solvent, waste solvent pickup) x 12 months/year. [\$60 x 12]= \$720	\$720
C. Time spent cleaning parts per month x 12 months/year 40 hrs x 12= 480 hours	480 hours
D. Cost of labor per hour	\$13
E. Total cost of labor per year (C x D)	\$6240
F. Parts-washing expenses per year [(A x B) + E] \$[(1 x 720) + 6240]= \$6960	\$6960
Hot Soap Degreaser Expenses	
G. Biodegradable soap cost per month x 12 months/year \$14 x 12= \$168	\$168
H. Operation expenses per month (utilities) x 12 months/year \$25 x 12= \$300	\$300
I. Total operating expenses per year (G+H)	\$468
J. Sludge-testing costs (\$250) and disposal (\$500) based upon one, 55-gallon drum of waste per year	\$750
Cost Savings	
K. Expenses per year using solvent	\$6960
L. Hot soap unit expenses/year	\$1218
M. Total cost savings per year (K - L)	\$5742
Payback Period	
N. Cost of equipment	\$4000
O. Payback period (N/M) \$4000/5742 = 0.69years	0.7 years

Cooling Your Costs: The Antifreeze Solution

The following is a sample case study for a moderate- to large-sized shop buying an antifreeze distillation unit with a 15-gallon capacity. Distillation units recov-

er pure ethylene glycol and will need to have the additives restored for corrosion and pH control.

We make the following assumptions for the Kansas Hi-Ho Shop:

- performs four jobs that generate eight gallons of waste antifreeze/week (av.)
- disposal costs for waste antifreeze in this area are \$200/55-gallon drum as a hazardous material
- sludge generation from distillation unit is one, 55-gallon drum every two years
- antifreeze replacement based on 50-50 dilution of new antifreeze

Cost Comparison for Antifreeze Disposal vs. On-Site Recycling

Current Practices:	Totals
A. Amount of antifreeze used per year: $(4 \text{ gal/wk}) \times (52 \text{ wk/yr}) = 208 \text{ gal/yr}$	208gal/yr
B. Amount of waste antifreeze per year: $(8 \text{ gal/wk}) \times (52 \text{ wk/yr}) = 416 \text{ gal/yr}$	416gal/yr
C. Cost of disposal of waste antifreeze per year: $416 \text{ gal/yr} \div 55 \text{ gal} = \text{app. } 7 \text{ drums @ } \$200/\text{drum} = \$1400$	\$1400/yr
D. Cost of new antifreeze per year: $\$5/\text{gal} \times 208 \text{ gal/yr} = \1040	\$1040/yr
E. Total cost per year: $C + D = \$2440$	\$2440/yr
Operations with Antifreeze Distillation Unit:	
F. Gallons of waste antifreeze per year: 416	416 gal/yr
G. Gallons of recovered antifreeze per year: $416 \times 90\% = 374 \text{ gal/yr}$	374 gal/yr
H. New antifreeze needed per year (based on makeup rate only): $(416 - 374) = 42 \text{ gal/yr}$	42 gal/yr
I. Cost of new antifreeze per year: $42 \times \$5/\text{gal} = \$210/\text{yr}$	\$210/yr
J. Cost of additives (will vary according to quality of recovered antifreeze) based on average: \$250	\$250/yr
K. Total operating cost : \$460	\$460/yr
L. Total cost savings: $\$2440 - 460 = \1980	\$1980/yr
Payback Period:	
M. Cost of antifreeze distillation unit: \$7000	\$7000
N. Total cost savings: \$1980	\$1980/yr
O. Payback period: $\$7000 \div 1980 = 3.5 \text{ years}$	3.5 yr

Recommended Best Management Practices for Automotive Maintenance and Repair Shops



Labeling raw materials and hazardous waste can save your company time and money. Hazardous waste must always have the appropriate labels. Improper labeling can lead to contaminated product and waste streams. See the *Kansas Hazardous Waste Generator Handbook* for labeling guidelines.

Segregate your wastes to prevent contamination of wastes with hazardous materials. If you put a hazardous waste into waste oil, the entire mixture can become hazardous waste.

Buy in bulk whenever possible. Bulk products are usually lower in cost and reduce packaging waste. Work with vendors to establish container recycle where possible.

Reduce spills by having a fluids-handling program in your company. If you spill a hazardous material, cleanup materials are considered hazardous waste also, increasing your disposal costs.

Inventory control can prevent overuse of products and control the kinds of materials that come into your shop.

Raw materials are the unused supplies of materials that you keep on hand. If you allow these supplies to become too old to be used, they may become hazardous wastes. Use inventory control to keep track of your raw materials.

Consult material safety data sheets before you buy a new product. If a vendor wants to have you try a new product, make sure he will take back the unused portion, especially if its hazardous.

Recycle all materials whenever possible. In many small town and rural areas of Kansas, it may not be possible. Work with your trade associations to explore shops that may wish to recycle; recyclers are more apt to work with shop owner groups that can guarantee them minimum amounts of materials.

Secure your waste storage areas. You are responsible for what's leaving your shop and you don't want someone else to put their waste in your containers.

Clean up spills with squeegees, oil mops, or reusable absorbents so material can be recaptured for use or recycle; wash "sheen" off the floor with a biodegradable soap after getting as much spill as possible off the floor. If you are using a caustic soap, don't put wash water into storm sewers or pour it on the ground outside. These chemicals can be harsh enough to cause danger to humans, animals, and environmental systems.

Water is a precious resource in Kansas. Minimize your water use for cleanups as much as possible. Drain all water to a sump area and use an oil skimmer to remove oils and grease; these can be recycled with your waste oil. Maintain a schedule to monitor your sump and have accumulated sludge pumped out when needed. Sludge can become hazardous if contaminated by hazardous wastes or other contaminants. Vacuum and dry sweep your shop as much as possible to reduce water use and sludge accumulation.



Section IV: Checklists for Success

Using checklists can help you spot areas in your shop that can create unnecessary waste, labor, paper work, and sometimes regulatory problems. This information is strictly for your use. If your shop moves, grows, or changes its services, go over the checklists again to see if any waste reduction strategies will apply to your new operations.

Raw Materials

Do you inventory your supplies to spot unnecessary accumulation? **Yes/No**

Do you minimize your shop's stock to keep supplies from getting too old to be used? **Yes/No**

If your shop keeps large amounts of supplies, do you use a first-in, first-out material usage policy to prevent materials from deteriorating in storage?

You can easily rotate and maintain your stock by labeling, dating, and inspecting new material containers as they are received. Then, use the earliest labeled stock. Keep simple records of the dates of receipt and usage to help reduce overstock and material degradation. Schedule a full-scale inventory of your raw materials at least once a year.

Do you generate hazardous wastes due to spills during raw material or waste handling or storage, or during repairs? **Yes/No**

Some spills will occur. Hang a clipboard in a handy spot and keep a record of larger spills (when they occur, and why). Use this information to identify spill-prevention options that might help your shop. Many of these options are listed throughout the checklist. Some easy options include locating parts-cleaning equipment near the service bays while in use and allowing cleaned parts to drain thoroughly. Remember, minimizing spills helps to reduce the amount of cleaning material you use, and reduces the amount of hazardous spent absorbent and used floorwash you generate.

Storage

You may generate additional hazardous waste if you store raw materials or hazardous wastes improperly. Store them in covered containers. A locked, covered, indoor area with a concrete floor and curbs for spill containment would be ideal for storage. Inspect the storage areas often, at least once each month, to look for leaky containers or improper storage.

How do you store your hazardous wastes and raw materials? Check the boxes that apply to your storage area(s):

	Hazardous Wastes	Raw Materials	
Indoors	<input type="checkbox"/>	<input type="checkbox"/>	Some fire departments recommend storing flammable wastes outdoors to reduce fire danger, but remember to follow other storage requirements and preferred practices.
Outdoors	<input type="checkbox"/>	<input type="checkbox"/>	
Covered	<input type="checkbox"/>	<input type="checkbox"/>	A covered storage area is important because rain water can increase your waste volume or contaminate raw materials. Also, exposure to sunlight can dangerously raise the pressure inside sealed containers. Keep individual containers covered to prevent evaporation and spills.
Uncovered	<input type="checkbox"/>	<input type="checkbox"/>	
Diked concrete pad	<input type="checkbox"/>	<input type="checkbox"/>	A diked concrete pad will contain spills better than asphalt or dirt.
Asphalt surface	<input type="checkbox"/>	<input type="checkbox"/>	
Dirt surface	<input type="checkbox"/>	<input type="checkbox"/>	
Locked	<input type="checkbox"/>	<input type="checkbox"/>	Without secure storage facilities, some unscrupulous hazardous waste generators could deposit their wastes in your containers, increasing your disposal costs.
Unlocked	<input type="checkbox"/>	<input type="checkbox"/>	

Do you inspect the storage area(s) to make sure containers aren't leaking and are stored properly? **Yes/No**

A good time to inspect your storage area(s) is during your raw material inventory.

Do you store different waste types in separate containers? **Yes/No**

Waste reduction requires waste segregation. Mixed wastes cost more to manage

Are storage containers covered? **Yes/No**

Covered containers will help reduce spills and evaporation.

Have you installed containment, such as a curbs or dikes, in storage areas to minimize the area contaminated by a spill? **Yes/No**

A curb or dike that surrounds the storage pad will prevent spills from leaving the storage area. A slightly sloped storage pad will help accumulate the spill in a smaller area so it will be easier to clean up.

Are your personnel trained in proper raw material and hazardous waste handling and storage techniques? **Yes/No**

You can reduce the amount of waste generated by spills if you train your employees to properly handle and store hazardous materials (OSHA requires this employee training).

Miscellaneous Auto Repair Waste

If you change engine oil, flush radiators, replace dead batteries, or perform similar repairs, then you may produce hazardous wastes such as spent antifreeze solution, spent lead-acid batteries, spent transmission fluid, and used oil or waste fuel. Reducing spills will help reduce the amount of unnecessary waste. However, since you can't stop using oil and batteries and other supplies, recycling and treatment are the best waste reduction approaches for these types of waste.

Does an oil recycler collect your waste oil? **Yes/No**

When the price of oil is high, some oil recyclers will pay you for waste oil. Shops typically combine transmission oil with other waste oils, but first check with your oil recycler.

Does a battery collector remove your used batteries? **Yes/No**

A battery collector often picks up your batteries after you have collected a certain number. Sometimes a battery collector will pay for intact lead-acid batteries.

Do you take used batteries to a storage or recycling facility? **Yes/No**

Cracked or broken batteries are considered a hazardous waste. Maintain a safe storage area for your batteries to prevent freezing and rupture.

Does a recycler or equipment leasing service collect your spent antifreeze solution? **Yes/No**

Check with your local water agency and environmental health department to determine your local antifreeze disposal. If your local water agency does not allow you to dispose of antifreeze waste to the sewer, contact an antifreeze recycling firm or explore on-site recycling.

Do you use a laundry service to clean your dirty rags and uniforms? **Yes/No**

Use your mop rags to wipe up small spills when they happen. Then, send the rags to a laundry service with your uniforms for cleaning.

While replacing brake shoes, do you collect and contain any loose asbestos waste that may be released?

Yes/No

Brake-washing machines are available that will reduce your exposure to asbestos. Some equipment-leasing companies provide asbestos collection systems. This equipment contains the asbestos dust in a solvent solution which the company collects and recycles.

Solvent Waste

Parts-cleaning operations usually generate spent solvent waste in the form of solvent sink mineral spirits and immersion (carburetor) cleaner solvent. Other solvents you may generate include other types of degreasers and paint thinners. If you spill these materials or use them for purposes other than parts cleaning or degreasing or removing paints, you may generate additional unnecessary waste. Solvents also evaporate easily.

Do you use the following equipment to clean auto parts? If yes, then you generate solvent waste.

	No	Yes	
Solvent sink	<input type="checkbox"/>	<input type="checkbox"/>	A solvent sink that drains directly into a waste storage drum is safer and easier to use than a dunk bucket or dip tank that you have to empty yourself. Remember to turn off the solvent when the sink is not in use. Also, place a plug in the drain of your solvent sink or cover the sink when not in use to prevent evaporation.
Solvent dunk bucket	<input type="checkbox"/>	<input type="checkbox"/>	
Solvent dip tank	<input type="checkbox"/>	<input type="checkbox"/>	

Do you use parts-cleaning solvent for purposes other than cleaning parts? **Yes/No**

Solvents are expensive. Use them only for their intended purposes. Don't waste parts-cleaning solvent on floors or use it to clean your hands.

Are the solvent sinks and/or dunk buckets located near the auto service bays to minimize the amount of solvent spilled? **Yes/No**

Place your parts-cleaning equipment near the service bays to reduce drips and spills. Remember, minimizing spills helps to reduce the amount of solvent you lose and reduces the amount of spent sawdust absorbent and detergent floorwash waste you generate.

Do you allow the cleaned parts to drain in the sink for a few minutes after cleaning to minimize the amount of solvent dripped on the floor? **Yes/No**

If you must use your solvent sink continuously, place an inexpensive steel tray or pan next to the sink. Drain the parts in the tray for

a few minutes after cleaning them and empty remaining solvent in the tray back into the sink. Or, have your sink fitted with a rack or basket to drain parts. If your sink already has a rack, remember to use it to drain parts

When immersing parts in solvents, do you pull them out slowly? **Yes/No**

Removing parts from solvent baths too quickly will create splashes and allow rapid evaporation.

When cleaning parts with mineral spirits solvent, do you use a solvent sink rather than a dunk bucket or dip tank? **Yes/No**

A solvent sink cleans parts more effectively and is easier to use than buckets or tanks. Also, solvents are less likely to spill or evaporate if you use a solvent sink. If you lease a solvent sink, the raw material supply, tank maintenance, and waste removal and management are often included in the price of the service. However, the service can be costly.

If you use a solvent tank, do you keep it covered when not in use? **Yes/No**

A lid on an open tank will help prevent evaporation, especially if the tank is heated. A sliding lid instead of one that lifts up will be more effective.

Does a hazardous waste hauler collect your solvent waste for recycling or treatment? **Yes/No**

If you own your parts-cleaning equipment and transport solvent waste offsite for recycling or treatment, you must have a registered hazardous waste hauler remove your waste.

Do you own solvent recovery equipment, such as a distillation unit? **Yes/No**

If your shop is large and you own your solvent parts-cleaning equipment, an on-site solvent recovery system may be cheaper than off-site recycling.

Water-Based (Aqueous) Hazardous Waste

In auto repair shops, aqueous hazardous waste refers to water-based detergent wastes and waste sump solids that are hazardous because they contain caustics, high levels of metals, and/or oily dirt. These wastes are typically generated by engine parts-washing equipment.

Do you use the following equipment for engine cleaning operations?

	No	Yes	
Jet spray washer	<input type="checkbox"/>	<input type="checkbox"/>	If you answered "yes" to any of the choices, then you probably generate aqueous detergent waste, aqueous caustic waste, and/or waste sump solids.
Hot tank	<input type="checkbox"/>	<input type="checkbox"/>	
Spray cleaner	<input type="checkbox"/>	<input type="checkbox"/>	

Can you replace your aqueous cleaning equipment (like hot tanks and jet spray washers) with a dry system such as a high temperature oven? **Yes/No**

In some larger shops, a high-temperature "burn out" oven can be used to remove oil, dirt, and grease from parts. The oven burns off the oil and then burns off airborne particles before release into the atmosphere. The dry ash residue left on the parts is removed with shotblasters, machines that bombard the parts with small glass beads or metal shot. Often the ash can be sent to a sanitary landfill.

Do you use a detergent-based cleaning solution instead of a caustic-based solution when you are cleaning aluminum engine parts? **Yes/No**

If a detergent-only solution is used, the waste solution may still be hazardous if it has dissolved metals or oily dirt; you may need to have the waste tested to make sure it is not hazardous. Pre-washing parts can reduce contamination of the washing solution. Or, try using two hot tanks, one with detergent-only solution for aluminum engine parts, and one with a caustic solution for all other types of engine parts.

Do you use a drip tray on hot tanks to minimize the amount of waste spilled on the floor? **Yes/No**

Place an inexpensive stainless steel tray or pan next to the tank and drain the parts in the tray for a few minutes after cleaning them. Carefully empty any detergent remaining in the tray back into the tank.

Are the hot tank(s) and/or jet spray washer(s) located near the auto service bays? **Yes/No**

Designate a set of bays as primarily intended for service requiring hot tank or jet spray parts cleaning and locate the equipment near these bays. This will help reduce spills and drips within your shop, reducing floor-cleaning waste.

Do you pre-rinse dirty engine parts (two-stage cleaning process)? **Yes/No**

To extend the life of the cleaning solution and clean your parts faster, consider an extra tank which would contain partially spent solution for rinsing most of the dirt and grime off the parts. Or, use a non-heated tank with partially spent solution for pre-rinsing.

Do you remove the sludge and solids from your cleaning equipment and reactivate the remaining solution to use it again? **Yes/No**

If your hot tank does not have heating elements on the bottom of the tank, you can remove the solids from the solution to extend the life of the cleaning solution. If the cleaning solution has become weak, you can test the solution and add more detergent or caustic material as needed.

Do you screen out sludge and solids before they reach the waste sump? **Yes/No**

Sludge and solids are a major contaminant from auto repair shops to the sewer system. Screen solids before they reach your sump to reduce these wastes and future sump cleaning costs.

Do you lease a hot tank(s)? Do you lease a jet spray washer(s)? **Yes/No**

A leased system can be easier to use since new detergent compounds, tank maintenance, and waste management are included in the price of the service. Leasing equipment often appeals to small- and medium-sized shops since equipment purchase can be costly. The cost of leasing varies.

Do you own your hot tank(s)? Do you own your jet spray washer(s)? **Yes/No**

Purchasing your own equipment is another option for engine parts cleaning, often favored by larger shops. However, you must make certain that your waste handling storage, transportation, and treatment techniques are safe and legal.

Do you recycle your radiator flush water? **Yes/No**

If your shop is primarily a radiator shop, a radiator flush booth may help reduce the amount of wastewater you generate.

Section V: Regulatory Levels of Hazardous Waste in Kansas

Small Quantity Generator (SQG)

Small quantity generators in the state of Kansas are those generators that:

- create less than 55 pounds of hazardous waste in a one-month period; and
- accumulate no more than 2200 pounds of hazardous waste, no more than 2.2 pounds of acutely hazardous waste, or no more than 55 pounds of debris and cleanup materials from acutely toxic waste spills.

SQGs are required to handle the hazardous waste they generate in an environmentally sound manner and they are not subject to any notification or reporting requirements. Small quantity generators may use any of the following alternatives to handle their hazardous wastes when disposed of in quantities less than 25 kg: recycling, reuse, reclamation, disposal at a permitted sanitary landfill, neutralization and discharge to the sanitary sewer only with permission of the city, and disposal at a permitted hazardous waste disposal facility.

Hazardous wastes such as solvents, sludges, and pesticides are not suitable for discharge to the sanitary sewer. Small quantities of hazardous waste may NOT be disposed of by dumping on the surface of the ground or into surface waters, burying in the ground at an unpermitted site, or by using wastes such as solvents for killing weeds. The small quantity generator regulations are located at K.A.R. 28-31-4(m).

Kansas Generators

Kansas generators are those that:

- create between 55 and 2200 pounds of hazardous waste in a calendar month;
- generate no more than 2.2 pounds of acutely hazardous waste or 55 pounds of debris and cleanup materials from acutely toxic waste spills; and
- accumulate no more than 2200 pounds of hazardous waste, no more than 2.2 pounds of acutely hazardous waste, or no more than 55 pounds of debris and cleanup materials from acutely hazardous waste spills.

Kansas generators must comply with the following regulatory requirements:

- A. Determine which wastes generated by the facility are hazardous.
- B. Obtain an EPA identification number by submitting a hazardous waste notification form to the Kansas Department of Health and Environment.
- C. Prepare a manifest for all shipments of hazardous waste. Package, label, mark, and placard all shipments of hazardous waste in accordance with pre-transportation requirements.
- D. Prepare and maintain the following records for three years:
 - 1) A signed copy of all manifests initiated
 - 2) Annual and biennial report(s)
 - 3) Manifest exception report(s)
 - 4) Hazardous waste analyses
 - 5) Weekly inspection reports
- E. Meet all storage requirements for containers and/or tanks.
- F. Meet emergency preparedness requirements.
- G. Report all international shipments of hazardous waste to the Kansas Department of Health and Environment and the Environmental Protection Agency.

EPA Generators

EPA generators meet any of the following requirements:

- create or accumulate more than 2200 pounds of hazardous waste in a calendar month at their facility,
- generate or accumulate 2.2 pounds or more of acutely hazardous waste, or
- generate or accumulate more than 55 pounds of hazardous waste and debris from cleanup of hazardous waste spills.

EPA generators are subject to all regulations for Kansas generators, except for the emergency preparedness requirements, as well as the following additional requirements:

- A. Provide a personnel training program to ensure that facility personnel are able to respond effectively to a hazardous waste emergency. The program must include—
 - 1) A director trained in hazardous waste procedures
 - 2) Instruction which teaches facility personnel about the location of emergency response and monitoring equipment; maintenance and operation of such equipment; communications procedures and response procedures for fires, explosions, and contamination incidents (Training must be completed within six months after an employee enters a position.)
 - 3) An annual review of the initial training

4. Development of job titles, job descriptions, description of training to be given each job title, and record of all training which occurs
- B. Adequately provide for preparedness and prevention with the following precautions:
- 1) Proper maintenance of facilities to minimize releases of hazardous waste.
 - 2) Where appropriate for the type of waste generated, provide an internal communications or alarm system, a telephone or two-way radio, and fire extinguishing and control equipment. All required equipment must be tested and maintained to ensure proper operation.
 - 3) Provide personnel working directly with hazardous waste with immediate access to communications and alarm equipment.
 - 4) Maintain aisle space sufficient to allow passage of personnel and fire, spill control, and decontamination equipment.
 - 5) Make arrangements with the local hospital, police department, fire department, and emergency response team to familiarize them with the plant layout and hazards involved with the wastes generated. Such arrangements should be documented.
- C. Prepare a contingency plan and implement emergency procedures to ensure that releases of hazardous waste are properly handled. The contingency plan must provide the following:
- 1) A description of the actions facility personnel must take to respond to a release.
 - 2) A description of the arrangements made with local authorities for emergency services.
 - 3) Designation of primary and secondary emergency coordinators and listing of their addresses and phone numbers. Assure that an emergency coordinator is on site or on call at all times.
 - 4) A list of all emergency equipment on site, its capabilities, and its location.
 - 5) An evacuation plan where the potential need for evacuation exists.
 - 6) Copies of the contingency plan to be maintained at the facility and submitted to the local police department, fire department, hospital, and emergency response team
 - 7) Periodic review and up-to-date maintenance as contingency plan.

The above list is an abbreviated version of the requirements that hazardous waste generators must fulfill to be in compliance. For a complete listing of requirements associated with hazardous waste, please consult the *Kansas Hazardous Waste Generator Handbook* and the *Kansas Statutes Annotated*, Article 34, and the *Administrative Regulations*, Article 31.

Section VI: Vendor List

Waste Oil Heaters

Missouri Clean Energy Systems

Rt. 2, Box 228
Hale, MO 65591-9714
800-272-7015, 800-565-4023
Fax: 660-565-2964
Contact Person: John Hoerr

waste oil furnaces, waste oil air conditioners

Shenandoah Manufacturing Company

1070 Virginia Ave
Harrisonburg, VA 22802
800-476-7436
Fax: 800-434-3068
Contact Person: Ron Foskey

waste oil commercial space heaters, boilers

Oil Filter Recyclers and Spill-Related Cleanup Vendors

Autop North America

P.O. Box 150146
Nashville, TN 37215-7434
615-255-7434
Fax: 615-255-7439
Contact Person: Michael Berg

oil and fuel filter recycling machine,
environmental lubrication equipment,
environment vehicle exhaust gas systems,
automated batch cleaning

Black Gold Corporation

240 Great Circle Road # 344
Nashville, TN 37228-1707
615-251-0680
Fax: 615-251-0682
E-mail/ Internet: blackgold@netcbi.com
Web site: www:blackgoldcorp.com
Contact Person: Chris Gansel

used oil recycling equipment, space heat
and water heat

Enviro-Pak Compactors

4308 W. Admiral Doyle Drive
New Iberia, LA 70560
800-737-5533

Fax: 337-367-9956

Contact Person: Mike Resweber

crushers of bottle/tubes, drums, lumps, oil filter, vial and oil cans

Herkules Equipment Corp.

2760 Ridgeway Court
Walled Lake, MI 48390-1662
800-444-4351

Fax: 248-960-7109

Contact Person: Todd Gamble/Mike Durand

spray gun cleaning equipment, oil filter crusher, paper compactors, dust extraction systems, can crushers, lifts, infrared curing

A E West Petroleum

P.O.Box 15217
Kansas City, KS 66115
913-621-6521

Contact Person: Whit Ruby

oil mops and accessories, used oil filter collection and processing

OBERG International, Inc.

505 Cedar Ave. Suite B-1
Marysville, WA 98270
360-658-7521, 800-848-8228

Fax: 360-653-9619

Contact Person: David Ledoux

oil filter presses, oil filter crushers, oil filters balers, drum crushers

RAASM USA

P.O.Box 150146
Nashville, TN 37215
615-255-7434

Fax: 615-255-7439

Contact Person: Jim Rau/ Michael Berg

environmentally friendly lubrication equipment and devices, exhaust systems, oil filter recycling machines, self-contained oil extractors

Benko Products, Inc.

5350 Evergreen Pkwy
Sheffield Village, OH 44145
440-934-2180

Fax: 440-934-4052

E-mail/Internet: Lbenko@ix.netcom.com

Contact Person: Laurie Benko

drum crushers and packers, spill containment pallets, industrial ovens

New Pig Corporation

One Pork Ave.

Tipton, PA 16684-0904

814-684-0101

Fax: 814-684-0608

E-mail/ Internet: hothogs@newpig.com

Contact Person: Carl Decaspers

manufacturing and merchandise of products for industrial and hazardous materials leak and spill response problems

Parts Washers

Contrast Equipment Company

1449 N. Topping

Kansas City, MO 64120

816-241-2412

Fax: 816-241-4134

Contact Person: Bob Borman

solvent reclamation, painting equipment, parts washer, oil skimmers, pretreatment

Corbett Industries

P.O.Box 212 39 Hewson Ave.

Waldwick, NJ 07463-1819

201-445-6311 ext. 22

Fax: 201-445-6316

Contact Person: Jim Corbett

industrial ovens, dryers, furnaces, kilns, air heaters, fume incinerators, spray booths, parts-cleaning equipment, pre-dryer systems, heat recuperation, packaged burner and control systems, monitor LELs, custom equipment, heat-cleaning ovens

Graymills Corporation

400 N. Bluff Road

Collinsville, IL 62234

773-248-6825

Fax: 773-477-8673

E-mail/ Internet: chemsol@wwnet.com

Contact Person: Kevin Weinacht

coolant pumps, solvent and aqueous cleaning, spray cabinets, cleaning in tank with agitation, pumping systems, aqueous parts cleaners, cleaning fluids

Kleer-Flo Company

15151 Technology Drive

Eden Prairie, MN 55344-2294

800-328-7942, 952-934-2555

Fax: 952-934-3909

Contact Person: Robert Loing

metal preparation chemicals, cleaners, parts washers, antifreeze recycling, brake washers, solvent and aqueous recyclers

Metal Cleaning & Finishing, Inc.

507 East Archer
Tulsa, OK 74120
918-585-1291

Fax: 918-585-5672

Contact Person: Bob Wills

parts washers distributor, membrane technology for aqueous cleaner, metal cleaning and finishing equipment, recycling, oily water reclamation and disposal

Process & Control Products

Box 481698
Kansas City, MO 64148-1698
816-942-8090

Fax: 816-942-8095

Contact Person: James Moran

aqueous parts cleaner and washer, ultrasonic cleaners, drying systems, fluid recycling equipment for aqueous parts cleaners, degreasers

Safety-Kleen Corp.

4801 W Irving
Wichita, KS 67209
316-942-5001

Fax: 316-942-5393

Contact Person: Scott Vincent

solvent and parts cleaner for cleaning and degreasing, liquid waste recycler

The Hotsy Equipment Company

5342 Winner Road
Kansas City, MO 64127
816-483-1580

Fax: 816-483-1651

Contact Person: Jake Schlicht

parts washers equipment, aqueous cleaners, water recycle systems, ultra filtration systems, oil/water separators

U S Polychemical Corporation

584 Chestnut Ridge Road
Chestnut Ridge, NY 10977
914-356-5530 ext.360

Fax: 914-356-6656

Contact Person: Mark Paul

parts washers, ultrasonic units, automatic dryers, solvent cleaning systems, zero VOC aqueous chemicals, site solvent replacement chemicals, zero VOC purge materials, HAPS-free paint strippers

Antifreeze Recyclers

BG Products, Inc.

P.O. Box 1282

Wichita, KS 67201

316-265-2686

Fax: 316-265-1082

E-mail/ Internet: bglab@feist.com

Contact Person: Dennis Rosson

antifreeze recycling units, power flush and fluid exchange systems

Finish Thompson

921 Greengarden Road

Erie, PA 16501

814-455-4478

Fax: 814-455-8518

Contact Person: Dennis Rahill

equipment for recycling waste solvent, coolant and antifreeze

FPPF Chemical Co., Inc.

117 W. Tupper St.

Buffalo, NY 14201-2193

800-735-3773

Fax: 716-856-0750

E-mail/ Internet: fppf@buffnet.net

Contact Person: Anthony Tucci

antifreeze recycling equipment, support chemicals, additives

Hi Tech Ind., Inc.

17029 Devonshire St. #124

Northridge, CA 91325

800-553-0509, 818-993-9960

Fax: 818-993-4317

E-mail/ Internet: hitech@hi-techind.com

www.hi-techind.com

Contact Person: John Randall

antifreeze recycling equipment, environmental products, automotive chemicals, wholesale antifreeze

Kleer-Flo Company

15151 Technology Drive

Eden Prairie, MN 55344-2294

800-328-7942, 952-934-2555

Fax: 952-934-3909

Contact Person: Robert Loing

metal preparation chemicals, cleaners, parts washers, antifreeze recycling, brake washers, solvent and aqueous recyclers

Pittsburg Genie
P.O Box 230
Eudora, KS 66025
1-800-634-1885, 785-542-1230
Fax: 785-542-1816
Contact Person: Richard Campbell

on-site and off-site antifreeze recycling

Solvent Stills

Contrast Equipment Company
1449 N. Topping
Kansas City, MO 64120
816-241-2412
Fax: 816-241-4134
Contact Person: Bob Borman

solvent reclamation, painting equipment,
parts washer, oil skimmers, pretreatment

Finish Thompson
921 Greengarden Road
Erie, PA 16501
814-455-4478
Fax: 814-455-8518
Contact Person: Dennis Rahill

equipment for recycling waste solvent,
coolant and antifreeze

PBR Industries
143 Cortland Street
Lindenhurst, NY 11757
800-842-1630, 631-226-2930
Fax: 631-226-3125

solvent recycling, spray run cleaners,
compactors, absorbents, oil/grease stain
remover, odor suppressant, fire extinguish-
ers, lubricants for compressors

Solvent Kleen
131.5 Lynnfield Street
Peabody, MA 01960
508-531-2279
Fax: 508-532-9304
Contact Person: Itamar Kutai

paint strippers replacement for methylene
chloride, solvent recovery systems,
non-hazardous degreasing solvents

Spill Prevention and Containment Products

Justrite Manufacturing Co

2454 Dempster Street
Des Plaines, IL 60016-5315
847-298-9250 or 800-798-9250

drum fill gauges, safety cans, drum vents

Oil Mop

Highway 13 South
P.O. Box 404
Pine Prairie, LA 70576
337-599-3000
Fax: 337-599-2882

oil mops and accessories

New Pig Corporation

One Pork Avenue
Tipton, PA 16684-0904
800-684-0101
Fax: 814-684-0608
E-mail/Internet: hothogs@newpig.com
Contact Person: Carl Decaspers

spill prevention and cleanup equipment

Iowa Gold Distributing

P.O. Box 370
Alburnett, IA 52202
319-842-2536
Fax: 319-438-6123

oil mops and accessories, spill cleaning equipment

OBERG International, Inc.

505 Cedar Ave. Suite B-1
Marysville, WA 98270
360-658-7521, 800-848-8228

oil filter presses, crushers, balers, and drum crushers



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