Processing End-of-Life Vehicles:

A Guide for Environmental Protection, Safety and Profit in the United States-Mexico Border Area

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Introduction

Every year, vehicles that reach the end of their useful life end up as discarded vehicles. Often these vehicles are abandoned or stockpiled at poorly managed scrap yards. While it is unclear how many vehicles reach the end of their useful life annually, there are periodic regional or country-specific reports that provide estimates of discarded or stockpiled vehicles. These stockpiled vehicles have reached the end of their useful lives, but have not been properly processed for recovery of the reusable or recyclable materials or disposal of waste components. Without proper processing, scrapping and recycling, the number of vehicles will only increase year after year. Once vehicles reach the end of their useful life, they can be a liability and owners might abandon them on open land. Local governments are often left to deal with these vehicles and the public health, environmental and financial burdens associated with them.

Not only are these vehicles a liability and an eyesore in local communities, but they often contain hazardous materials, like antifreeze and oil, that can be harmful to workers, residents and the environment. Fortunately, with the proper tools, facilities and knowledge to process discarded vehicles, hazards can be properly managed and the vehicle components and parts can be recovered for their scrap metal value. Properly managing discarded vehicles reduces risks to workers, public health and the environment; lowers disposal costs; saves landfill capacity and creates opportunities to recover valuable resources and earn revenues from dismantling and scrapping operations.

As part of the U.S.-Mexico Border 2020 Program's goal to reduce waste, by safely and responsibly recovering materials and managing waste, the U.S. Environmental Protection Agency (EPA) and the Mexican environmental agency, Secretaría del Medio Ambiente y Recursos Naturales (SEMARNAT), collaborated on this guide to help operators of vehicle dismantling facilities

Abandoned vehicles that require processing and prepping before materials recovery and disposal

understand and practice environmentally sound management. Border 2020 emphasizes a regional bottom-up approach as the basis for decision-making, priority-setting and project implementation to address the environmental and public health problems in the border region.

Purpose of This Guide

This guide provides vehicle dismantling and scrapping facilities and their operators with information on proper removal, storage and handling of potentially hazardous materials from discarded vehicles. Removing hazardous materials will help ensure that vehicles can be safely stored and processed, maximizing the recovery of valuable resources and mitigating worker safety, public health and environmental risks. By training staff to properly handle and prepare vehicles for scrapping and recycling, facilities can remove more of these vehicles from border communities and provide environmental, economic and aesthetic benefits. This guide provides general guidance and best practices for your assistance - it does not replace local laws and regulations.

Overview of an End-of-Life Vehicle

Regardless of its age and its weight, a vehicle is made out of about 75 percent metal, both ferrous and non-ferrous. The remaining 25 percent of the vehicle weight results from tires, fluids and other materials. When vehicles reach the end of their useful life or are discarded, they contain different wastes that include glass, metal, plastic, fabric and rubber components. They also include fluids such as used oil, antifreeze, lubricants and gasoline or diesel, and increasingly contain electronic components with heavy and precious metals. Understanding the parts and components of a discarded vehicle is integral to its safe and efficient recovery. Properly processing vehicles will prevent cross-contamination and maximize recovery value.

Vehicle Ready for Dismantling

Scrap Vehicle and Metal Recovery Operations

Processing and preparing discarded vehicles for disposal requires ample space for six different activities:

1. Accepting and storing discarded vehicles.
2. Removing hazardous materials.
3. Dismantling vehicles for usable or recyclable parts.
4. Storing vehicle hulks.
5. Storing and disposing of hazardous fluids and materials removed from discarded vehicles.
6. Crushing or shredding vehicle hulks (deliver to metal crushing facility if not equipped to complete this activity).

1. Accepting and Storing Discarded Vehicles

When accepting discarded vehicles and preparing them for salvage, you should visually inspect the vehicle for any leaks. Dedicate a space for inspecting vehicles when they arrive on-site. This space should include measures to prevent soil and water contamination if fluids are leaking from the vehicle. Begin dismantling and processing the discarded vehicles as soon as possible to reduce storage time and minimize the potential for environmental contamination from leaking fluids. Runoff from the storage area caused by precipitation (rain, snow, etc.) should not be contaminated. Methods to collect and treat runoff can be used if the site is known to have contaminated surfaces. However, doing so may require obtaining a water discharge permit for the facility from the local authorities. When accepting or storing discarded vehicles:

- Check discarded vehicles for leaks.
- Clean up any spills.
- Dispose of any contaminated soils and cleaning materials as hazardous waste, unless materials are determined not to be hazardous waste.
- Minimize the time from when a vehicle is received to when it is disassembled and processed.

2. Removing Hazardous Materials

The first step in processing a discarded vehicle is to drain it of all hazardous fluids, such as those from fuel tanks, transmissions, radiators and power steering units, as well as any parts that are leaking fluids.

You should remove the battery and fluids in the following order to ensure the safe removal of all hazardous items:

1. Battery.
2. Refrigerants.
3. Gasoline or diesel fuel.

Next, the following fluids should also be removed in any order:

- Antifreeze.
- Brake fluid.
- Engine oil.
- Transmission fluid.
- Power steering fluid.
- Differential fluid (if present).
- Windshield washer fluid.

The following hazardous materials should also be removed before the vehicle hulk is crushed or shredded:

- Mercury switches [found in anti-lock brakes (ABS) brakes and convenience lighting].
- Lead (battery connectors and wheel weights).

Detailed information on the collection, stockpiling, and disposal for each of these waste streams is provided in quick-reference sheets in Appendix A.

The amount of fluids to be removed is estimated at around 19 liters per vehicle. The table below shows the estimated volume of fluids in discarded vehicles by fluid type. The space used for draining fluids and dismantling vehicles should have a sturdy, non-permeable base, such as concrete or durable liner, to provide an easy cleaning surface and to prevent spilled fluids from contaminating the environment. The space should be covered to protect it from the weather and to prevent spilled materials from being washed into the environment. If the space includes an exposed concrete pad, it should be high enough off the ground to prevent flooding during rainstorms.

Estimated Volume of Fluids in Discarded Vehicles

Fluid Type	Liters/Vehicle	U.S. Gallons/ Vehicle
Fuel	10.2	2.7
Engine oil	3.6	1.0
Coolant	2.8	0.7
Transmission oil	1.3	0.3
Steering gear oil	0.8	0.2
Total	18.7	4.9

Mercury Switch from Vehicle Convenience Light

Waste Fluids Drained from a Vehicle

An alternative option for smaller or temporary locations is to undertake work outdoors in dry, warm weather only upon an impermeable working surface. The constructed temporary vehicle fluid recovery area should consist of, for example, poly liner or plywood working surface. Absorbent materials should be on hand at all times to clean up any spills. All spills must be cleaned up and any contaminated soils and cleaning materials must be disposed of as hazardous waste unless materials are tested and shown not to be hazardous or otherwise determined not to be hazardous waste.

3. Dismantling Vehicles for Usable or Recyclable Parts

Once all of the hazardous components are removed, you should identify and remove all usable or recyclable components. Reusable or recyclable parts of a discarded vehicle often hold value even after the end of the car's useful life. If in good condition, many engine components and body parts can be salvaged, reconditioned and sold to automotive repair shops or to individuals performing auto restoration projects. Some metal recycling companies also require that most, if not all, plastic and upholstered components be removed before shredding or crushing the vehicle hulk.

4. Storing Vehicle Hulks

Once all of the hazardous materials and usable or recyclable parts have been completely removed from a discarded vehicle, it is commonly referred to as a "hulk." Hulks are defined as the shells of large usable items, usually vehicles or vessels. Vehicle hulks can be hard to move and take up a large amount of dedicated space. When storing vehicle hulks, remember:

- Vehicle hulks should only be stored once all hazardous materials have been removed.
- Clean up any lingering spills or leaks seen around hulks immediately.
- Salvage hulks for usable or recyclable parts.
- Send hulk to a metal crusher or crush and ship hulks with no more "salvage" value to a scrapper for scrap metal recycling.

Recommended Equipment for a Vehicle Dismantling Facility

- Secured building with garage-bay-style door, concrete floor, adequate roof and no drains leading to a sewer, sewage tank or stormwater collection system.
- Forklift or other heavy machinery to move vehicles from receiving area to dismantling area and then from dismantling area to vehicle hulk storage area.
- Gasoline evacuation pump with filter.
- Small wheel hoists to lift car high enough to drain fluids.
- Small hand pumps for removal of engine oil, transmission fluid, gear oil, coolants and brake fluid.
- Containers for storage of oils, antifreeze, windshield washer fluid, etc.
- Portable refrigerant removal device with separate storage tanks for each type of refrigerant.
- Dedicated drip pans to catch fluids.
- Spill kit to clean up spills.

5. Storing and Disposing of Hazardous Fluids and Materials

Hazardous fluids and other hazardous materials should be stored in sealable containers and separated appropriately. These containers should be kept in the vehicle dismantling area, stored on the concrete pad. This will provide easy access to the containers when draining fluids from vehicles. Once these containers are full, the hazardous materials must be sent to an appropriate hazardous waste disposal facility. Hazardous materials and fluids of the type found in discarded vehicles should never be released into the environment or sent to a municipal waste landfill.

Other best practices for storage include:

- The storage area should be covered to provide protection from the weather.
- Containers of hazardous materials should be on a non-permeable surface.
- Fuels should be stored in a well-ventilated area of a building or outdoors protected from the weather.
- Refer to the quick-reference sheets in Appendix A for proper handling and storage techniques for each hazardous material.

Example of Fuel Collection and Storage Container

6. Crushing Vehicle Hulks

Once all of the salvageable parts and hazardous materials are removed, the vehicle hulk can be crushed to reduce its volume for shipping. However, removing the nonhazardous, non-metallic components reduces the volume of material to be crushed and could increase the scrap value of the vehicle hulk. Crushing consists of flattening a hulk or logging it—that is, compressing it into a rectangular cube.

When you have stored enough hulks, you may hire a third-party to bring a mobile crusher and operate it at your site. The crushing area must be large enough to accommodate the crusher and also have a space designated for the storage of crushed vehicles. The following steps should be completed in conjunction with crushing operations:

- All hazardous fluids and materials should be removed from the vehicles prior to crushing.

Vehicle Crusher in Operation

Example of "Logged" Metal

- Any spills should be cleaned up immediately and all contaminated soil and cleaning materials should be disposed of as hazardous waste (unless tested or shown otherwise).
- Any fluids resulting from the crushing operations should be collected and disposed of as hazardous waste (unless tested or shown otherwise).
- Once the crusher has been removed from site, the site should be cleaned and debris removed to a permitted landfill.

The proper handling of these waste streams is discussed in Appendix A's quick-reference sheets on collection, stockpiling and disposal.

Responsible Disposal

The types of hazardous fluids and materials found in discarded vehicles must never be sent to a typical municipal landfill. Hazardous materials require special handing, transportation, recordkeeping and disposal facilities in accordance with the local, state and federal laws and regulations. Some hazardous materials, such as lead components and waste batteries, can be recycled rather than discarded. Contact the appropriate facility, such as a secondary lead smelter or a waste battery recycler to arrange the delivery of hazardous materials that retain value. Other hazardous waste streams, such as mercury switches, require a specific facility that can accept mercury wastes. Remember to:

- Contact a recycling/hazardous waste facility permitted by SEMARNAT to accept the specific waste stream to arrange the delivery of hazardous materials.
- Contact the appropriate transport authority (marine, rail or road) before the shipping and transportation instructions of waste to ensure proper handling.
- Keep manifests and transportation records on -site.

Cost Recovery

The long-distance transportation of vehicle hulks and the proper disposal of hazardous materials to a permitted recycling and disposal facilities can be costly. However, in advance of crushing, many items can be salvaged from vehicles that can be sold to recyclers to help cover some of the related disposal costs. Recovery costs of these items will depend on the market value of the materials at the time of sale. These items may include:

- Usable or recyclable parts.
- Catalytic converters (high-value items that contain several precious metals).
- Batteries.
- Aluminum wheels.
- Fuel (gasoline/diesel).
- Antifreeze.
- Used oil.

The most valuable item recovered from a discarded vehicle is the crushed or logged vehicle hulk, sold as scrap metal. Removing the hazardous liquids and materials from the discarded vehicle allows a facility to sell the vehicle hulk for profit. As noted above, removing the nonhazardous, non-metallic components reduces the volume of material to be crushed and could increase the scrap value of the vehicle hulk.

Health, Safety and Security

Worker and Public Safety

Dismantling operations can involve a number of hazardous substances posing worker and public safety concerns. Consequently, employers should ensure that their workers are trained in safe work practices for the facility. Among these are special handling and storage requirements for hazardous materials, first aid and emergency procedures. Employers should also provide workers with the necessary personal protective equipment (PPE) to complete their jobs in a safe manner. PPE and safety items that should be kept on-site include:

- Approved safety boots (steel toe).
- Eye goggles.
- Gloves.
- Eye wash station.
- First aid kit.
- Fire extinguisher.
- Work coveralls.

Workers should remove items from vehicles in the following order to prevent injury and environmental damage:

1. Remove the battery to de-energize the vehicle.
2. Remove refrigerants to prevent accidental release into the environment.
3. Remove gasoline in a well-ventilated area to prevent the buildup of fumes and decrease the risk of fire or explosion.
4. Remove other hazardous materials.

Public safety must also be taken into consideration during dismantling operations. Common hazards include:

- Exposure to hazardous waste.
- Trips, slips and falls.
- Fires and explosives.

Keep the dismantling operation's location secure from public access during normal working hours. At the end of each day, secure the site to prevent public access.

Ensuring a Safe Dismantling Area

The dismantling area must have an adequate roof and concrete floor pad for easy cleanup of spills and to prevent soil contamination.

Smaller or temporary locations can dismantle vehicles outdoors in dry, warm weather, but only on an impermeable working surface, such as plywood over a protective sand layer or liner.

Environmental Health and Safety

Collecting and storing hazardous materials on-site creates the potential for environmental contamination. The following best practices should be used in order to prevent potential spills and contamination:[1]

- Store all hazardous materials in approved containers with securely fitting lids.
- Place all containers holding hazardous materials in an area with no drains and include measures to prevent soil and water contamination if fluids are leaking from the containers.
- Properly label all containers with their contents to prevent cross-contamination of recovered fluids.
- Remove gasoline outside the dismantling area in a well-ventilated area.
- Remove refrigerants after the battery has been removed, but before any other fluids or parts, to prevent accidental leakage to the environment.
- Use drip pans at all times to catch fluids dripping from vehicles.
- Ensure that areas where hazardous wastes are stored are not susceptible to water runoff or flooding.
- Make sure spill kits are available on-site.

1. National Code of Practice, 2008, and British Columbia Ministry of Environment, 2008

- Keep lime or bicarbonate of soda on hand to neutralize spilled battery acid.
- Dispose of all used spill cleanup material as hazardous waste.

In order to follow the above best practices, the following safety equipment should be kept on hand:[2]

- Fire extinguishers in all facility buildings.
- Safety equipment, such as rubber or latex gloves and safety goggles.
- Absorbent materials, such as rags, towels and sawdust.
- Containers to hold spilled waste and used absorbent materials.
- Shovels and/or scoops.
- Industrial spill cleanup products tailored for the cleanup of oils and solvents, depending on the facility operations.

Site Security

Site security is very important. Facilities that process discarded vehicles can become targets for vandalism and theft, and the materials and equipment kept on site can present hazards to intruders. Therefore, it is extremely important to keep all equipment locked and inaccessible to the public. Store all hazardous materials and vehicle dismantling equipment in a secured location. Lock any machinery, such as the crushing equipment, in a secured location at the end of each day to prevent injury.

Industry Standards and Additional Guidance

This guide provides basic guidance and general best practices for your assistance. If you would like to strive for a higher standard of recovery, you can consult additional industry guidance and standards, such as those established by the Institute of Scrap Recycling Industries and their associated standards, including the Recycling Industry Operating Standard™. There may also be standards for specific vehicle components—for example, the Responsible Recycling standard and the e-Stewards certification for the recovery of used electronic devices, as well as the Rubber Manufacturing Association's guidance on the recovery of scrap tires.

For More Information

This guide was produced by the U.S. EPA and SEMARNAT under the U.S.–Mexico Border 2020 Program. The mission of the Border 2020 Program is to protect the environment and public health in the U.S.–Mexico border region, consistent with the principles of sustainable development. For assistance with use of this guide, or for more information about ongoing efforts of the Border 2020 program, please visit www.epa.gov/border2020.

2. Minnesota Pollution Control Agency, 2002

Appendix A. Collection, Stockpiling and Disposal Quick-Reference Sheets

The quick-reference sheets in this appendix summarize the proper collection, stockpiling and disposal of waste streams associated with discarded vehicles. Keep these sheets in a place where they can be easily reviewed by dismantlers when dealing with these types of wastes.

Quick-reference sheets are provided for the following waste streams:

- Waste fuel.
- Refrigerants.
- Waste batteries.
- Lead.
- Mercury switches.
- Waste fluids.

Waste Fuel

Worker Hazard: Waste fuels are flammable and may catch on fire or explode from a spark or ignition source.

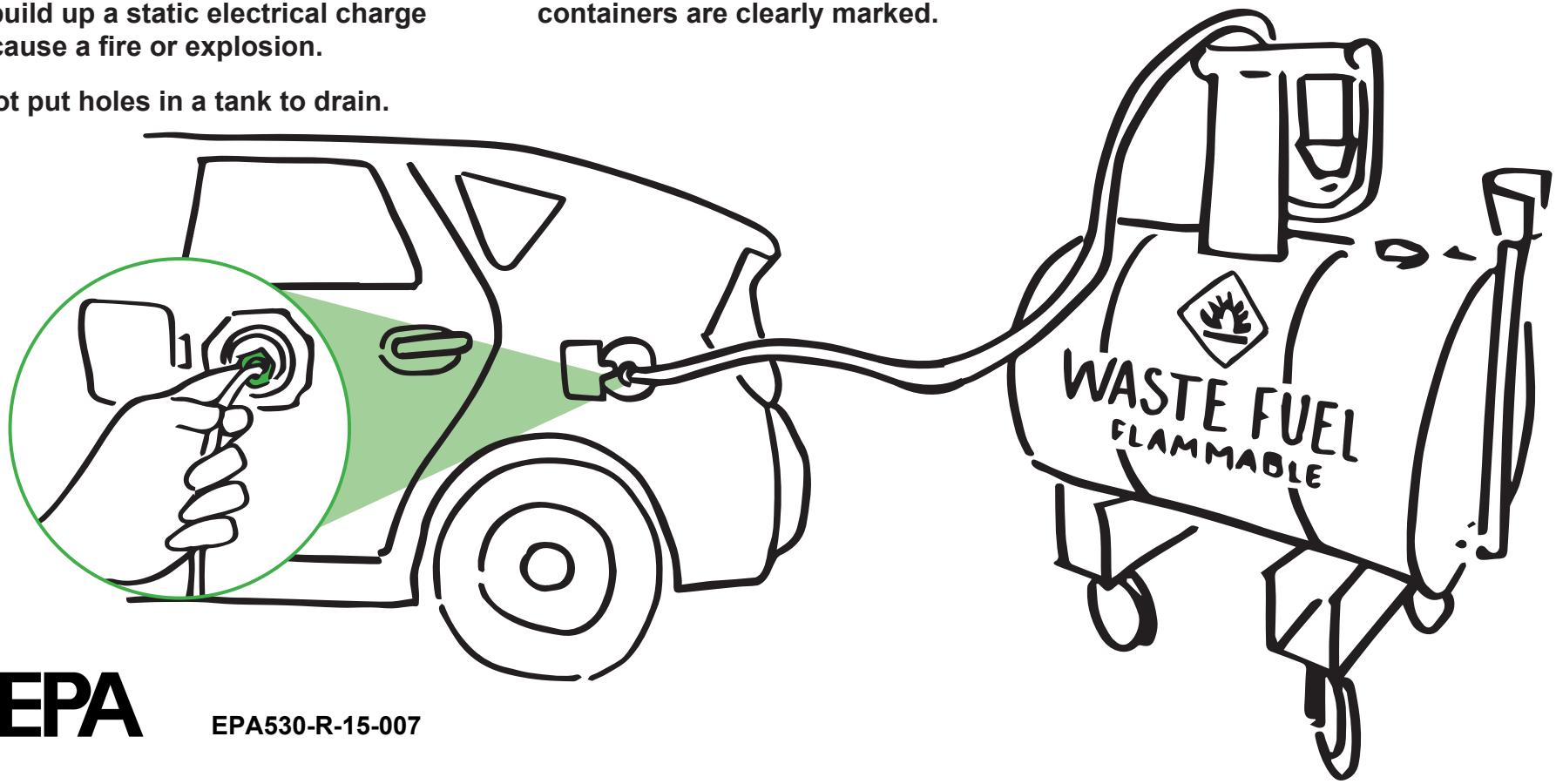
Environmental Hazard: Waste Fuel is toxic to fish and wildlife.

COLLECTION

- Remove fuel in a well-ventilated area using a suction system specifically designed for this purpose.
- Do not use plastic hand pumps as they can build up a static electrical charge and cause a fire or explosion.
- Do not put holes in a tank to drain.

STOCKPILING

- Store waste fuel separately in containers designed only for this purpose.
- Make sure waste fuel storage containers are clearly marked.



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Refrigerants

Worker Hazard: Refrigerants are gasses under pressure and may be flammable.

Environmental Hazard: Refrigerants may contain ozone-depleting substances and should not be vented into the air.

COLLECTION

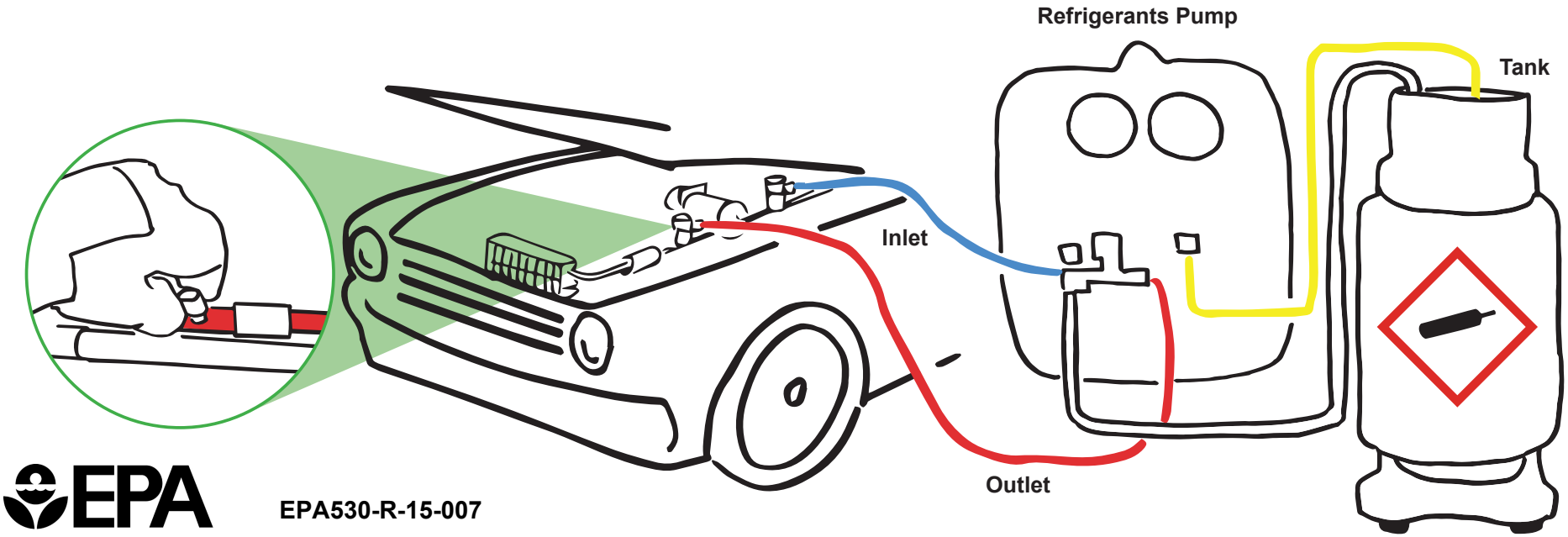
- Remove refrigerants **after** the battery has been removed but **before** removing any other fluids or items from the vehicle.
- Only trained technicians should remove refrigerants.

STOCKPILING

- Record the amount of refrigerant removed per vehicle.
- Store refrigerants in labeled, refillable storage containers.
- Test the containers for leaks every five years and replace if damaged.

- Refrigerants are recovered using a portable pump and tank. Pumps come in all shapes and sizes, but the hoses connecting the vehicle are usually color-coded, according to the following legend.

Hose connecting refrigerants pump to tank
Outlet hose connected to refrigerants pump
Inlet hose connected to refrigerants pump



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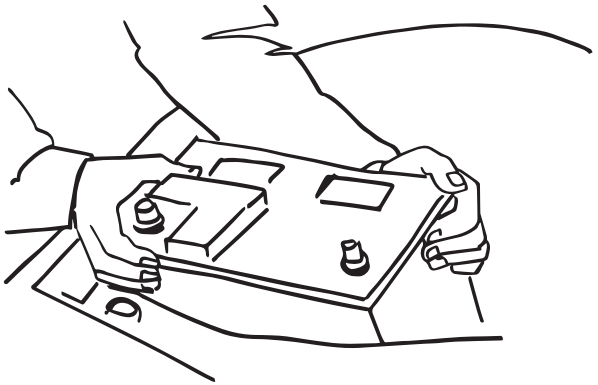
Waste Batteries

Environmental Hazard: Waste batteries contain corrosive fluid that can cause burns to the skin and eyes.

Environmental Hazard: Waste batteries contain heavy metals that can contaminate the environment.

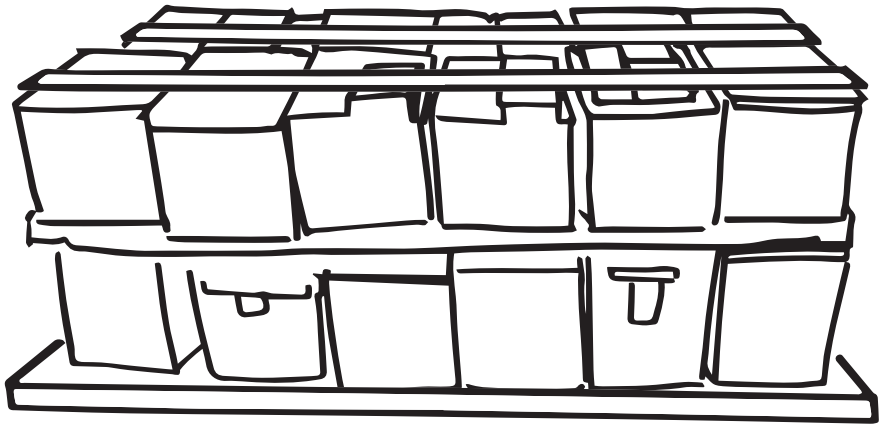
COLLECTION

- Removing batteries first makes vehicles safe for handling other materials.



STOCKPILING

- Keep waste batteries protected from moisture.
- Stack no more than two batteries high.
- Place cardboard or plywood between stacks to keep batteries from shorting and causing an electrical fire.
- Secure batteries by wrapping in a leak-proof polyethylene liner and secure to pallet using nylon straps.



TIP:
Be careful not to crack the battery casing! Many recyclers will not accept leaking batteries!

Waste batteries have value! You can sell them to a battery recycler.

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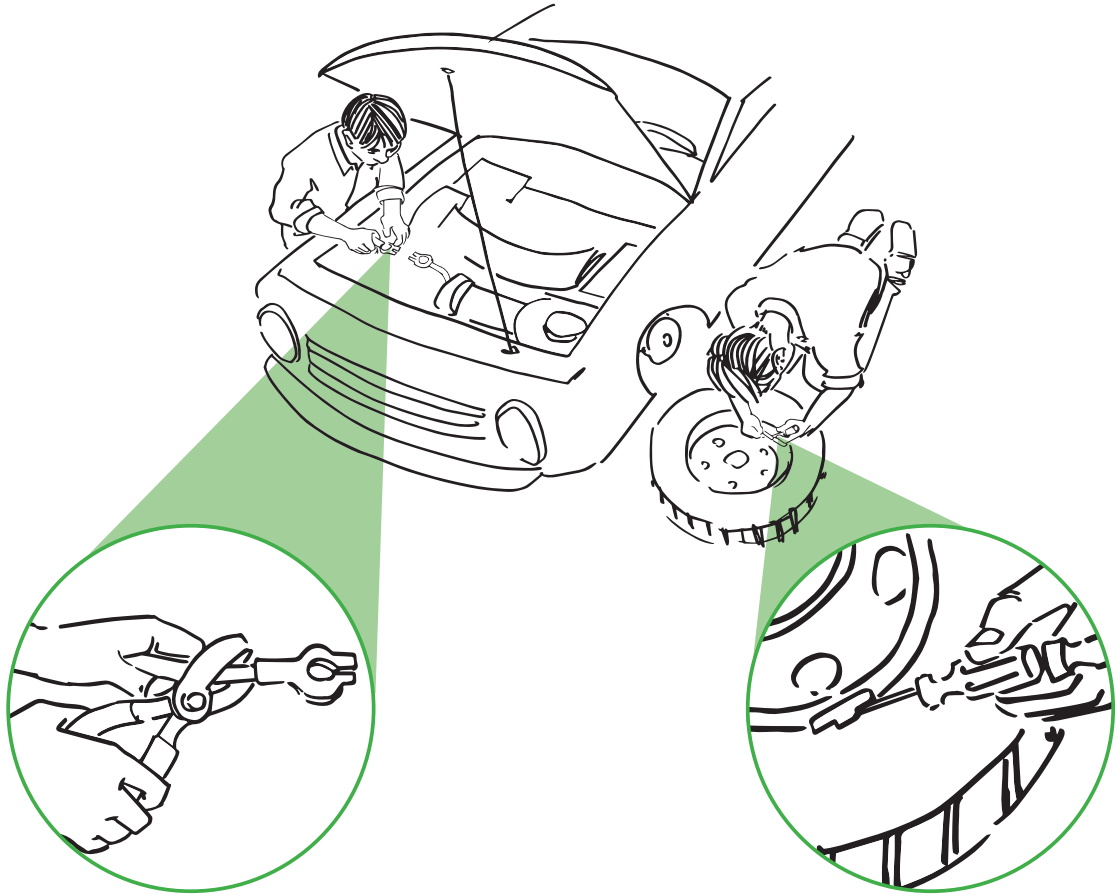
Lead

Worker Hazard: Lead is toxic to people and can lead to serious and long-term health problems.

Environmental Hazard: Lead is toxic to fish and wildlife.

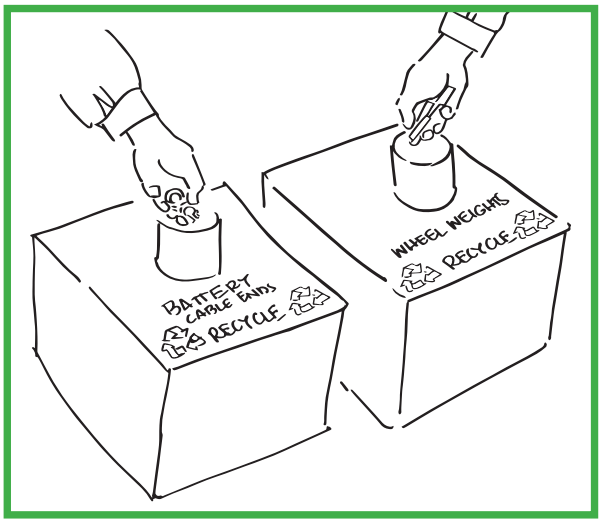
COLLECTION

- Remove lead wheel weights and battery cable ends before crushing the vehicle.



STOCKPILING

- Store lead wheel weights and battery cable ends in separate, heavy-duty containers.



Lead parts have value! You can sell lead parts to a smelter who recycles the material.

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Mercury Switches

Worker Hazard: Mercury is toxic to people and can lead to serious and long-term health problems.

Environmental Hazard: Mercury is toxic to fish and wildlife.

COLLECTION

- Locate all mercury switches found in vehicle. *Appendix B—Vehicles Containing Mercury Switches* can help you locate them for various vehicle models.

Convenience Lights

- Find the lighting assembly under the vehicle trunk and/or hood and remove from vehicle.
- Open the lighting assembly to expose the mercury switch (a sealed metal pellet).
- Remove the switch and place it in the collection container.

Anti-Lock Braking Systems

- Find the ABS G-Force sensor. It can be located in the drive tunnel, below the rear seat on the floor pan, on the right front wheel apron, or on the left frame rail below the driver.
- Remove the s ABS G-Force sensor and place it entirely in the collection container. Do not remove the switches.

STOCKPILING & DISPOSAL

- Store mercury switches in a plastic container with a securely fitting lid.
- When the container is full, send the switches to a mercury management facility for safe disposal.

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Waste Fluids

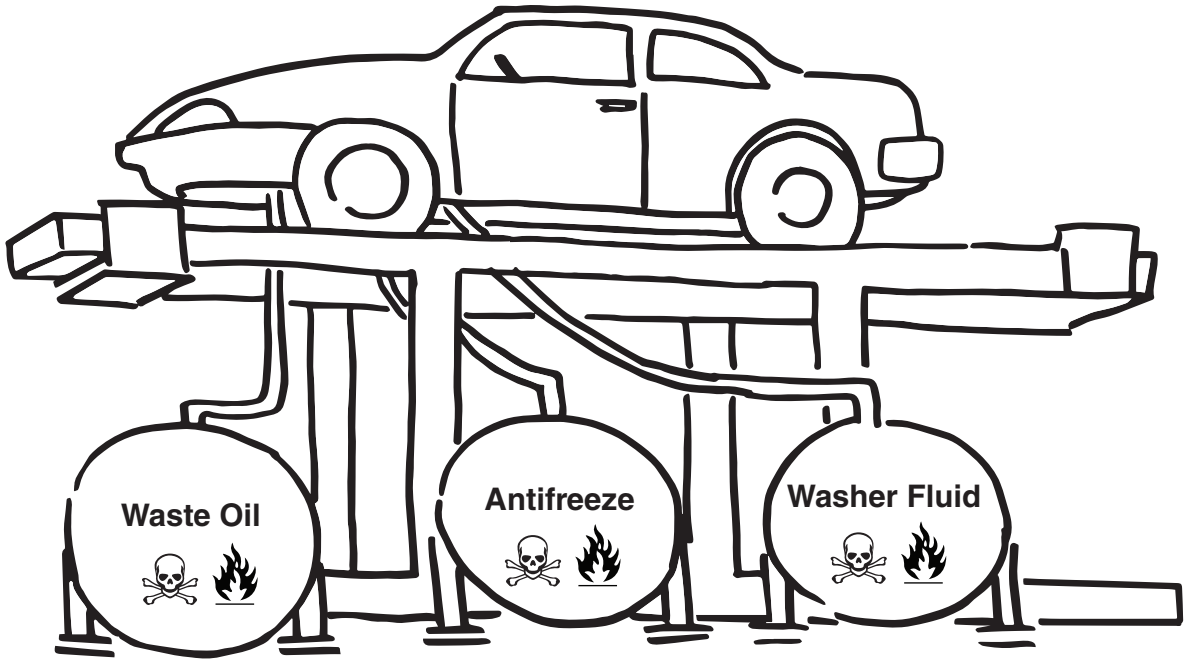
Environmental Hazard: Waste fluids may be toxic to fish and wildlife.

COLLECTION

- Use hand pump or drain from components before crushing vehicle.

STOCKPILING

- Waste Oils (including engine, transmission, power steering, differential, and brake fluid) can be combined and stored together in a labeled metal or plastic container with a secure lid.
- Antifreeze and windshield washer fluid must be stored separately in a clearly labeled metal or plastic container with a secure lid.
- Store container in a secondary containment area with no drains to prevent fluids from leaking.



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Appendix B. Vehicles Containing Mercury Switches

Table 1. Vehicles Containing Mercury Convenience Switches

MAKE / MODEL	MODEL YEAR	SWITCH LOCATION		
		Hood	Trunk	Vanity Mirror
AUDI				
Audi 100	1977-1988	✓		
Audi 200	1980-1988	✓		
CHRYSLER GROUP	Dodge, Chrysler, Jeep, Plymouth, Eagle			
All	1998 and prior	✓	✓	
FORD	Ford, Lincoln, Mercury, Mazda, Merkur, Volvo			
Ford Mustang	2000 and prior	✓	✓	
Ford Crown Victoria	2000 and prior	✓	✓	
Mercury Grand Marquis	2000 and prior	✓	✓	
Lincoln Town Car	2000 and prior	✓	✓	
Ford, Lincoln, Mercury, and Merkur Cars	1996 and prior	✓	✓	
Ford, Lincoln, and Mercury Trucks, SUV's, and Vans	2001 and prior	✓		
* Excludes: 1999 and newer model year Ford Econoline, Ford Windstar, Ford Ranger, and Mercury Villager				
Mazda Navajo	1993 -1997	✓		
Mazda B-Series Pick-Up	1995 -1999	✓		
* Ranger/B-Series phased out of mercury switches with 1999 model year.				
Volvo (hood & trunk switches)	1991 and prior	✓	✓	
Volvo (vanity mirror switch) -- Excludes Volvo 240	1986 -1991			✓
* Volvo convenience switches may contain glass mercury capsules. Use care when removing convenience switches from these vehicles.				
GENERAL MOTORS	Chevrolet, GMC, Cadillac, Buick, Oldsmobile, Pontiac, Saturn, Saab			
All Vehicles	1999 and prior	✓	✓	
* Excludes: 1999 model year Chevrolet Astro, Chevrolet Silverado, GMC Safari, GMC Sierra				

Vehicles Containing Mercury Convenience Switches (cont'd)

MAKE / MODEL	MODEL YEAR	SWITCH LOCATION		
		Hood	Trunk	Vanity Mirror
Cadillac Escalade	2000	✓		
Chevrolet Blazer	2000, 2001, 2002	✓		
Chevrolet Cavalier	2000, 2001		✓	
Chevrolet Corvette	2000	✓		
Chevrolet Express	2000, 2001, 2002	✓		
Chevrolet S-10 Crew cab	2002	✓		
GMC Denali	2000	✓		
GMC Envoy	2000, 2001	✓		
GMC Jimmy	2000, 2001	✓		
GMC Savana	2000, 2001, 2002	✓		
GMC Sonoma Crew cab	2002	✓		
Luxury G-Van	2001, 2002	✓		
Oldsmobile Bravada	2000, 2001, 2002	✓		
Pontiac Sunfire	2000, 2001		✓	
PORSCHE				
924	1976 - 1985	✓		
924 S	1986 - 1988	✓		
944	1982 - 1988	✓		
944 S	1987 - 1988	✓		
944 S2	1989 - 1991	✓		
944 Turbo	1986 - 1991	✓		
928	1978 - 1983	✓		
928 S	1980 - 1983	✓		
928 S / S4	1984 - 1990	✓		

ELV Solutions. Mercury Convenience Light Switches.

- See the following page for Mercury ABS G-force switch locations. BMW, MITSUBISHI, NISSAN, SUBARU, VOLKSWAGEN, and TOYOTA vehicles DO NOT contain mercury convenience switches.
- Vehicles manufactured 2003 Model Year and beyond DO NOT contain mercury convenience switches.
- Vehicles without trunks including SUVs, station wagons, and hatchbacks DO NOT contain a mercury convenience switch in the "Trunk" or rear of the vehicle.

Table 2. Vehicles Containing Mercury ABS G-Force Switches

MAKE / MODEL	MODEL YEAR	SWITCH LOCATION			
		Rear Seat	Rear Center	Driver Seat	Right Front
AUDI	Audi				
Audi 80 / 90	1987 - 1993	✓			
Audi 100 / Avant	1987 - 1993	✓			
Audi V8	1989 - 1995	✓			
Audi 200	1987 - 1991	✓			
Audi Coupe quattro	1987 - 1992	✓			
CHRYSLER LLC	Dodge, Jeep				
4WD Dodge Stealth	1992 - 1996		✓		
Jeep Cherokee	1992 - 2001	✓			
Jeep Grand Cherokee	1993 - 2001	✓			
Jeep Wrangler	1992 - 2003			✓	
FORD MOTOR COMPANY	Ford, Mazda, Mercury				
Ford Bronco	1993 - 1997			✓	
Ford Explorer	1993 - 2002			✓	
Mazda Navajo	1993 - 2002			✓	
4x4 Ford Ranger	1995 - 2001			✓	
Mazda B-Series Pick-up	1995 - 2001			✓	
AWD Mercury Mountaineer	1997 - 2002			✓	
MITSUBISHI					
3000 GT 4WD	1991 - 1994		✓		
Galant 4WD	1990 - 1992		✓		
Expo 4WD	1991 - 1993		✓		
Expo LVR 4WD	1991 - 1993		✓		
Eclipse 4WD	1991 - 1993		✓		
NISSAN					
Pathfinder 4x4	1996		✓		
SUBARU					
Subaru Legacy w/ 5MT AWD	1990 - 1995				✓
Subaru Impreza w/ 5MT AWD	1993 - 1996				✓

ELV Solutions. Vehicles containing Mercury ABS G-Force Sensors.

Table 3. Vehicles Containing Air Bag Crash Sensor Modules with Mercury Switches

MAKE / MODEL	MODEL YEAR	SWITCH LOCATION	
		Console	Driver's Seat
TOYOTA			
Celica	1990 - 1993	✓	
MR2	1991 - 1993	✓	
Supra	1990 - 1993	✓	
LEXUS			
ES 250	1990 - 1991	✓	
LS 400	1990 - 1992	✓	
VOLVO			
All Models Except 240	1987	✓	✓
All Models	1988 - 1992	✓	✓
240	1993	✓	✓
AUDI			
Audi 80/90	1989 - 1993	✓	
Coupe	1990 - 1991	✓	
Audi 100/200	1989 - 1993	✓	
S4	1992	✓	
Audi V8	1990 - 1991	✓	
MERCEDES-BENZ			
Model 190	1986 - 1990	✓	
E-Class	1986 - 1990	✓	
S-Class	1984 - 1990	✓	

ELV Solutions. Air Bag Crash Sensor Module Information.

NOTE: In the above applications only the air bag crash sensor modules contain mercury switches. Air bag inflation units (steering wheel, instrument or dash panel, seat, side curtain, etc.) do not contain mercury switches and should not be removed.