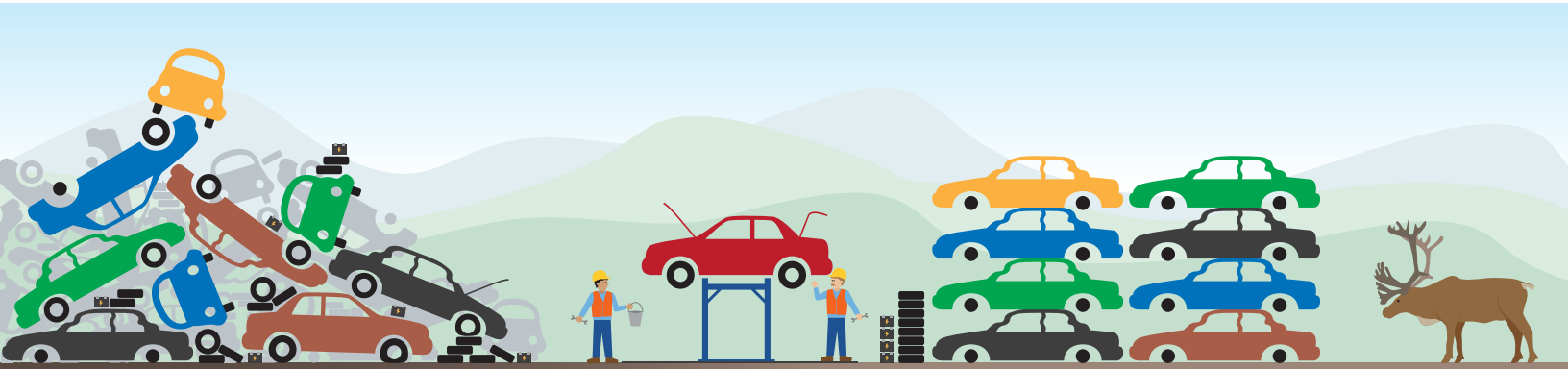


Protecting the Land

A Practical Guide to ELV and Sustainable Waste Management in Nunavut

August 2017



Quick-Reference Instruction Sheets:

De-Polluting ELVs

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PLEASE NOTE:

To find reference notes for sources of information used in these Quick-Reference Instruction Sheets, please refer to the full-length document titled ***Protecting the Land – End-of-life Vehicle and Appliance Management for Northern and Remote Communities***, which can be found at:

scoutenvironmental.com/projects/tundra-take-back-nunavut

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Automotive Battery

Description

Lead-acid batteries supply electricity to a vehicle. This electricity is used to power lighting, accessories and other¹¹ electrical systems, even when the car is not running¹².

It is very important to remove the battery as the first step in vehicle dismantling.

Hazards

- An average car battery contains 18-20 pounds of lead, a known human toxin.
- Lead-acid car batteries contain about 10 pounds of sulfuric acid which is extremely corrosive and potentially harmful to the environment.
- Batteries that are damaged or missing a cap can leak acid that can severely damage your eyes and skin. Always wear gloves and safety glasses when handling batteries¹³.
- Battery terminals are made of lead and must be properly managed.

Stockpiling and storage

There are several options for storing and transporting batteries. The first is a tote; a heavy, leak-proof, polyethylene container or a Quatrex bag. Batteries should be placed upright in the tote and then stored indoors to prevent cracking and leaking.



If plastic totes or Quatrex bags are not available, batteries can be stacked upright on a wooden pallet, and can be stacked up to three layers high on a single pallet. Thick layers of cardboard should be placed between each layer to prevent the batteries from coming into contact with each other. For shipment, the package should be wrapped several times with plastic shrink wrap.

In either case, inspect the batteries for cracks and leaks every week and neutralize any acid spills with lime or bicarbonate soda¹⁴.

REMOVAL STEPS

1. Remove the negative battery terminal first by loosening the 10 mm nut with a wrench. Undo the cable from its clip and put the cable to the side.



2. Lift up the plastic cover on the positive battery terminal and loosen the nut with a wrench. Remove the positive post from the battery and put the cable to the side.



3. Use a pair of wirecutters to clip off the positive and negative cable terminals, which contain lead.



4. Remove the bolts on the bracket that holds the battery in place. Remove the bracket and lift the battery out of the vehicle.





Refrigerants/Freon

Description

Refrigerants (i.e., Freon) are found in vehicle air conditioning systems. These systems usually contain HFC134a, but some older vehicles built before 1996 contain CFC-12. This refrigerant has been banned because of its significant depleting impacts on the Earth's ozone layer¹⁵.

Hazards

- CFC-12 is a powerful greenhouse gas that has serious depleting impacts on the ozone layer¹⁶.
- HFC-134a is also an important greenhouse gas that contributes to global warming.
- Refrigerants must be removed by a certified technician.

Stockpiling and storage

Refrigerants must be stored in approved, refillable storage containers and never vented to the atmosphere. Storage containers must be properly labelled and should be replaced or hydrostatically tested every five years¹⁷.



REMOVAL STEPS

1. Connect portable refrigerant removal device couplers to the low and high side refrigerant service ports.



2. Start the refrigerant removal machine and remove all Freon gas from the vehicle.



3. The certified refrigerant technician must record the amount of refrigerant removed from each vehicle.



4. Use a marker to clearly label the vehicle once the refrigerants are removed.



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Brake Fluid

Description

Brake fluid is a special type of hydraulic fluid used in brake systems. It is used to transfer force into pressure, and to amplify the force of the brakes.

Hazards

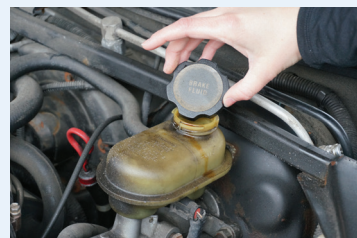
- Brake fluid is not considered hazardous waste unless it contains additives like chlorinated compounds.
- If brake fluid has become contaminated with brake cleaner or other solvents, it is also considered hazardous waste¹⁸.
- Brake fluid is flammable, toxic and corrosive. Keep it away from fires and electric outlets and wear personal protective equipment as needed¹⁹.

Stockpiling and storage

The fluid should be transferred to a plastic or steel drum designated for brake fluid only. Due to chlorinated compounds that may be found in some brake fluids, **it is recommended that brake fluid not be mixed with other waste oils** unless your disposal company says it is okay to do so².

REMOVAL STEPS

1. Remove the cap from the brake fluid cylinder.



2. Use a dedicated hand pump to remove the brake fluid from the reservoir.



3. Transfer the fluid to a designated container for storage.



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Power Steering Fluid

Description

Power steering fluid is an important part of the power steering system that helps the driver to easily turn the steering wheel. This fluid can be removed, stored and disposed of with other used oils.

Hazards

- Inhalation or contact with skin or eyes may cause irritation. Be sure to use personal protective equipment as needed.
- Seek medical attention if the product is ingested²¹.

Stockpiling and storage

Waste oil (such as power steering fluid) can be stored in steel drums or plastic containers that have properly fitting lids. These containers should be kept in the covered dismantling area and inside a secondary containment unit if possible and should be kept off the ground on a pallet. According to the British Columbia Ministry of Environment, steel drums are recommended because plastic containers tend to degrade over time and could potentially cause a leak or spill²².



REMOVAL STEPS

1. Remove the cap from the power steering fluid reservoir and feed the hose from a hand pump into the reservoir.



2. Pump out the power steering fluid. This hand pump can also be used for other oils.



3. Transfer the fluid to a plastic or steel storage container. Other waste oils can be stored in the same drum.



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Windshield Washer Fluid

Description

Windshield washer fluid helps the wiper blades clean dirt and debris off a vehicle's windshield. Clean washer fluid can often be re-used or even sold.

Hazards

- Windshield washer fluid contains methanol, which is a volatile organic compound (VOC). On hot summer days, VOCs can contribute to smog.
- The methanol in windshield washer is flammable when it is not diluted.
- Methanol is poisonous even when diluted²³.

Stockpiling and storage

Transfer the windshield washer fluid to a dedicated container. Do not mix the fluid with any other materials, including engine oil, antifreeze, brake fluid and transmission fluid. If the washer fluid is clean, it can be given away or sold for re-use²⁴.



REMOVAL STEPS

1. Remove the cap from the washer fluid reservoir.



2. Feed the hose from a dedicated hand pump into the reservoir.



3. Pump out the windshield washer fluid.



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Mercury Switches (Convenience Light)

Description

Some cars and trucks built before January 1, 2003 were manufactured with small amounts of liquid mercury. The mercury is contained in metal casings called “mercury switches”. These switches can be found in convenience light assemblies under the hood and/or trunk of a vehicle. In rare cases, mercury switches are also used to light the vanity mirror on the sun visor.

Hazards

- If mercury switches are not removed before a vehicle is crushed, shredded and recycled into new steel, it can be released into the environment.
- Mercury that is not properly managed can pollute the environment and enter the food chain.
- Mercury is corrosive and must be shipped by ground or sea as a hazardous material.

Stockpiling and storage

Place the mercury switch in a plastic collection container supplied by the Switch Out program. These pails are approved for the storage and shipment of mercury.



REMOVAL STEPS

There are different styles of convenience light assemblies and the removal steps will be different for each one. Visit www.switchout.ca to find more detailed switch removal instructions.

1. Locate the convenience light assembly and unplug it from the power supply.



2. Remove the plastic cover.



3. Use a flathead screwdriver or your fingers to pry out the small silver mercury switch underneath the lightbulb.



4. If the switch can't be removed, place the whole assembly in the Switch Out collection container.



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Mercury Switches (ABS)

Description

Gravity-operated mercury switches can also be found in anti-lock braking system (ABS) sensor modules. In these switches, the mercury is contained in metal casings and embedded in a plastic and resin casing. ABS sensors can typically be found in the drive tunnel, below the rear seat on the floor pan, in the right front wheel apron, and on the left frame rail below the driver's seat.

Hazards

- If mercury switches are not removed before a vehicle is crushed, shredded and recycled into new steel, mercury can be released into the environment.
- Mercury that is not properly managed can pollute the environment and enter the food chain.
- Mercury is corrosive and must be shipped by ground or sea as a hazardous material.

Stockpiling and storage

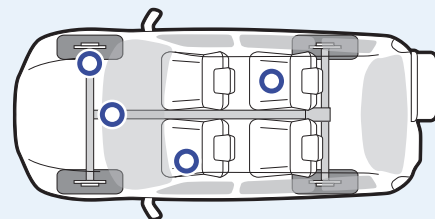
Place the entire ABS sensor module in a plastic collection container supplied by the Switch Out program. For your safety, please don't try to remove the mercury switches from the ABS sensor! Switch Out pails are approved for the storage and shipment of mercury.



REMOVAL STEPS

Detailed switch removal instructions can be found at www.switchout.ca.

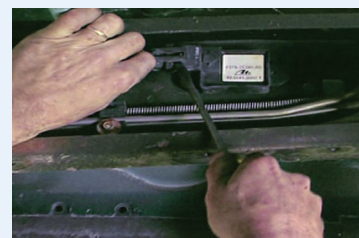
1. Find out if your vehicle has a mercury-containing ABS sensor and check to see where it is located.



2. If needed, place the vehicle on a lift making sure it is secure.



3. Release the clips and disconnect the wire harness.



4. Remove two bolts to release the sensor.



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Antifreeze/Coolant

Description

Antifreeze (also called coolant) is a coloured fluid found in a vehicle's radiator. Radiators are normally filled with 50% antifreeze and 50% water. The antifreeze prevents the water from freezing in cold temperatures and boiling in hot temperatures²⁵.

Hazards

- Waste antifreeze contains heavy metals such as lead, cadmium, and chromium²⁶.
- Ingesting or inhaling glycol (found in antifreeze) can lead to throat and respiratory problems. High doses can lead to respiratory failure and coma²⁷.

Stockpiling and storage

Carefully pour the antifreeze into a dedicated plastic or steel container for storage.

REMOVAL STEPS

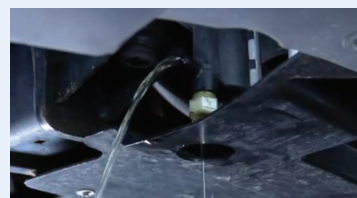
1. Ensure the engine is completely cool before attempting to remove the antifreeze.



2. Remove the radiator cap to release any pressure in the cooling system²⁸. The antifreeze can be removed using a hand pump, or drained from below.



3. Lift the ELV making sure it is secure.



4. Place a drain pan below the radiator and release the antifreeze by opening the drain valve.



5. The antifreeze can also be released by driving a spike into the radiator tank.



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Engine Oil

Description

Engine oil (or motor oil) is used to lubricate internal combustion engines. The main function of the oil is to reduce wear on moving parts, inhibit corrosion, improve sealing, and cool the engine by carrying heat away from moving parts²⁹.

Hazards

- Used motor oil contains heavy metals, contaminants and dirt and is considered hazardous waste.
- Oil that is improperly disposed of can migrate into surface and ground water. It takes only one gallon of oil to contaminate one million gallons of drinking water.
- Oil can also seriously harm aquatic plants and animals³⁰.

Stockpiling and storage

Waste oil can be stored in steel drums or plastic containers that have properly fitting lids. These containers should be kept in the covered dismantling area and inside a secondary containment unit if possible. According to the British Columbia Ministry of Environment, steel drums are recommended over plastic containers as plastic tends to degrade over time and could potentially cause a leak or spill³¹.



REMOVAL STEPS

1. Place the vehicle on a lift making sure it is secure.



2. Locate the engine oil tank on the underside of the vehicle and place a drain pan underneath.



3. Remove a nut to drain the tank.



4. In some cases, a hole will need to be drilled into the tank to release the oil.



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Transmission Fluid

Description

Transmission fluid is used in vehicles with automatic transmissions as well as some modern manual transmissions. It is typically colored red or green to distinguish it from motor oil and other fluids in the vehicle³². Transmission fluid can be difficult to remove, so extra care should be taken to ensure that spills don't happen during the drainage process³³.

Hazards

- Transmission fluid can be irritating to the eyes and skin. Avoid direct contact and use personal protective equipment.

Stockpiling and storage

Transmission fluid must be removed as part of the de-pollution process and can be mixed with other waste oils³⁴. Waste oil can be stored in steel drums or plastic containers that have properly fitting lids. These containers should be kept in the covered dismantling area and inside a secondary containment unit, if possible. According to the British Columbia Ministry of Environment, steel drums are recommended over plastic containers as plastic tends to degrade over time and could potentially cause a leak or spill³⁵.



REMOVAL STEPS

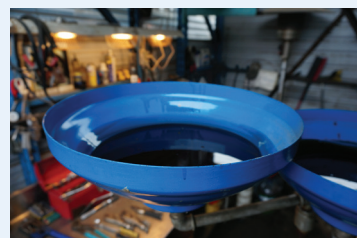
1. Place the vehicle on a lift making sure it is secure.



2. Place a drain pan underneath the transmission fluid reservoir. Remove a nut or drill a hole with a chisel gun to release the fluid.



3. Wait for the transmission fluid to fully drain into the pan.



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Differential Oil

Description

The differential is a component in all cars that helps them turn corners smoothly. Front-wheel-drive vehicles typically integrate the differential in the transmission housing and share the same fluid, but in rear-wheel-drive vehicles, the differential has its own housing. The lubrication inside this housing is called differential oil³⁶.

Hazards

- Differential oil can be irritating to the eyes and skin. Avoid direct contact and use personal protective equipment.

Stockpiling and storage

This fluid must be removed as part of the de-pollution process and can be mixed with other waste oils³⁸. Waste oil can be stored in steel drums or plastic containers that have properly fitting lids. These containers should be kept in the covered dismantling area and inside a secondary containment unit, if possible. According to the British Columbia Ministry of Environment, steel drums are recommended over plastic containers as plastic tends to degrade over time and could potentially cause a leak or spill³⁹.



REMOVAL STEPS

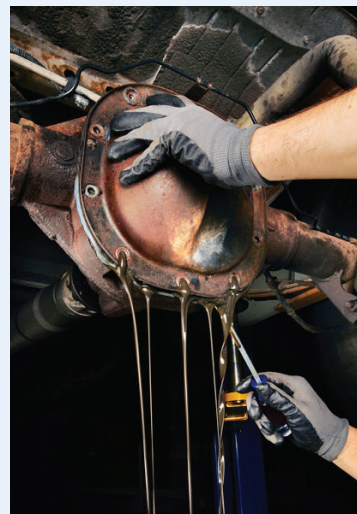
1. Place the vehicle on a lift making sure it is secure.



2. Place plastic dropcloth and wide catch pan underneath the differential housing.



3. Unscrew the housing bolts, leaving a couple of bolts on top loosely attached to hold the cover in place. Using a standard screwdriver, pry open the cover and allow the oil to drain out³⁷.



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Lead Wheel Weights

Description

Lead weights are clipped to the rims of automotive wheels in order to balance the tires. An average vehicle contains ten wheel weights (two on each of the four wheels and two more on the spare). These weights should be removed before the tires and rims are recycled.

Hazards

- If lead wheel weights are not removed, they can break down and contaminate surface, groundwater, and drinking water supplies⁴⁰.
- Lead particles in the environment can attach to dust and be carried long distances in the air. Lead can be harmful to humans when ingested or inhaled⁴¹.

Stockpiling and storage

Lead wheel weights and battery cable ends should be stored separately in covered metal or wooden containers⁴².



REMOVAL STEPS

1. Place the vehicle on a lift, making sure it is secure.



2. Remove the wheels from the vehicle using a wrench or impact wrench.



3. Remove the lead wheel weight from the rim using a special removal tool.



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Gasoline/Diesel

Description

Vehicles are powered by internal-combustion engines that convert the chemical energy available in fuel into mechanical energy. There are two common types of engines that accept different types of fuel: gasoline and diesel⁴³.

Hazards

- Fuel should be removed in a well-ventilated area to prevent the build up of fumes and decrease the risk of fire or explosion.
- If gasoline is contaminated with antifreeze, brake fluid, carburetor fluid or other substances, it can't be reconditioned.
Never mix these substances together⁴⁴
- Drain gasoline and diesel into separate containers.

Stockpiling and storage

Store gasoline and diesel fuel in separate containers or drums. Unless the fuel is contaminated with another substance, it can normally be re-used. Keep in mind that as gasoline ages, it tends to lose some of its ability to ignite in an engine and may require reconditioning⁴⁶.

REMOVAL STEPS

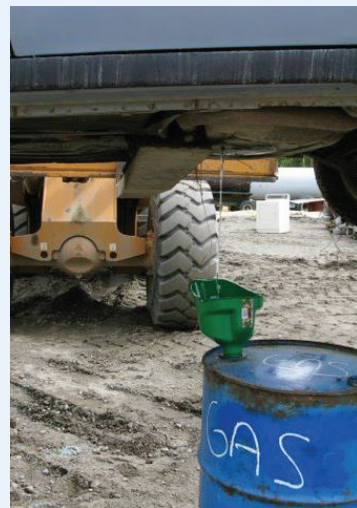
1. Place the vehicle on a lift, making sure it is secure.



2. If you have access to a gasoline evacuation pump, use it to punch a hole in the gas tank and extract the fluids.



3. If you do not have an evacuation pump, punch a hole in the lowest part of the tank using a non-sparking tool or spike. Let the fuel drain into a drum fitted with a large funnel⁴⁵.



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Vehicle de-pollution checklist

Use the following checklist to ensure that you've completely de-polluted the vehicle.

Under the hood

- ☐ Battery
- ☐ Refrigerants/Freon
- ☐ Brake fluid
- ☐ Power steering fluid
- ☐ Windshield washer fluid
- ☐ Mercury switch (convenience light)

In the trunk

- ☐ Mercury switch (convenience light)

Under the car

- ☐ Antifreeze/coolant
- ☐ Mercury switch (ABS)
- ☐ Engine oil
- ☐ Transmission fluid
- ☐ Differential oil
- ☐ Gasoline/diesel

Around the wheels

- ☐ Lead wheel weights

