

**Guidelines for Environmentally Sound
Facilities for Handling and Scrapping of
End-of- Life Vehicles (ELVs)
(Revised)**



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1. Background

With the increase in the growth of automotive sector, management of ELVs is critical and requires attention. Environmentally sound management of ELV is of vital importance for environment conservation, circular economy and sustainable development. The management of ELVs includes collection, handling, transportation, storage, processing and channelizing materials or waste generated during processing to appropriate recycling or waste disposal facilities respectively. Such activities, have potential to cause impact on human health and environment and, therefore, require environmentally sound management.

CPCB in the year 2016 prepared “Guidelines for the Environmentally Sound Management of ELVs in India”, which was further revised in 2019 “Guidelines for Environmentally Sound Facilities for Handling, Processing and Recycling of End-of- Life Vehicles (ELV)” as per directions of the Hon’ble National Green Tribunal, Principal Bench, New Delhi, (in the matter of Original Application No. 996 of 2018; News items published in The Times of India Authored by Paras Singh Titled “In factory setting, Mayapuri’s scrapping through”)

These guidelines are issued in suppression of earlier CPCB guidelines published in the year 2019 and aligned with Motor Vehicles (Registration and Functions of Vehicle Scrapping Facility) Rules, 2021 notified by MoRTH, the Steel Scrap Recycling Policy of Ministry of Steel issued in 2019 and the Automobile Industry Standards for Collection and Dismantling of End-of-Life Vehicles, 2021.

These guidelines were revised in consultation with various stakeholders such as Ministry of Road Transport and Highways (MoRTH), Automotive Component Manufacturers Association of India (ACMA); Society of Indian Automobile Manufacturers (SIAM), Ministry of Heavy Industries and Public Enterprises (MoHI&PE); Ministry of Steel; Ministry of Environment, Forest & Climate Change (MOEF&CC); Registered Vehicle Scrapping Facilities; etc. These guidelines outline procedures and facilities required for setting up environmentally sound scrapping facilities for ELVs along with compliance requirements under environmental regulations including Waste Management Rules notified under Environment (Protection) Act, 1986.

2. Introduction

ELV are defined as the vehicles which are no longer validly registered or declared unfit through Automated Fitness Centres or their registrations have been cancelled under Chapter IV of the Motor Vehicles Act or due to an order of a Court of Law or are self-declared by the legitimate registered owner as a

waste vehicle due to any circumstances as specified in the Motor Vehicles (Registration and Functions of vehicle Scrapping Facility) Rules, 2021.

ELVs are broadly divided into Natural ELVs and pre-mature ELVs. Natural ELVs refer to those vehicles that have come to the end-of-life due to wear and tear. Premature ELVs refer to those vehicles that have come to end-of-life due to unnatural reasons such as an accident, fire, flood or vandalism damage.

ELVs contain hazardous substances including waste oil, lubricants, waste batteries, lamps, electronic components, air bags, etc. The recovery of these materials is of concerns: firstly, their recovery is often harmful to the health of the scrap recovery workers; and secondly, they may cause environmental contamination if improperly dismantled or disposed.

At present, new vehicle scrapping facilities are being set-up in the States in line with Motor Vehicles (Registration and Functions of Vehicle Scrapping Facility) Rules, 2021, however, most of the automobile scrap yards in the country are managed by the semi-formal sector. These, semi-formal recyclers use crude methods to recover materials and are poorly organized among each other and with other stakeholders of the ELV value chain.

ELVs contain large quantities of metal and other materials that, if salvaged or recycled properly can be effectively fed back into the economy. This reduces the environmental impacts arising from production of primary materials.

Secondary metals are processed using simple technologies requiring less energy in comparison to the primary processing of metals. This further reduces environmental impacts of resource use.

The reuse and scrapping of vehicles provides an important opportunity for transforming the resources. In India, up to 70% of a vehicle are dismantled and directly reused or sold to other manufacturers.

In the recycling process both ferrous and non-ferrous metals are recovered and reuse. It has been estimated that passenger cars contains about 70% steel and 7-8% aluminum. The rest 20-25% is plastic, rubber, glass etc., which are also recyclable. Recycling one ton of steel conserves 1,134 kg of iron ore, 635 kg of coal and 54.4 kg of limestone.

3. ELV Scrapping Activities: Environmentally sound de-pollution, dismantling, shredding, material recovery and disposal of ELVs

The environmentally sound scrapping of ELVs comprises four major stages and is depicted below:

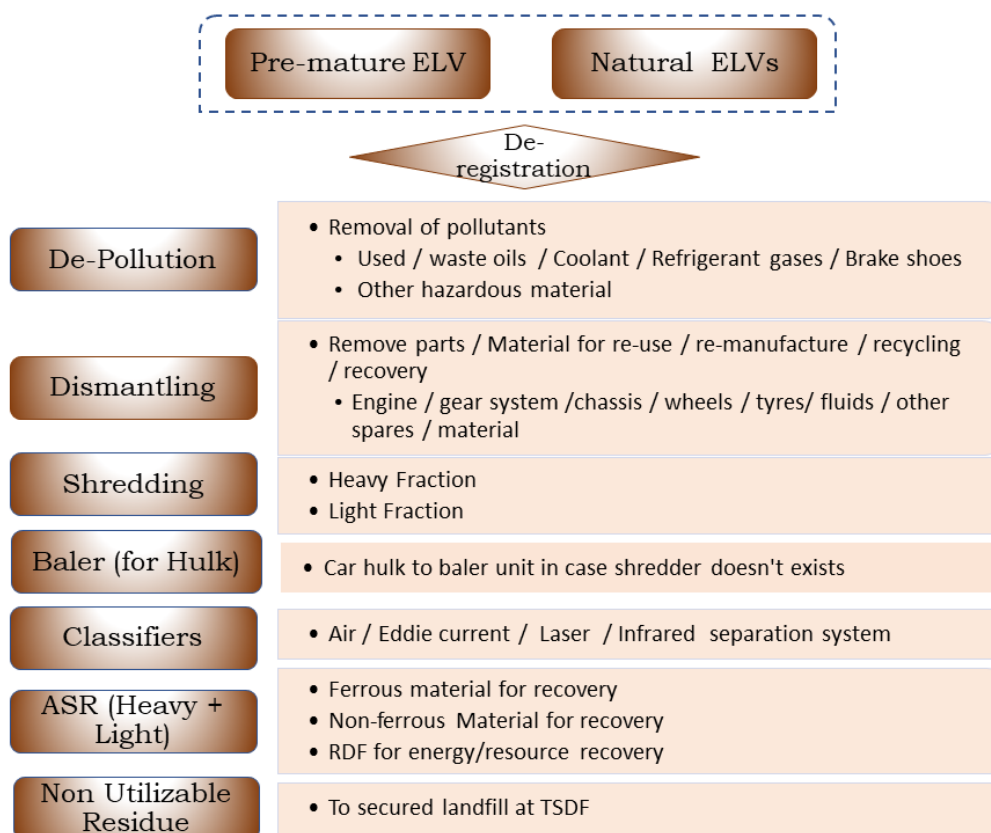


Figure 1 Stages of Environmentally Sound Management of ELV

1. De-pollution: The scrapping of ELV process starts at the RVSF where it is first de-polluted and then dismantled (sometimes these two steps are summarized as “dismantling”). De-pollution includes removing hazardous components and substances such as battery, fuel, other fluids, airbags, catalysts and any parts containing mercury or toxic heavy metals. As the removed materials are hazardous in nature such as explosive/ corrosive/etc., de-pollution must follow strict health and safety rules and contamination of the environment must be prevented.
2. Dismantling: Once the vehicle has been de-polluted it is then dismantled. This process involves segregating and collecting recyclable and reusable components, excluding those listed at section 11.4 of AIS 129 (Part1). The recovered components and fluids are sold for reuse in other vehicles (the hulk, motor parts, batteries, fuel, etc.) or for further recycling (tires, valuable metals, carpets, etc.).
3. All waste water that is produced during the de-pollution and dismantling processes must be treated.
4. Automotive shredder residue (ASR):

- a. ASR is a highly heterogeneous mixture of residual ferrous and non-ferrous metals (5–23%), plastics (20–49%), rubber (3–38%), textile and fibre material (4–45%), wood (2–5%), and glass (2–18%). Some of these components can be further processed: heavy ASRs are molten for the recovery of valuable non-ferrous metals such as aluminium and copper; combustible materials are used to make fuel substitutes; etc. However, these components are difficult to separate from other materials such as ash and heavy metals. Therefore, it is more common to either use ASR for energy recovery or to send them directly to landfills.
- b. The hulk of the vehicle is crushed so that it can be transported in a compact and cost-effective form to the shredder facility. There it is broken up into fist-sized pieces by large shredders. The shredded material is then separated into ferrous metals for material recovery as well as non-ferrous metals (heavy automotive shredder residue (ASR)) and other materials (light ASR). Processing scrap in smelters usually produces secondary metal.
- c. Several countries have high targets for the recycling rates of ELVs, the recycling of ASR thus becomes increasingly important.

4. Environmental Policy

The National Environmental Policy 2006 (NEP) focuses on sustainable development and need to facilitate reuse / recovery/ recycling of necessary material (resourceful) from waste, thereby contributing to conservation of natural resources and reduction of wastes destined for final disposal.

Considering the large recycling potential, ELVs should be recycled properly to recover valuable natural resources in an environmentally sound manner.

The regulatory provisions for environmental safe recovery of hazardous and non-hazardous material present in these ELVs have been addressed in the existing Rules for waste management notified under Environment (Protection) Act, 1986.

However, the environmental compliances for recycling activities could be in accordance with the prevailing laws such as The Water (Prevention & Control of Pollution) Act, 1974, (The Water Act), The Air (Prevention and Control of Pollution) Act, 1981 (Air Act) and the waste management Rules notified under Environment (Protection) Act, 1986 (EP Act).

A regulatory framework to facilitate scrapping of ELVs has also been provided through Steel Scrap Recycling Policy issued by Ministry of Steel in 2019 and notification Motor Vehicles (Registration and

Functions of vehicle Scrapping Facility) Rules, 2021 by Ministry of Road Transport and Highways.

Steel Scrapping Policy promotes circular economy in steel sector and promotes a formal and scientific collection, dismantling and processing activities of ELVs at RVSFs to produce high grade ferrous scrap for quality steel production through scientific handling, processing and disposal of all types of recyclable scraps through authorized recyclers/facilities. Further, the policy talks about infrastructure and equipment required for steel scrap Processing Center and shall adhere to statutes, or any other relevant guidelines issued by GoI.

Motor Vehicles (Registration and Functions of Vehicle Scrapping Facility) Rules, 2021, notified by MoRTH provides the Powers and responsibilities of Registered Vehicle Scrapping Facility (RVSF); Conditions of eligibility for RVSF; Registration procedure for RVSF; Registration Authority of the concerned State Government or Union territory Government; development of portal for Single Window Clearance.

5. Environmental Regulations for Scrapping of ELVs

1. The wastes generated during environmentally sound scrapping of ELVs shall be managed in accordance with various Rules notified by the Ministry of Environment, Forests and Climate Change under the Environment (Protection) Act, 1986. These rules have been notified in order to provide statutory provisions for regulating the handling and management of wastes without causing any adverse effects on environment and human health. The Rules are implemented through the State Government and State Pollution Control Boards or the Pollution Control Committees of the Union Territories. The following waste regulations have been notified by the Ministry that are applicable for the management and recycling of ELVs:
 - a) Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 as amended
 - b) Solid Waste Management Rules, 2016.
 - c) E-Waste Management Rules, 2016 as amended.
 - d) Plastic Waste Management Rules, 2016 as amended.
 - e) Batteries Waste Management Rules, 2022
 - f) EPR Guidelines for Waste Tyres, 2022 under HOWM Rules, 2016
 - g) Ozone Depleting Substances (Regulation and Control) Rules,

2000.

All the above rules address environmental issues concerning waste management (recycling or disposal). The different rules cover industrial wastes, urban waste as well as post- consumer waste.

2. The concept of recyclability of wastes and regulating recycling activity has been introduced in all these rules with goal to increase recovery of resources thereby reducing waste destined for disposal. Some of these rules include provision for the registration/authorisation of recyclers which have capability to recycle wastes by adopting environmentally sound techniques (ESTs).
3. The hazardous substances and hazardous fluids in ELVs such as waste oil, transmission fluid, coolant fluid, brake fluid, power steering fluid, hydraulic fluid, gear oil, lead acid batteries and other materials arising from de-pollution of ELVs shall be recycled or disposed of in accordance with Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. In addition to these substances, hazardous solid wastes such as air filter, oil filter, brake shoe, asbestos in clutch discs, etc. are required to be disposed of in accordance with these Rules. Any recycling of these hazardous wastes recovered from the ELVs shall be carried out only by the registered recyclers notified under these rules. The residues containing hazardous substances arising from both manufacturing and recycling activities have to be disposed of in an environmentally sound manner and the disposal procedures shall be decided on the basis of the constituents present in the waste. All hazardous wastes generated from the ELVs shall be disposed of in accordance with the requirements under the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
4. In compliance with the requirements under the Montreal Protocol the Ozone Depleting Substances (Regulation and Control) Rules, 2000 have been notified. These rules provide a control on the production, consumption, export and import of the 96 Ozone Depleting Substances listed in the Schedule 1 of these rules. All refrigerants containing ODS recovered from ELVs should be disposed of in accordance with these rules and shall be channelized to TSDf or other facilities recognized by Central Government or appropriate authority, as applicable.
5. The plastic waste which can be recycled shall be channelized to registered plastic waste recycler in accordance with the Plastic Waste Management Rules, 2016.
6. EPR regulation provides target for recycling of waste tyres and waste Batteries, wherein the Producers are required to channelize waste tyres and batteries to authorized facilities for refurbishing, recycling or

recovery of material as per provisions under Batteries Waste Management Rules 2022 (as re-notified) and EPR guidelines for management of waste tyres.

7. The collection, recovery and disposal of the solid waste shall be in accordance with the Solid Waste Management Rules, 2016.
8. Similarly, all electronic parts are to be treated and disposed of in accordance with the E-Waste Management Rules, 2016 to channel e-waste for recycling to registered recyclers.

6. Automotive Industry Standards (AIS: 129) on ELVs

'AIS 129 addresses End-of-Life Vehicles' (ELVs) with an objective to enable automobile recycling activity as an organized sector and also prescribe minimal operational standards for recycling in-line with the Motor Vehicles (Registration and Functions of Vehicle Scrapping Facility) Rules, 2021, notified by MoRTH

7. Collection and Handling of ELVs

1. There is the need to develop a collection and channelization mechanism for ELVs from source of its generation for recycling and recovery in an environmentally sound manner. The ELV collection system needs to be established to facilitate the movement of ELV in a regulated manner from its origin to the final destination for scrapping, recycling and disposal. The stages involved in the process include establishing collection channels, setting up ELV collection & deposition facilities, providing financial mechanisms for collection, and organizing handling and storage.
2. Collection channels: There exist different collection channels for ELVs. Bulk generators or fleet owners such as public transport and tourist agencies (government and private) or offices (government and private) adopt different modes of disposal of ELVs depending upon the number of vehicles and their conditions. Bulk amounts of ELVs are usually auctioned off by public agencies. The buyer is the highest bidder and resale of automobile parts. The other mechanism that prevails is the replacement of old and used vehicles by new ones through dealers or the manufacturers.

Many automobile companies and bulk generators of ELVs carry out regular sales of used vehicles which are conducted by private agencies. The buyers may be individuals who intend to further use the vehicle or auto scrap dealers or dismantlers. Defective parts from the Original

Equipment Manufacturers (OEM) also reach auto scrap dealers or dismantlers in the semi-formal sector, especially when OEMs recall the vehicles with manufacturing defects to replace defective parts. Individual owners channel ELVs through sale or exchange of old vehicles while buying new ones. Vehicle parts may also reach semi-formal sector in case of accidents, fire or when parts and components are stolen from vehicles abandoned on the road sides.

Based on these common practices the ELV collection channels should close the gaps in the recycling loop and prevent the loss of potentially valuable material. In order to provide efficient collection systems for ELVs, the actors in the collection channels are to assess the materials for reuse and recycling in order to prevent improper scrapping practices in the backyard of scrapping units. Effective collection channels would further enhance the availability of material for recycling and make the tracking of material and material components possible.

8. Setting up Registered Vehicle Scrapping Facility (RVSF)

- 1) Motor Vehicles (Registration and Functions of Vehicle Scrapping Facility) Rules, 2021, notified by MoRTH outlines procedure for registration of RVSF from Registration Authority of the concerned State Government or Union territory Government.

Rule 5 and 6 of above rules outlines conditions of eligibility for setting up RVSF and also the procedure for registration of Vehicle Scrapping Facility with registration authority.

- 2) Registered RVSFs are authorized to make suitable entries in VAHAN database regarding scrapping of the vehicle and issuance of Certificate of Deposit and Certificate of Scrapping.
- 3) In view of the large size and volume of automobile scrap the collection facility may need to be set up in an adequate area of land where the various types of ELVs could be handled. ELVs in India would include the small two and three wheelers, cars, large buses, trucks and trailers. Depending upon the area available, different locations to be assigned for different types of ELVs.
- 4) Take back could be provided by Collection Centers and RVSFs. These may be created by upgrading existing vehicle service centers, scrap yards or recycling workshops in co-operation with vehicle producers. In a collective system, Producers may setup joint collection centers or collectively sign contracts with existing ELV recyclers to organize the collection on their behalf. In an individual collection each producer may have to set up his / her own collection

facility or sign individual contracts with collectors.

- 5) The collection system needs to fulfill the criteria of an adequate area of coverage for collection. It is advisable to consider a 50 km radius around a take back facility. Collection points or centers can be established in designated places where ELVs are collected. Such collection points could also be linked to a centralized collection center where these could be stored and later sent to RVSFs.
- 6) Collection Centre may be established by a RVSF at any other place, other than the premises of Scrapping Yard if collection center undertakes activities such as depollution and dismantling the requirements applicable for RVSFs shall also be applicable to such Collection Center.
 - i. As per Rule 4(3) of Motor Vehicles (Registration and Functions of Vehicle Scrapping Facility) Rules, 2021; it shall be duty of authorized scrapping facility to carry out verification of records of the vehicles produced for scrapping.
 - ii. ELV collector shall provide information as per the application/format prescribed by the Central Government, the moment disposed vehicles transaction is completed with the de-polluter/ dismantler/recyclers.
 - iii. Rule 8 of Motor Vehicles (RVFSF) Rules, 2021 outlines the criteria for scrapping of vehicles.

9. Handling, Storage and Transportation of ELVs

1. **Handling:** ELVs are often large in size (for example trucks and buses) and require machines to handle them. Any vehicle that reaches end-of-life needs to be lifted using cranes and towed to the destination. At the Collection and RVSFs, cranes / lifting equipment would be required to move ELVs within the unit. Adequate handling equipment should be required for any ELV collection, treatment and recycling facility.

ELVs should be stored in a way that protects their value and protects the surrounding environment. ELVs contain hazardous fluids and other components that can pollute the soil, water, and air. For example, when leaking fluids soak into the ground they contaminate the upper soil layers as well as the underlying groundwater. Likewise, storm water runoff from rainfall and snowmelt can be contaminated if it comes in contact with greasy, oily parts, or flows over contaminated soils or through puddles of

vehicle fluids. Contaminated storm water runoff can spread pollution on one's property and onto neighbors' property. If refrigerants (such as Freon) are allowed to escape from air conditioning units in ELVs, they can spread to the upper atmosphere and destroy parts of the earth's protective ozone layer.

The collection Centers, dismantling centers/RVSFs shall take all the steps to:

- a) contain contaminants and prevent accidents and limit their consequences on human beings and the environment; and
- b) provide persons working in the site with appropriate training, equipment and the information necessary to ensure their safety.

2. **Storage:** Pre-conditions for storing ELVs

- a) ELVs shall not be stored preferably for more than 15 days prior to de-pollution (i.e. until the fuel, oil, antifreeze, and other fluids are completely drained, and the fuel tank, radiator, and other fluid containing parts have been removed). It shall be ensured that fluids do not leak or drip onto the ground.
- b) A written record shall be kept of the vehicles stored.
- c) In order to prepare vehicles for storage a routine shall be established; this helps in knowing the condition of every vehicle stored.
- d) An ELV after removing the battery shall be stored in an environmentally safe manner by ensuring the following salient points:
 - i. ELVs shall be stored in dry areas where there is no water logging or water not flowing under the vehicle during rain or snow melt periods.
 - ii. ELVs shall be stored on impermeable surfaces, such as concrete floor.
 - iii. Storage areas shall be provided for spillage collection, decanting and degreasing;
 - iv. Storage facilities shall be provided for dismantled spare parts, including impermeable storage for oil contaminated spare parts;
 - v. Appropriate containers / covered-compartments shall be provided for storage of batteries (irrespective of whether electrolyte draining and neutralization is conducted on site or elsewhere), filters and PCB / PCT containing condensers;

- vi. Storage tanks shall be provided for the segregated storage of ELV fluids;
 - vii. A suitable Effluent Treatment Plant (ETP) with collection tank, oil and grease trap followed by physico-chemical treatment shall be provided for the treatment of wastewater generated from floor/vehicle washings, if any, including rainwater in compliance with health and environmental regulations;
 - viii. Used tyres shall be stored appropriately, including the prevention of fire hazards and excessive stockpiling.
 - ix. If engines or greasy parts are exposed, they shall be covered with a tarpaulin or other covering to prevent rain.
 - x. ELVs shall not be stored in the flood hazard zone or in wetlands.
 - xi. ELVs shall not be stored along or over property boundaries, public rights-of-way, or easements.
 - xii. The boundaries of the vehicle storage area shall be demarcated with a site drawing.
 - xiii. Vandals and other unauthorized persons shall be kept away from entering the vehicle storage area. A fence shall be erected with “no trespassing” signages.
 - xiv. ELVs shall be parked in rows, with enough aisle space between the rows to allow individual vehicles to be inspected and removed as needed.
 - xv. ELVs shall be stored in an upright position and in case of cars, stacks shall not exceed 3 cars high and 2 abreast in a row only after depollution (removal of battery, fuel, other fluids, airbags and any parts containing mercury)
 - xvi. The RVSFs shall maintain the records regarding the transaction of vehicles and scrap generation and its responsible disposal to authorized recyclers, and all the machinery, equipment and apparatus in the Registered Vehicle Scrapping Facility premises, ready for inspection by the Registration Authority or Designated Officer of the State Government, the officials of State Pollution Control Board and the Central Pollution Control Board or the Union territory Government.
 - xvii. The storage area shall be inspected regularly to ensure that there are no problems; a record shall be kept of the inspections.
- 3) **Transportation** of ELVs need specialized vehicles with a provision to lift and load the ELVs. If there are large numbers of ELVs it becomes economical to have dedicated vehicles for transportation.

In case of small numbers, it may be feasible to use public carriers. Large vehicles and lifts are also required for the onsite movement of ELVs.

- 4) The areas designated for ELV scrap yard and storage shall be demarcated and provided with the following:
 - a. Impermeable surfaces for designated areas;
 - b. Spillage collection facilities;
 - c. Decanters and cleanser degreasers;
 - d. ETP for the treatment of wastewater, including surface run-off during rains;
 - e. Designated storage areas for dismantled spare parts;
 - f. Impermeable storage areas for oil contaminated spare parts.
 - g. Tanks/containers for segregated storage of fluids – such as fuel, motor oil, gearbox oil, transmission oil, Hydraulic fluid, cooling liquids, antifreeze, brake fluids, air conditioning fluids and other fluids.
 - h. Equipment and tanks/cylinders for safe de gassing and storage of gases and safe storage for pyrotechnics from air bags, ACs etc.
 - i. Appropriate Areas / containers for storage of solids, batteries, oil filters Unless crushed, PCB/PCT containing condensers, other hazardous components used tyres (to provide adequate fire-fighting systems to prevent fire hazard near stockpiling)

10. Environmentally Sound De-Pollution of ELVs

The processes involved in de-pollution of the vehicle are important as the ELV is made free from the gaseous, liquid and hazardous substances and the further processing becomes safe. A generic process flow diagram given at figure-2 should be adopted for de-pollution operations. De-pollution activities should be carried out using appropriate equipment that is specifically designed for carrying out the operations. Such equipment is usually pneumatically operated. The use of such equipment ensures that a high level of de-pollution (removal, as far as reasonably practicable, of most fluids contained in the ELV) can be achieved in a relatively short timeframe (20-30 minutes per ELV). In case that a de-pollution in a completely mechanized system is not possible, alternative methods of manual operations could be used, ensuring the same levels of de-pollution without compromising on health and safety requirements. Since

most of the operations in the semi-formal sector is based in manual operations, an assessment of the risks involved in using such methods of de-pollution must be carried out. Based on this assessment adequate measures, necessary to comply with relevant health and safety legislation/ regulation, must be put in place. If alternative manual methods are used it should ensure the same level of de-pollution.

The de-pollution or decontamination operations comprise of a number of steps according to which the ELVs are to be treated (see figure 2). The steps are based on the materials contained in the ELV. There are certain minimum standard practices that need to be followed. Additionally, vehicle specific requirements are given by automobile manufacturers.

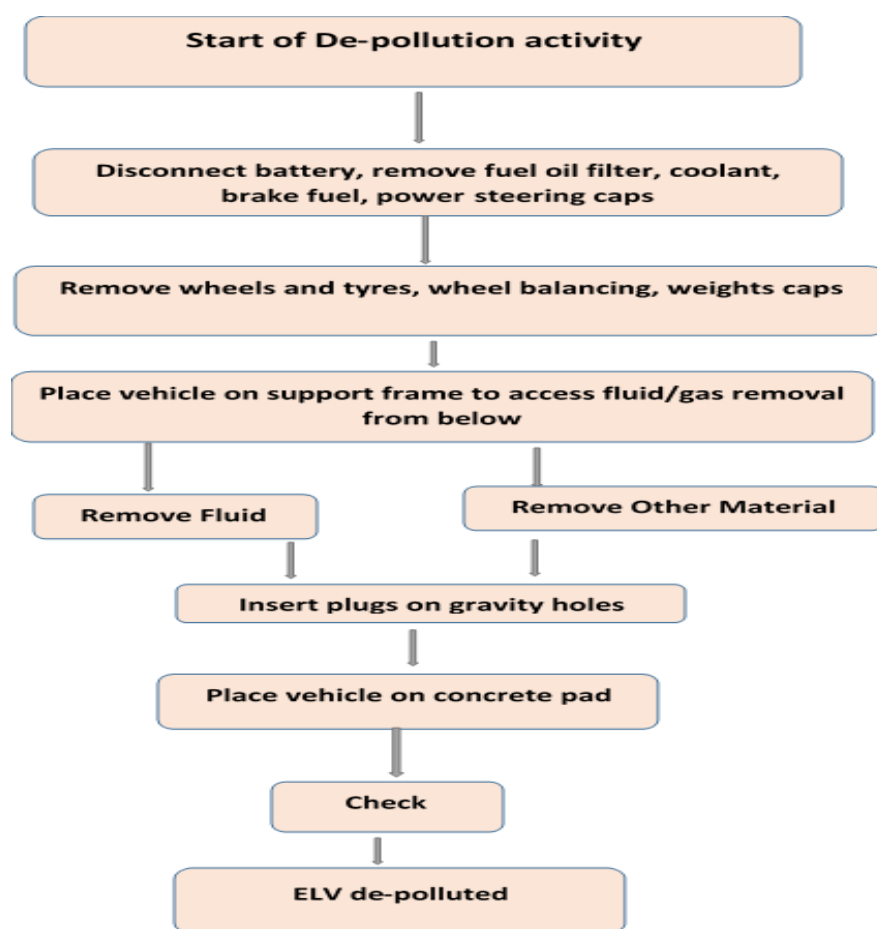


Figure 2: De-pollution Process

On arrival of ELV for scrapping, the de-pollution operations should be carried out as soon as possible and preferably not later than 15 days.

The sequence of the de-pollution operations is given in the table below where it is indicated whether an individual operation is best conducted from above (A) or below (B) the ELV. The specific sequence

of operations, however, may be evolved as per the requirement of the ELV and equipment available at the treatment facility. The objective should be to completely de-pollute / de-contaminate the ELV before it can be passed on to further treatment, i.e., segregation, bailing and/or shredding and material recovery. Sufficient time should be given for gravity draining of the engine oil to ensure that the oil is properly drained.

Table 1: De-Pollution Sequence

Operation	De-pollution Sequence
A. Before Lifting the vehicle	
Remove Battery	A
Remove fuel filter cap & oil filler	A
Remove wheels and tyres and separate balance weights	A
Remove any parts identified as containing mercury	A
B. Lift the vehicle on de-pollution frame or lifting device	
Degas air conditioning unit (if fitted)	A
Drain washer bottle	A
Drain brake/clutch reservoir(s)	A
Drain power steering reservoir (if fitted)	A
Drain engine oil and remove oil filter for crushing or disposal	B
Drain transmission oil, including rear differential	B
Drain coolant	B
Drain brake fluid	B
Remove catalyst (if fitted)	B
Drain fuel tank	B
Drain shock absorbers or remove suspension fluid	B
Replace drain plugs/fit plastic stoppers	B
C. Remove vehicle from de-pollution frame or lifting device	
Deploy airbags and other pyrotechnics in-situ (if fitted and able to conduct this operation)	A
Remove air bags and other pyrotechnics (if fitted, and cannot be deployed in-situ)	A

Some of the basic steps for the removal of hazardous substances that are likely to be present in all vehicles have been given below;

Hazardous substances (fluids)

Hazardous substances (fluids) such as engine oil, gear oil, transmission fluid, hydraulic fluid, brake fluid, power steering fluid, coolant fluid,

present in automobiles need to be removed while processing ELVs and sent to registered/authorized recycling or refining unit as per the norms prescribed in the relevant regulations and guidelines.

a. Waste oils

- i. Used and waste oils shall be sent to registered recycling or re-refining unit.
- ii. If uncontaminated, these shall be sent for burning for energy recovery.

b. Transmission oil

- i. Transmission oil contained in gearboxes can be gravity drained through the drain plug. Drilling a hole in the bottom of the gearbox shall drain those without drain plug.
- ii. In rear axle differentials of rear wheel drive vehicles, the drain plug shall be drilled or differential flange shall be loosened to allow the oil to drain.
- iii. Oil shall be collected in a container and stored and then sent for disposal.
- iv. The power steering fluid has to be extracted from both reservoir and connecting hose using similar equipment for reservoir and by piercing the hose and sucking out the fluid or cutting.
- v. Transmission oil/fluids shall be managed like used oil by direct reuse or re-refining in registered recycling units, or by burning it for energy recovery.
- vi. Transmission fluid must not be disposed in a storm drain, septic tank, on the ground, the sewer system or dumpster.

c. Brake fluids & cleaners

- i. Brake fluid is typically contaminated with chlorinated solvents from brake cleaners.
- ii. Brake fluid shall be collected in a separate container marked, "Hazardous Waste – Brake Fluid".
- iii. Brake fluid must not be burned for energy recovery.
- iv. Brake fluid must not be disposed of in a storm drain, septic tank, on the ground, sewer system or dumpster.
- v. Brake and carburetor cleaner shall be closed when not in use.
- vi. Brake/carburetor cleaners must not be mixed with other solvents, like solvents from parts washers.
- vii. Spent cleaners and solvents shall be disposed of as hazardous waste.

d. Fuel and fuel filters

- i. Fuel shall be removed from fuel tanks by siphoning or suction.
- ii. Fuel reusability shall be determined – it shall be labeled "Reusable Gas (or Fuel)" if reusable; if the fuel is not reusable it shall be labeled as "Hazardous Waste – Gas (or Fuel)"
- iii. All fuel shall be stored in closed, leak proof containers.
- iv. Reusable fuel shall be used at the facility or given away.
- v. Fuel must not be mixed with any other waste streams.
- vi. Excess fuel shall be drained from filters into a proper fuel

container.

- vii. Used fuel filters shall be kept in a separate fireproof container marked "Hazardous Waste Fuel Filters Only". Fuel filters shall be treated as hazardous waste and disposed of as required.

e. Coolant (Antifreeze)

Coolant can be collected by gravity drained (by removing the bottom hose) from the radiator or by using suction unit and sent for co-processing, if possible, else shall be sent to TSDF for treatment and disposal.

Hazardous Substances (solids).

- a. Lead acid batteries present in the automobiles are one of the major sources of toxic and hazardous substances. They contain sulphuric acid that is corrosive and lead plates that are highly toxic.
 - i. Lead-acid Batteries shall be removed and tested for reusability.
 - ii. Leaking batteries shall be drained and acid stored in containers safely.
 - iii. Intact or drained batteries shall be stored indoors avoiding heat and rain.
 - iv. Batteries shall be sent for recycling in registered recycling units.
 - v. Battery terminal metal parts sold as scrap for recycling shall contain acid which causes pollution
- b. Air filter contains foam and ferrous parts that pose a potential hazard if burnt in case it cannot be directly used.
- c. Oil filter contains filter paper and residual oil which is toxic when burnt, it also contains metallic parts which is sold by scrap dealers
- d. Hot tank solutions and sludge from cleaning ELVs (and ELV parts) in auto recycling units could be a major issue as it shall be contaminated with the process effluents and residues. These need to be collected separately in containers and treated as hazardous wastes.
- e. Mercury switch shall contain mercury, copper and brass and are required to be recycled by authorized recycler.
- f. Brake shoe clutch plates/discs contain asbestos that is carcinogenic and hazardous to human health. Asbestos are crushed with the vehicle and are not removed for reuse in vehicle recycling. If brake shoes and clutches are not removed, asbestos particles shall become airborne while shredding. Sometimes these are stripped and dumped on ground. The best way is to limit

exposure and health damage by providing proper controls to contain brake dust and prevent its release in the air:

- i. Brakes or clutches must not be cleaned with air hoses, dry brushes, wet brushes, rags, garden hose, liquid squirt bottles, solvent spray or ordinary shop vacuums.
 - ii. Brake shoes or clutches shall be removed using specially designed low pressure spray equipment that wets down brake or clutch dust and properly catches the runoff to help prevent asbestos from being released.
 - iii. It is not recommended to eat in asbestos work areas. It is recommended to wash hands before eating.
 - iv. Before going home clean clothes shall be put on. Asbestos particles can become embedded in clothing and carried into the house.
- g. Rubber parts are usually sent for recycling in furnaces as they have the potential to emit toxic fumes.
- h. Glass parts, essentially the windshield and other glasses fitted in the doors, are toughened glass with a PVC sheet pressed between the two layers of glass. If the glass is intact it can be reused. Recycling options are limited and it can only be recycled into construction aggregate. If the PVC is removed, then it can be recycled like normal glass. If recycling automotive glass is not an option, it shall be handled as solid waste.
- i. Electronic parts are fitted in modern cars. Such electronic waste shall be disposed of in accordance with the E Waste Management Rules, 2016.
- j. Refrigerant gases present in ELVs need to be removed before processing ELVs as these have the potential to cause adverse effects on environment and health. The two types of refrigerant that are used in vehicle air conditioning systems are R12 and R134a. The type of refrigerant is marked on the vehicle. The refrigerant must be removed using a specialized refrigerant gas recovery equipment which allows airtight operations in order to avoid any gas leakage, and two collection cylinders are required; one for R12 (a CFC) and one for R134a (an HFC).
- k. Airbags contained in most of the modern vehicles contain explosives and shall be handled in accordance with the handling and deployment procedure prescribed by the manufacturer.
- l. Catalyst: All modern vehicles contain catalytic converters in the

exhaust for both diesel and petrol vehicles. These catalysts contain precious and rare metals which are valuable for recycling.

All de-polluting operations shall be carried out within the scrap yard of the RVSF. Hazardous and other solid wastes generated during handling, storage and de-pollution activity within the scrapping yard shall be carried out as per section 15.

11. Environmentally Sound Dismantling & Segregation

In the next step, the de-polluted and decontaminated ELVs are dismantled to separate different parts of the vehicle into their components so that these could be segregated for further processing. Dismantling is one of the important steps in the processing of ELVs. The dismantling process could be manual or mechanical depending upon the type, size of the vehicle and numbers being handled. Small vehicles can be easily dismantled and manual dismantling is preferred. The larger vehicles that are not easy to handle manually can be dismantled using machines or are subject to mechanical dismantling. Manual dismantling helps to identify and remove parts that can be reused.

In line with AIS 129 PART-1, any person(s) operating Collection Centre(s) and Dismantling Centre(s) shall not sell the components mentioned in clause 11.4 for reuse in the after sales market.

The Registered Scrapper shall ensure that the components that shall not be retained for reuse after sales market shall be as per the list of such components given in AIS 129 (Part1).

12. Environmentally Sound Shredding, Separation and Processing of Residues

After de-pollution and dismantling of ELV, the remaining structure of ELV i.e. hulk shall preferably be shredded in a shredder.

The shredding facility may be installed at the scrap yard where de-pollution and dismantling activities are carried out. In case the shredders are not installed, the facility may install bailing machines to compact the hulk and other large scraps to make it suitable for further shredding at a common shredder facility or a steel plant. Common shredding facility may complement numbers of facilities who carry out de-pollution and dismantling of ELVs. However, hulks may be treated as hazardous waste, unless it is established that the same do not qualify for hazardous waste, and, therefore, various provisions of HOWM Rules, 2016, with regard to storage, transportation, record maintenance, etc. would be applicable.

Management of residues generated during shredding:

When an ELV is shredded, the residue is usually separated into four fractions: ferrous metals (using magnetic separation), non-ferrous metals (using mechanical separation), heavy shredder residue and the light fraction, which is separated by air suction. Ferrous metals are not being processed further and are considered ready.

Facilities where shredders are not yet installed, may use Baler Machine to compact the hulk. Both ferrous and non-ferrous metals can be compacted by hydraulic baling press to increase the density of scrap and transport the bales for steel / non-ferrous smelting plants for recycling or recovery of metals after shredding to suitable size.

The shredder essentially pulverizes the vehicle into fine sized pieces of materials, which are then sent by conveyors for separation using magnetic separation, eddy current, laser and infrared systems (depending on the availability of the systems). Shredding and separation plants are capital intensive and technically complex. The metal recovered from these plants becomes raw material feedstock for steel mills, electric arc furnaces, aluminum and other nonferrous metal smelters to manufacture a variety of products, including new vehicles. The automobile recycling rate is almost 100% and is the most recycled commodity.

Along with ELVs, shredders may also process other metal rich scrap, such as construction scrap and waste, large end-of-life appliances such as white goods. During the shredding process, the vehicle is broken down into much smaller pieces, and the metals are extracted. Both ferrous metals – iron and steel – and non-ferrous metals, such as copper, zinc and aluminum, are recovered. Ferrous metals make up about 70% of a vehicle, while non-ferrous metals make up about 6%. These are separated using magnetic separators. The amount of recyclable material that is removed from an ELV via shredding is generally calculated to be about 75% by weight.

Treatment of automobile shredder residue (ASR): The final processing of ELV by shredding generates many fractions and a residue also known as Automobile Shredder Residue (ASR) containing a variety of materials that could not be recovered by any of the processes employed. This residue has been a major concern and a lot of research has been going on for the uses of this residue. The two fractions identified in ASR are the light fraction representing 10-24% of the weight of the original vehicle and the heavy fraction representing 2-8% of previous vehicle weight. A gross estimate of ASR generated from ELV scrapping in relation to the original vehicle weight is 15-17%. Initially ASR was being land filled. Recent findings show that the light fraction of ASR could be used for energy

production while only the heavy fraction needs to be land filled. In Japan mixed ASR is used for thermal energy production. Meanwhile non-recoverable ASR need to be sent to TSDF for disposal.

The schematic diagram shown below depicts the steps required for a systematic recycling process but also indicates the percentage recovery rates of resources at different stages in the ELV scrapping process.

The de-pollution removes 3-5% of weight, dismantling 5-35% of weight, and remaining car hulk is about 60-90% of the previous car weight. The ferrous metal share after shredding is 35-65% while the non-ferrous share is 1-5%. Substantial amounts of non-ferrous parts enter into heavy ASR fraction (2-8%) while the light fraction of ASR is around 10-24%.

Non-recyclable residues generated in baler unit shall also be treated as hazardous waste requiring disposal through TSDF. Effective dismantling and segregation practices, may reduce quantity of non-recyclable residues requiring disposal.

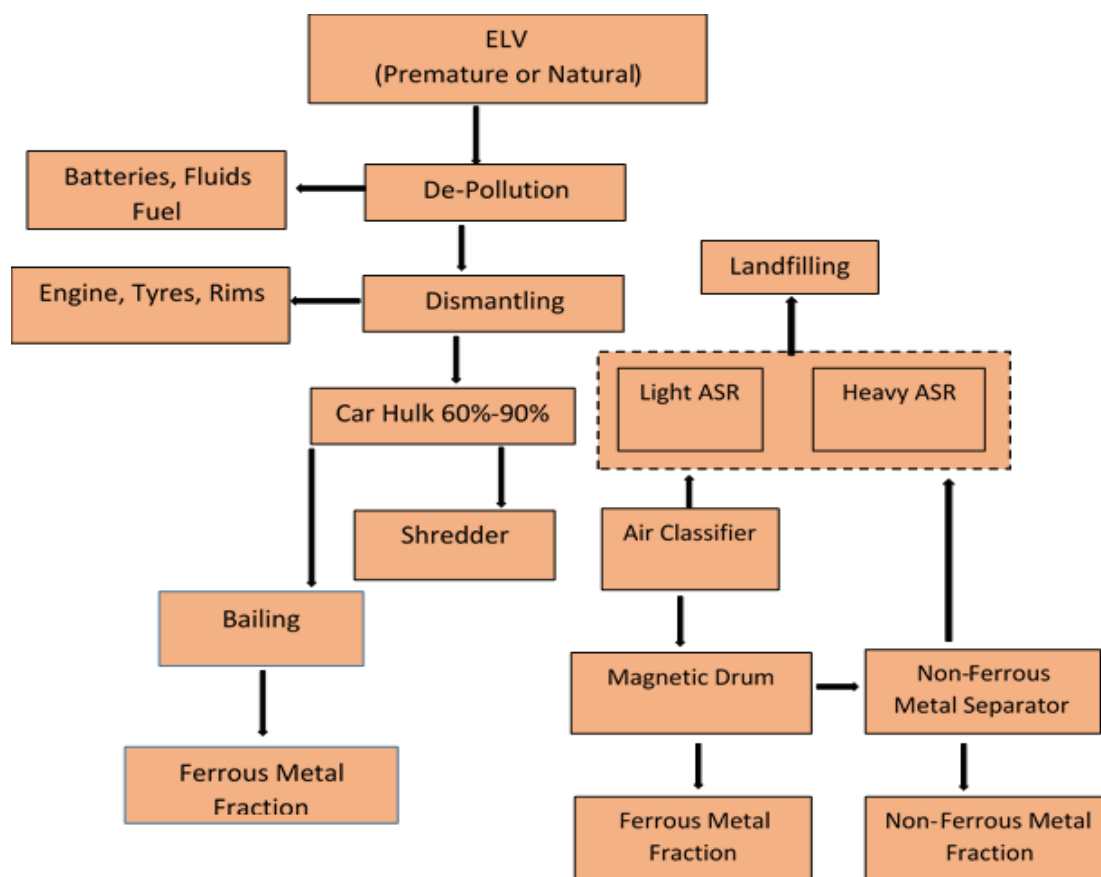


Figure 3: Typical ELV Processing

Post de-pollution, any improvement in dismantling would produce less quantity ASR. Hence, where possible the ELV

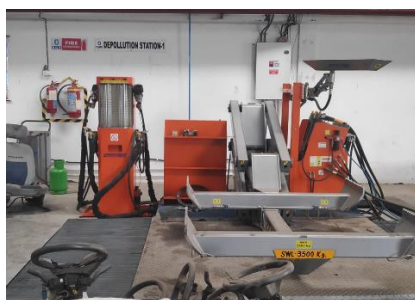
scrapping facility shall focus on effective dismantling, prior to shredding.

13. Facilities for Scrapping of ELVs at RVSFs

The facilities required for scrapping of ELVs depending on type of activities carried out are given below:

a) De-pollution, dismantling and segregation

- i. For the lifting of vehicles during the de-pollution process the facility needs a de-pollution frame or lifting device.
- ii. Pneumatic tools and electrical screwdrivers are required for detaching the parts to be recycled from the ELV.



- b) Bailing of vehicle hulk- Where shredders are not available, baler machine (hydraulic baling) are used to compress hulk, scrap metal and waste material to create dense blocks. Both ferrous and non-ferrous metals can be compacted by hydraulic baling press to increase the density of scrap. It reduces the storage and transportation costs and makes it easy to handle and charge in the furnace.

Balers are long bins equipped with a removable lid and hydraulic rams. Scrap is charged to the bin, the lid is closed and the scrap

is compresses under huge pressure. The pressure is exerted from all sides compressing it into a dense bale or bundle.



- c) Shredding: In shredder, de-polluted vehicle hulks are fed to the shredder/hammer mill with varying amounts of water. In case of dry shredding, extensive dust is sucked from the shredder by suction air streams. For moist shredding a small amount of water is sprayed into the shredder to eliminate airborne dust emissions from the shredder and from the product transfer points.
- d) Processing Residues (Light ASR) – After shredding, all material is injected into a chamber which normally contains a column of rising air. Light ASR, fluff and dust is lifted up by the air drag and removed by cyclone separators. There exist various types of classifiers that can separate particles of different sizes and weight classes.
- e) Processing Residues (Ferrous metal): Once light material has been separated, the remaining residue is transported to magnet separators / drum magnets for segregation of ferrous metals. Magnetic separation can be repeated until material is sorted to a satisfactory degree.
- f) Processing Residues (non-ferrous metal)
 - i. Eddy-current separators (ECS): In the next step, non-ferrous metals (aluminum, copper, zinc, etc.) are separated using eddy-current separators (ECS). The ECS is installed at the end of a conveyer belt and creates a magnetic field to throw conducting metals forward from the belt into a product bin, while non-metals simply fall off the belt. The separation process can be repeated until material is sorted to a satisfactory degree.
 - ii. Heavy media separation / sink-and-float separation: Another technology for segregation of non-ferrous metals is by heavy media separation, also called sink-and-float separation.

Material is introduced into a heavy medium mixture of water and very fine & dense powder. Denser particles will sink, while lighter particles will float on top of the medium.

g) Sorting of non-metal fractions

Following facilities adopted for sorting and separating metals from specific non-metal materials:

- i. Sorting of non-ferrous metal fractions: Sensors based on color recognition can be applied to differentiate copper and brass (red/yellow particles) from aluminum/ magnesium (white/grey particles).
- ii. Sorting of ASR – Non-metal residues (such as glass, fibre, rubber, plastics, dirt, etc) can be separated into light and heavy fractions using air classifiers.

h) Treatment of segregated materials

After the shredding and separation process, there are the ferrous metal, non-ferrous metal, and light & heavy ASR fraction. The ferrous and non-ferrous metal fractions are commonly processed in metal smelters. There are different options for treating the ASR fractions.

- i. Thermal treatment: ASR has a calorific value of 14 – 30 MJ/kg rendering it a valuable energy source. However, high chlorine content, brominated flame retardants, ash content and high heavy metal concentrations make it difficult to use it as fuel. To limit the amount of hazardous substances released from burning ASR, it may be co- incinerated in Municipal Solid Waste (MSW) incineration plants not exceeding a certain share in the fuel. Testing the flue gas emissions showed that the flue gas emission composition did not change significantly. However, concentrations of heavy metals increased in boiler and fly ash.
- ii. Another option is to improve the quality of the ASR. By removing the finest fraction of the ASR through screens, shaker tables, rotary drums or float/sink separation techniques the ASR fuel quality can be improved. Removing PVC from the ASR can lower the chlorine concentration of ASR. Density separation with a bath density of 1,100 – 1,200 kg/m³ can remove up to two-thirds of chlorinated plastics from the ASR.
- iii. ASR could be used as a fuel for cement kilns, tests using 50 % of ASR as fuel in the kilns had a negative effect on clinker as the concentrations of heavy metals in the material increased significantly. In addition, more ash is formed, clogging of the fuel

injection zone happens and increased concentrations of hazardous elements are found in the kiln dust.

- i) Metal recovery: For recovering metals from the recycling process, the obtained materials can be treated in different smelters. Ferrous metal fractions can be fed into electric arc or blast furnaces. The different metal fractions can be treated in copper or integrated smelters.
- j) Chemical recycling: There is the option of converting the organic content of ASR to liquid and gaseous fuels via pyrolysis or gasification. Through chemical recycling processes, materials such as monomers, light hydrocarbons, liquid and gaseous fuels could be extracted from the hydrocarbon- based fraction. The main sources of such products will be plastics and rubber. Pyrolysis is the thermal decomposition of organic materials (such as wood, coal, plastics, tires) to produce fuels and chemicals. Gasification is a process that converts the organic component of a material in a gaseous mixture of CO, H₂ and CO₂ and reduced metals. Gasification reactors commonly used are moving bed, fluidized bed and entrained flow reactors.
- k) Plastics recovery: Technologies that could be used to separate plastics from the ASR are heavy media separation, froth flotation, jigging, cryogenic grinding, use of magnets, air knives and vibrating tables. The thermoplastics content in the plastics fraction in ASR is high (70 – 80 %) and can be recovered, heated and remolded in products such as park benches, lamp posts, road side furniture, etc. Separation technologies that could be used for this task include water elutriators and gravity separators. The option of co-processing in cement kilns need to be considered when the segregated plastics are non-recyclable.
- l) Incorporation into other materials: ASR can also be recycled or stored by including it in composite, concrete or asphalt.
- m) Land-filling: Land-filling of the ASR is the most common treatment approach for this fraction as the other technologies described above are either too expensive or have significant negative environmental impacts.

14. Requirements for Setting up of ELV Scrapping Facility

1. The establishment of an ELV scrapping facility needs to be based on these guidelines, the best practices adopted and compliance to regulatory requirements under Water, Act, Air Act, Motor Vehicles (RFVVSF) Rules, 2021 and the rules notified under EP Act.

2. RVSFs shall only be set up by the formal, formalized or organized sector. Considering the benefits of material recovery and circular economy from the material recovered from ELVs, the activities presently taking place in the semi-formal sector needs support and channelization system for converting into formal facility. With the increasing vehicular population, a suitable infrastructure for large scale operations with the involvement of Producers of vehicles may be needed to deal with a large number of vehicles. The proposed mechanism for the ELV recycling facility is only an illustrative model and may need upgradation based on technical advancement.
3. ELV Facility and Operation Requirements: There is a need to identify land of adequate space to facilitate establishment of RVSFs in the States for scrapping of ELVs from small two wheelers to large trucks and trailers. It may be possible to have different facilities for different types of vehicles but one major facility in every region catering to a number of States would be advantageous. However, the interstate movement would need to be facilitated.

4. Procedures for Setting up & Management of RVSF

Steps required for setting up RVSF are the following:

- i. As per Rule 4 of Motor Vehicles (RVSF) Rules, 2021, ELV scrapping facility shall obtain registration from State Registration Authority of the concerned State Government or Union territory Government where Facility is intended to be located.
- ii. Land shall preferably be produced in an industrial estate/area to set up the facility. Requisite layout and design approvals shall be obtained from the concerned SPCB/PCC.
- iii. Any person(s) operating Collection Centre(s) and Dismantling Centre/RVSF shall fulfill the minimum requirements in accordance with the Rule 13 of the Motor Vehicles (Registration and Functions of Vehicle Scrapping Facility) Rules, 2021.
- iv. Environmental Clearances (EC), wherever applicable, shall be obtained based on the scale of operations as prescribed in the Environmental Clearance notification dated 14 September 2006.
- v. The RVSF shall have:
 - Suitable earmarked area for parking, scrapping yard operations (de-pollution, dismantling, segregation, bailing and/or shredding) and storage of scraps.
 - Parking of ELVs on non-permeable asphalt or concrete or epoxy coated flooring with adequate drainage facility shall be

- parked.
 - Certified de-polluting equipment to ensure zero leakage of pollutants during draining of fuels or fluids or gases and liquids, certified de-risking equipment for safe neutralization or removal of air-bags, pre-tensioner etc., appropriate dismantling equipment for the activities defined, designated areas for storing the segregated scrap, adequate space for storage and handling of segregated spares, designated space for temporary storage of automotive hazardous waste such as tyres, batteries, fuel, oils, liquids and gases, suitable safety and occupational health equipment, material handling equipment for the safe transportation of spares, scrap etc.
 - Appropriate Industrial grade lighting and ventilation systems, conformity to noise pollution norms and
 - Appropriate effluent treatment plants or water recycling plants
- vi. An Environmental Management Plan (EMP) shall be prepared and put in place.
 - vii. Consents to establish and consent to operate under the Water Pollution (Control & Prevention) Act, 1974 and Air Pollution (Control & Prevention) Act, 1981 from the concerned SPCB/PCC.
 - viii. Authorization under HOWM Rules, 2016, from the concerned SPCB/PCC for handling, storage, packaging, transportation of hazardous waste to authorized recyclers and treatment and disposal facility operators. The facility shall have membership or agreement with authorized recyclers and treatment and disposal facility operators. Further, solid waste shall be handled over to authorized waste collector of ULBs as per Solid Waste Management Rules, 2016 and Plastic Waste shall be handed over or sold to authorized recycler under Plastic Waste Management Rules, 2016.
 - ix. Requisite operations shall be planned for complying with provisions under Rule 4 of Motor Vehicles (RFVVSF) Rules, 2021 and AIS standards.
 - x. Facility shall have a written plan describing the facility's risk management objectives for environmental performance and compliance and its plans for attaining these objectives based on a "plan-do-check-act" continual improvement model.
 - xi. Regular evaluation of Environment, Health and Safety (EH&S) objectives and monitoring of progress toward achievement of these objectives shall be conducted and documented in the facility.
 - xii. Facilities shall take sufficient measures to safeguard occupational and environmental health and safety. Such measures may be indicated by local, state, national and international regulations

- agreements, principles and standards, as well as by industry standards and guidelines.
- xiii. The guidelines of CPCB for storage and transportation of hazardous waste shall also be compiled with.
 - xiv. Training & Capacity Building for employees at different levels.
 - xv. Environment, Health & Safety (E H & S)
 - a. An up-to-date, written hazardous materials identification and management plan to address the specific hazardous materials that would be handled.
 - b. Where materials are shredded or heated, appropriate measures to protect workers, the general public and the environment from hazardous dusts and emissions.
 - c. An up-to-date, written plan for reporting and responding to exceptional pollutant releases, including emergencies such as accidents, spills, fires, and explosions.
 - d. Liability insurance for pollutant releases, accidents and other emergencies.
 - e. Completion of an EH&S audit, preferably by a recognized independent auditor, on an annual basis.
 - xv. Facility to have a regularly implemented and documented monitoring and recordkeeping program that tracks key process parameters, compliance with relevant safety procedures, effluents and emissions, incoming, stored and outgoing materials and wastes.
 - xvi. Facility to have an adequate plan for closure and shall be updated periodically and financial guarantees shall ensure that the necessary measures are undertaken upon definite cessation of activities to prevent any environmental damage and return the site of operation to a satisfactory state, as required by the applicable laws and regulations.
 - xvii. Operator of Collection Centre(s) and RVSFs shall preferably accredit their centers/facility as per ISO 14001 (Environmental Management System)
 - xviii. In case RVSF do not have adequate capability or facility for recycling of hazardous waste (like e-waste, used oils, lead acid batteries, lithium-ion batteries, etc.), or for recycling of scrap material within its premises, then such materials shall be sold or transferred to authorized recyclers/utilizers.

5. Registration and Authorization of RVSFs

- a. The RVSF shall have consent to operate and authorization from the respective State Pollution Control Board/Pollution Control Committee
- b. Any person(s) operating both the Collection Centre(s) and RVSF shall obtain an authorization in accordance with the procedures prescribed in the Rule 6 of the Motor Vehicles (Registration and Functions of Vehicle Scrapping Facility) Rules, 2021 "Registration procedure for Registered Vehicle Scrapping Facility" or as per procedures prescribed by the concerned Govt. agency.
- c. Only the authorized RVSFs shall be allowed to scrapped the ELVs.
- d. ELVs scrapping shall be carried out by adopting environmentally sound techniques and as per this document, '*Guidelines for Environmentally Sound Facilities for Handling and Scrapping of End-of- Life Vehicles (ELV)*'.

15. Management of Various Wastes Generated During De-pollution, Dismantling and Shredding of ELVs

Besides obtaining useful scraps which can be channelized for recycling; de-pollution, dismantling and shredding of ELVs will generate light and heavy fractions ASR and several categories of wastes such as hazardous wastes, e-wastes, solid wastes and plastic wastes which requires to be managed in an environmentally sound manner in compliance with provisions stipulated under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016; E-Waste Management Rules, 2016; Solid Waste Management Rules, 2016 and Plastic Waste Management Rules, 2016, respectively.

The light ASR and heavy fractions ASR may be considered as hazardous wastes and in case authorized resource/energy recovery facilities are not available, the same shall be disposed in authorized common hazardous waste treatment, storage and disposal facility (TSDF) where the same may be imparted incineration or secured landfilling depending upon characteristics of the ASR. The indicative mode of management of various wastes generated during de-pollution and dismantling of ELV is given in **Table 2** below:

Table 2: Management of various wastes generated during De-pollution & Dismantling

S. No.	Details of HW	Management
1.	Engine	Drilling 6 inch hole in the casing to make it non-reusable, thereafter recovery

S. No.	Details of HW	Management
		of metal
2.	Used/waste oils	Recycling
3.	Transmission oil	Disposal / Energy recovery
4.	Brake fluids & cleaners	Disposal / Energy recovery
5.	Used fuel filters	Disposal / Energy recovery
6.	Refrigerant gases	Disposal through incinerator
7.	Automotive/E-vehicle Batteries	Recycling
8.	Air filter	Recycling
9.	Oil filter	Recycling
10.	Mercury containing switch	Disposal through TSDF
11.	Brake shoe clutch plates/discs	Disposal through TSDF
12.	Rubber parts	Recycling
13.	Glass parts	Recycling
14.	Airbags	Disposal
15.	Catalyst	Recycling/Utilization
16.	Seat belt assemblies	Recycling
17.	Seats	Recycling /Utilization (Seats, where safety belt anchorage and/or airbags are incorporated in the seat shall not be reused)
18.	CNG kits	Recycling

Note: The above components shall not be retained for reuse in after sales market.

New technologies/proposals for possible recycling/recovery of material from ASR from the fractions needing disposal should be encouraged. CPCB/SPCB may receive such proposals to study feasibility of the utilization options under Rule 9 of HOWM Rules, 2016.

(a) Management of Hazardous Wastes

Various hazardous waste generated during de-pollution/dismantling/shredding of ELVs such as Used Oil, Waste Oil, Transmission oil, brake fluid, coolant fluid, lead acid batteries, brake shoe, clutch plates, ASR, etc. requires to be managed in accordance with provisions stipulated under the Hazardous and other Wastes (Management and Transboundary Movement) Rules, 2016.

- i. Application made to SPCB/PCC for grant of authorization for handling, generation, collection, storage, transportation, packaging, offering for sale, transfer, disposal, etc. under Rule 6 of the said Rules shall clearly mention categories of hazardous waste, their quantity, method of recycling/recovery/disposal, etc. which

shall be carefully examined by the SPCB/PCC. Upon assessment of the same and verification during inspection by SPCB/PCC, authorization for management of hazardous waste may be granted by SPCB/PCC stipulating categories of hazardous waste, their quantity, method of recycling/recovery/disposal, etc. and other conditions as prescribed under Form 2 of the said Rules.

- ii. The storage period of hazardous wastes shall be in accordance with the Rule 8 of the Hazardous & Other wastes (Management and Transboundary Movement) Rules 2016.
- iii. The wastes generated during the de-pollution/dismantling/shredding activity shall be stored under a dedicated covered storage shed.
- iv. Proper slope with collection pits be provided in the storage area so as to collect the spills/leakages.
- v. The de-polluting/dismantling/shredding facility shall ensure that wastes are packaged in a manner suitable for safe handling, storage and transportation. The labelling on packaging shall be readily visible and material used for packaging shall withstand physical and climatic conditions.
- vi. Labelling of the hazardous waste container shall be in accordance with the provisions laid down under the HOWM Rules, 2016 and shall include the information with regard to waste type, the origin (name, address, telephone number of sender), hazardous property (e.g. flammable), and the symbol for the hazardous property (e.g. the red square with flame symbol).
- vii. Drums containing wastes stored in the storage area should be labeled properly indicating mainly type, quantity, characteristics, source and date of storing etc.
- viii. The collection center/de-polluting/dismantling/shredding facility shall ensure that the wastes generated during dismantling be sent or sold to an authorised recycler/utilizer or disposal facility, as case may be.
- ix. The de-polluting/ dismantling/shredding facility shall maintain a record of wastes managed by him as per the format given in Form 3 of the said Rules and prepare and submit to the State Pollution Control Board, an annual return containing the details specified in Form 4 on or before the 30th day of June following the financial

year to which that return relates in accordance with the said Rules.

- x. Handing over of the hazardous waste to the authorised actual user shall be only after making the entry into the passbook of the authorised recycler/utiliser. Further, such authorised recycler/utiliser shall also maintain records of wastes purchased in a passbook issued by the State Pollution Control Board/Pollution Control Committee along with the authorization.
- xi. The transport of hazardous waste containers shall be in accordance with the provisions of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the rules made by the Central Government under the Motor Vehicle Act, 1988 and other guidelines issued from time to time.
- xii. Manifest System shall be followed for movement of wastes. The flow of manifest document (which contains details of waste description & quantity, senders, transporters, receivers, acknowledgements by transporters and senders, etc.) as prescribed under the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, are as below:

Copy number with colour code	Purpose
(1)	(2)
Copy 1 (White)	To be forwarded by the sender to the State Pollution Control Board after signing all the seven copies.
Copy 2 (Yellow)	To be retained by the sender after taking signature on it from the transporter and the rest of the five signed copies to be carried by the transporter.
Copy 3 (Pink)	To be retained by the receiver (actual user or treatment storage and disposal facility operator) after receiving the waste and the remaining four copies are to be duly signed by the receiver.
Copy 4 (Orange)	To be handed over to the transporter by the receiver after accepting waste.
Copy 5 (Green)	To be sent by the receiver to the State Pollution Control Board.
Copy 6 (Blue)	To be sent by the receiver to the sender.
Copy 7 (Grey)	To be sent by the receiver to the State Pollution Control Board of the sender in case the sender is in another State.

The above manual manifest system would not be necessary once the facility gets registered on centralized Hazardous Waste Tracking System when implemented by CPCB.

(b) Management of Ozone Depleting Substances

The refrigerant gases used in vehicle air conditioning systems may contain ozone depleting substances and may require to be regulated as per Ozone Depleting Substances (Regulation and Control Rules), 2000, or other policies/directions issued by Central Govt. from time to time. In case of Ozone Depleting Substances, which have been phased-out, shall be disposed of as per the approved technologies (such as thermal destructing in secondary combustion chamber of the incinerator of TSDF or another such facility recognized by Central Government or the appropriate authority, as applicable).

(c) Management of E-Wastes

Air conditioners, display unit, printed circuit board, music system, etc., which are not in usable condition, shall be treated as E-waste during de-pollution/dismantling/bailing/shredding of ELVs. Such E-wastes shall be channelized to dismantlers/recyclers authorized under the E-Waste Management Rules, 2016 and amendments thereof. Records of such E-wastes generation and storage shall be maintained along with authorized dismantlers/recyclers to whom the same have been channelized. Manifest system for transportation of such E-wastes as prescribed under the said Rules shall be followed. Further, Annual Returns be submitted to the concerned SPCB/PCC by 30th June following the financial year to which that return relates, as stipulated under the said Rules.

(d) Management of Plastic Wastes

The plastic waste generated during de-pollution/dismantling/bailing/shredding of ELVs shall be channelized to registered recyclers authorized under the Plastic Waste Management Rules, 2016. Records of such plastic waste generation and storage shall be maintained along with registered recyclers to whom the same have been channelized. Further, Annual Returns be submitted to the concerned SPCB/PCC by 30th April of every year, as stipulated under the said Rules.

(e) Management of Solid Wastes

The solid wastes, which are not hazardous, shall be segregated, stored and the segregated waste be handover to authorized waste pickers or waste collectors in accordance with Solid Waste Management Rules,

2016. Records of such solid waste generation and storage shall be maintained along with authorized waste pickers to whom the same have been channelized. Further, Annual Returns be submitted to the concerned SPCB/PCC by 30th April of every year, as stipulated under the said Rules.

(f) Management of Waste Batteries and Tyres

Batteries recovered from the ELV should be channelized to authorized facilities for refurbishing, recycling or recovery of material as per provisions under Batteries Waste Management Rules 2022 (as re-notified). Further, EPR guidelines for management of waste tyres, notified under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, in July, 2022 shall be adhered to.

EPR regulation provides target for recycling of waste tyres and waste batteries, wherein the producers are required to channelize a specified quantity of material to authorized recycling facilities as part of their responsibility.

Waste tyres should be processed for production/recovery of carbon black, crumb rubber, crumb-modified bitumen, pyrolysis oil, etc. in the order of priority. The waste batteries should be channelized to authorized refurbisher for residual use or to authorized batteries recyclers for recovery of metals (Lead, Copper, Aluminum, Co, Li, etc.) or metal compounds (of Cobalt, Lithium, Nickel, etc) and plastics. Thus, ELV scrapping facility would facilitate EPR compliance of Producers of batteries and tyres.
