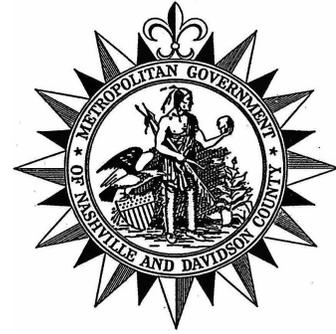
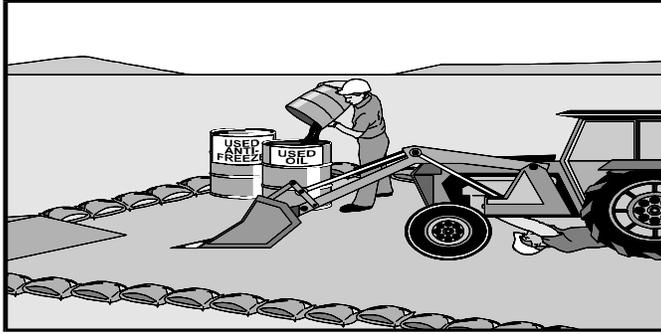


ACTIVITY: Vehicle and Equipment Maintenance and Repair

ICP – 04



Targeted Constituents				
● Significant Benefit		▸ Partial Benefit		○ Low or Unknown Benefit
○ Sediment	● Heavy Metals	○ Floatable Materials	○ Oxygen Demanding Substances	
○ Nutrients	● Toxic Materials	● Oil & Grease	○ Bacteria & Viruses	○ Construction Wastes
Implementation Requirements				
● High		▸ Medium		○ Low
○ Capital Costs	▸ O & M Costs	▸ Maintenance		▸ Training

Description

Procedures and practices to reduce the discharge of pollutants to the storm drain system or to watercourses as a result of vehicle and equipment maintenance by conducting these activities off-site or in a designated area designed to contain spills and prevent run-on or runoff. This management practice is likely to create a significant reduction in heavy metals, toxic materials, and oil and grease.

Approach

Vehicle or equipment maintenance is a potentially significant source of stormwater pollution. Activities that can contaminate stormwater include engine repair and service (parts cleaning, spilled fuel, oil, etc.), replacement of fluids, and outdoor equipment storage and parking (dripping engines). For further information on vehicle or equipment servicing, see ICP-02, Vehicle and Equipment Fueling, and ICP-03, Vehicle and Equipment Washing and Cleaning.

- Use centralized, covered, off-site maintenance facilities whenever practical.
- Locate on paved surfaces where practical (Preferably paved with concrete rather than asphalt).
- Use berms to protect maintenance areas from run-on.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Do not dump fuels and lubricants onto the ground.
- Do not place used oil in a dumpster.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Do not bury used tires.

- Repair leaks of fluids and oil immediately as soon as possible.
- Clean leaks, drips, and other spills with as little water as possible. Use rags for small spills, a damp mop for general cleanup, and dry absorbent material for larger spills. Use the following three-step method for cleaning floors:
 1. Clean spills with rags or other absorbent materials.
 2. Sweep floor using dry absorbent material.
 3. Mop floor. Mop water may be discharged to the sanitary sewer via a toilet or sink.
- Provide spill containment dikes or secondary containment (swales, berms, walls, etc.) around stored oil and chemical drums.
- Maintain an adequate supply of spill cleanup materials in designated areas.
- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.
- Keep equipment clean, don't allow excessive build-up of oil and grease.
- Keep drip pans or containers under the areas that might drip.
- Do not change motor oil or perform equipment maintenance in non-appropriate areas. Use a vehicle maintenance area designed to prevent stormwater pollution.
- Inspect stored equipment for leaks on a regular basis.
- Segregate liquid, solid and hazardous wastes for easier recycling and may reduce treatment costs. Keep hazardous and non-hazardous wastes separate, do not mix used oil and solvents, and keep chlorinated solvents (like 1,1,1-trichloroethane) separate from non-chlorinated solvents (like kerosene and mineral spirits). Many products made of recycled (i.e., refined or purified) materials are available. Engine oil, transmission fluid, antifreeze, and hydraulic fluid are available in recycled form. Buying recycled products supports the market for recycled materials.
- If possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. For example:
 - Use non-caustic detergents instead of caustic cleaning agents for parts cleaning (ask your supplier about alternative cleaning agents).
 - Use detergent-based or water-based cleaning systems in place of organic solvent degreasers. Wash water may require treatment before it can be discharged to the sewer. Contact your local sewer authority for more information.
 - Replace chlorinated organic solvents (1,1,1-trichloroethane, methylene chloride, etc.) with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check list of active ingredients to see whether it contains chlorinated solvents. The "chlor" term indicates that the solvent is chlorinated.

- Choose cleaning agents that can be recycled.
- Contact your supplier or refer to trade journals for more waste minimization ideas.
- Make sure incoming vehicles are checked for leaking oil and fluids.
- Clean yard storm drain inlet(s) regularly and especially after large storms.
- Do not pour materials down drains or hose down work areas; use dry sweeping. Infrequent steam or pressure wash is appropriate if wash water is collected and/or treated.
- Store idle equipment under cover.
- Drain all fluids from wrecked vehicles into pans or other containers instead of letting them drain on the ground.
- Recycle greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic, and transmission fluids.
- Minimize use of solvents. Switch to non-toxic chemicals for maintenance when possible.
- Parts are often cleaned using solvents such as trichloroethylene, 1,1,1-trichloroethane or methylene chloride. Many of these cleaners are harmful and must be disposed of as a hazardous waste. Cleaning without using liquid cleaners (e.g. wire brush) whenever possible reduces waste. Prevent spills and drips of solvents and cleansers to the shop floor. Do all liquid cleaning at a centralized station so the solvents and residues stay in one area. Locate drip pans, drain boards, and drying racks to direct drips back into a solvent sink or fluid holding tank for re-use.
- Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents.
- Be especially careful with wrecked vehicles, whether you keep them indoors or out, as well as vehicles kept on-site for scrap or salvage. Wrecked or damaged vehicles often drip oil and other fluids for several days.
 - As the vehicles arrive, place drip pans under them immediately, even if you believe that the fluids have leaked out before the car reaches your shop.
 - Build a shed or temporary roof over areas where you park cars awaiting repair or salvage, especially if you handle wrecked vehicles. Build a roof over vehicles you keep for parts.
 - Drain all fluids, including air conditioner coolant, from wrecked vehicles and “part” cars. Also drain engines, transmission, and other used parts.
- Paint signs on storm drain inlets to indicate that they are not to receive liquid or solid wastes.
- Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate

stormwater. Most municipalities prohibit or discourage disposal of these items in solid waste facilities. Place the oil filter in a funnel over the waste oil recycling or disposal collection tank to drain excess oil before disposal. Oil filters can be crushed and recycled. Ask your oil supplier or recycler about recycling oil filters.

- If the vehicle or equipment is to be stored outdoors, oil and other fluids should be drained first.
- There are several commercial available materials and devices that can temporarily seal (some magnetically) storm or sanitary drains. Place these in conspicuous locations proximate to the drains and train personnel in their use for spills and leaks.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.
- For a quick reference on disposal alternatives for specific wastes see Table CP-15 in the Employee/Subcontractor Training BMP fact sheet.
- Collect leaking or dripping fluids in fluid specific drip pans or containers. Fluids are easier to recycle if kept separate.
- Keep a drip pan under the vehicle while you unclip hoses, unscrew filters, or remove other parts. Use a drip pan under any vehicle that might leak while you work on it to keep splatters or drips off the shop floor.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- Train employees and subcontractors in proper maintenance and spill procedures. This should include periodic review of the Spill Prevention Control and Countermeasures (SPCC) Plan.

Maintenance

- Maintain waste fluid containers in leak proof condition.
- Vehicle and equipment maintenance areas shall be inspected regularly.

Limitations

- Space and time limitations may preclude all work being conducted indoors.
- It may not be possible to contain and clean up spills from vehicles/equipment brought on-site after working hours.
- Drain pans (usually 1 ft. (0.3 m) x 1 ft. (0.3 m)) are generally too small to contain antifreeze, which may gush from some vehicles, so drip pans (3 ft. (0.91 m) x 3 ft. (0.91 m)) may have to be purchased or fabricated.
- Dry floor cleaning methods may not be sufficient for some spills. Use three-step method instead.

- Identification of engine leaks may require some use of solvents.

**Primary
References**

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**Subordinate
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Hazardous Waste Reduction Assessment Handbook – Automotive Repair Shops; DTSC, 1988.

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