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Depollution Guidance for End-of-Life Vehicles over 3.5 tonnes

PB 9947

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Acknowledgments:

This advice was commissioned by Defra and DTI from Mayer Environmental Ltd. It is based on practical dismantling trials carried out during 2004 at Snows Commercials Ltd and CMS (Kent) Ltd and is intended to reflect current best practice.

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This document is also available on the Defra website (at www.defra.gov.uk).

Published by the Department for Environment, Food and Rural Affairs.
Printed in the UK, December 2004, on recycled material containing 80% post-consumer waste and 20% totally chlorine free virgin pulp.

PB 9947

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Introduction & background

As a result of European legislation, the way in which vehicles reaching the end of their useful life have to be treated has changed. In the UK, end-of-life vehicles (ELVs) over 3.5 tonnes in weight and their trailers need to be dealt with in compliance with this legislation. This includes end-of-life Heavy Goods Vehicles (HGVs) and end-of-life Passenger Service Vehicles (PSVs), for example buses and coaches. The facilities affected by the changes are those storing or dismantling these types of vehicles. The legislation does not apply to vehicles that are not end-of-life 'motor vehicles', for example battle tanks, aircraft, trains and ships.

For the purpose of this guidance the term 'end-of-life HGV' has been used to refer to all end-of-life motor vehicles over 3.5 tonnes in weight.

End-of-life HGVs have many pollutants associated with them and are classified as hazardous waste. The legislation requires that end-of-life HGVs are depolluted to remove their hazardous components and fluids. Components that require their fluids to be retained for reuse however, for example engines and gearboxes, are not required to be depolluted, providing they are stored in an appropriate manner.

This guidance details how to remove the specified hazardous components and fluids from an end-of-life HGV and, where they do not need to be retained in components for reuse, how to remove the fluids. An operator who carries out the relevant procedures in this guidance will have achieved the required level of depollution. The procedures outlined in the guidance however, are not the only methods that can be used to achieve this. Different methods may be used provided they result in the same levels of depollution.

This guidance document provides the following:

- A brief overview of the equipment and facilities relevant to depolluting end-of-life HGVs.
- A description of the depollution operations that need to be conducted to meet the requirements of the relevant legislation.
- An annex on the relevant environmental legislation, primarily the End-of-Life Vehicles Regulations 2003, which implements parts of the ELV Directive, and Health and Safety considerations.

The depollution procedures are only part of the overall process required to treat an end-of-life HGV. Other operations, such as conducting the required administrative activities and complying with all existing legislation relating to these activities, will still need to be carried out, but are beyond the scope of this guidance document.

This guidance has been developed to cover the depollution procedures for end-of-life vehicles over 3.5 tonnes in weight. For some end-of-life vehicles over but close to 3.5 tonnes in weight, the most suitable depollution procedures for certain components may be closer to those detailed in the previous Defra/DTI publication "Depolluting End-of-Life Vehicles, Guidance for Authorised Treatment Facilities"[1], which was developed for end-of-life vehicles (essentially cars and vans)

1 Copies of this guidance are available through the DTI website at www.dti.gov.uk

under 3.5 tonnes in weight. Reference to this document may therefore be required prior to depollution, in order to establish the most suitable depollution methods for a particular vehicle.

The varying size and characteristics of end-of-life HGVs as well as the market for resale will impact on how they are depolluted and dismantled. Larger vehicles might need to be worked on outdoors and accessed by other means where lifting is not possible. The larger quantity of fluids to be removed will require containers and storage tanks of sufficient capacity. However, the quantity of fluids contained in a vehicle will also vary according to the characteristics of the vehicle, for example, a small PSV will have a smaller quantity of fluids compared with a refuse truck. Where an end-of-life HGV is dismantled for the reuse of parts, depollution may follow the dismantling process and fluids may be left in parts to maintain their operation.

1.1 Equipment

There is no mandatory equipment for carrying out the depollution of end-of-life HGVs. Methods used for accessing the vehicle may include placement over a pit or lifting by means of pneumatic, mechanical-hydraulic, electro-hydraulic or electro-mechanical equipment.

Depending on the type of vehicle, it may also be possible to carry out some of the depollution procedures on a level surface. In the case of pneumatically operated equipment, the compressor used to power this equipment must have sufficient capacity to ensure that the equipment can operate satisfactorily.

Whichever method is used for the depollution, an assessment of the risks involved must be carried out and the measures necessary to comply with relevant health and safety legislation put in place. In addition, the methods used will need to deliver the required level of depollution.

Some of the considerations to be taken into account when deciding on where the end-of-life HGV will be depolluted may include:

- Clearance height below the vehicle
- Clearance height above vehicle when elevating the vehicle for depollution
- Height and weight of the vehicle
- Stability of the vehicle (affected by damage)

1.2 Site requirements

Sites undertaking the storage and treatment of end-of-life vehicles require a Site Licence from the Environment Agency. Where such vehicles are stored at the site on which they became end-of-life vehicles, the site operator does not require a licence but must still comply with certain storage standards.

Sites for the treatment and storage (including temporary storage) of end-of-life HGVs, require the following:

Sites for the storage of end-of-life HGVs

- The provision of an impermeable surface and sealed drainage system for the storage of end-of-life HGVs awaiting depollution. The sealed drainage system must be capable of collecting any contaminated surface water, including rainwater, from the impermeable surface.
- Site security at a sufficient level to prevent both the escape of waste from the site and unauthorised access.

Sites for the treatment of end-of-life HGVs

- The provision of an impermeable surface and sealed drainage system for the depollution of end-of-life HGVs. The sealed drainage system must be capable of collecting any contaminated surface water, including rainwater, from the impermeable surface.
- It may be necessary to obtain a consent if water is to be discharged. Discharges to sewers are generally controlled by the local water company. Other discharges are regulated by the Environment Agency.
- Appropriate storage areas for spare parts.
- The provision of an impermeable surface with a sealed drainage system for the storage of parts containing oil.
- Secure containers on an impermeable surface for the storage of lead acid batteries. The containers should be capable of preventing the escape of fluids and the ingress of rainwater.
- Appropriate storage tanks for the segregated storage of each fluid removed from end-of-life HGVs.
- Appropriate storage areas for tyres to minimise the risk of fire.

Vehicles that have been depolluted may be stored on a hardstanding and may be dismantled there if the dismantling does not involve or disturb the engine, transmission or hydraulic systems.

Some spare parts, for example engines, require oil to be retained in order to preserve working surfaces. Such parts must be appropriately segregated and stored on an area with an impermeable surface and sealed drainage system.

Defra guidance notes covering this part of the ELV Regulations can be found on the Defra website www.defra.gov.uk and in the Environment Agency/SEPA document "Guidance on the Standards for Storage and Treatment of End-of-Life Vehicles"

The health and safety implications of storing large quantities of hazardous and/or highly flammable materials need to be properly assessed in consultation with the Health and Safety Executive (HSE). The Environment Agency should be consulted on any environmental implications of the storage.

Overview of the depollution process

In order to depollute an end-of-life HGV, a number of operations have to be carried out. An example is shown in the following Process Flow Diagram. This was developed from practical trials with a number of different makes and models of HGV. Treatment facilities may develop an alternative sequence, providing they can demonstrate the same level of depollution has been achieved.

The removal of wheels/tyres is not a depollution requirement. However, removal may allow better access for draining of the shock absorbers. Depending on the methods used for accessing the vehicle, it may be easier to perform some of the depollution activities with the wheels on, to allow the vehicle to be moved.

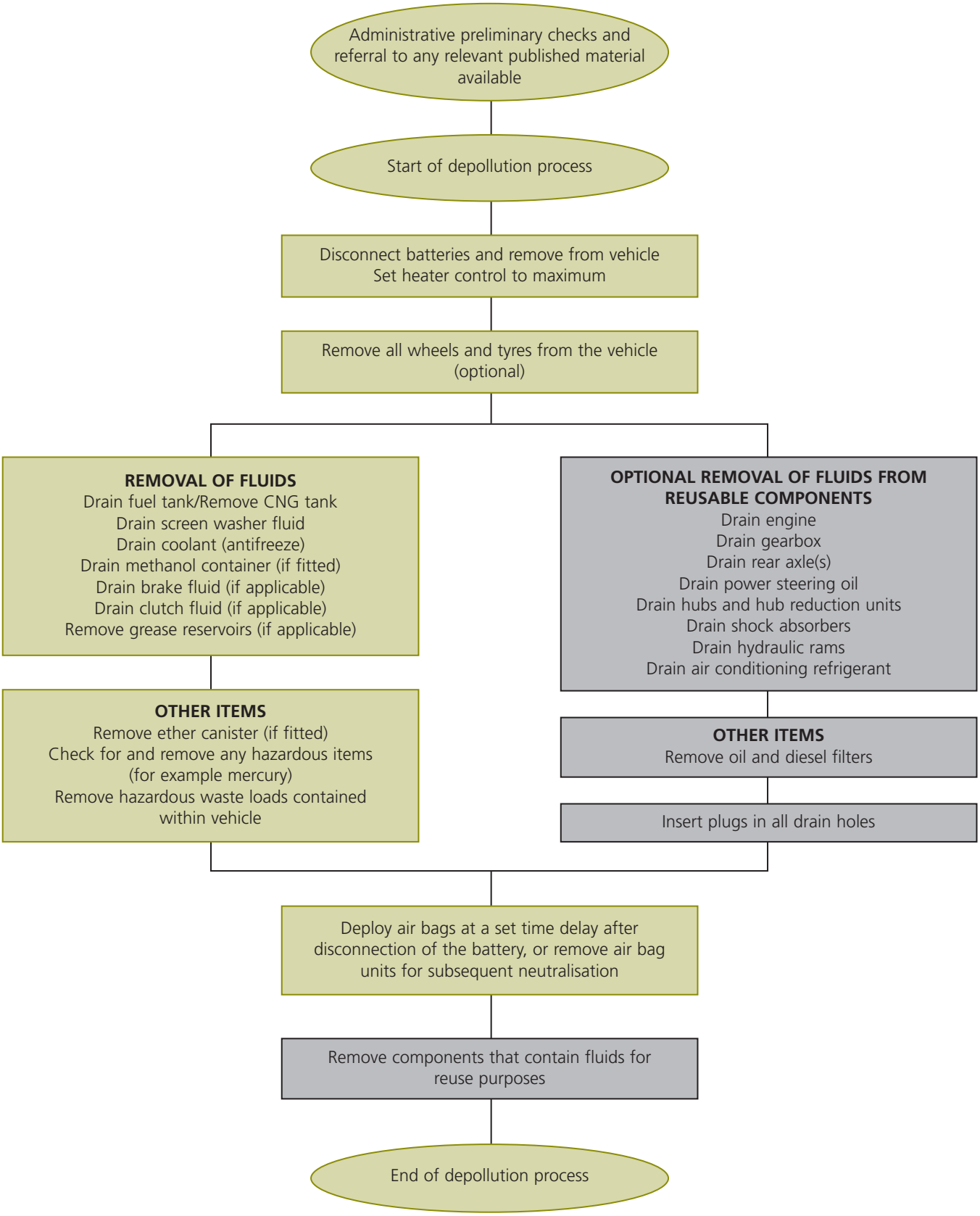
The depollution sequence showed in the example Process Flow Diagram can be represented as 4 stages:

- Preliminary activities
- Removal of fluids and other items
- Optional removal of fluids from reusable components
- Removal or deployment of air bags

The procedures required to complete each stage are described in the remaining sections of the manual.

After each depollution operation has been carried out, the fluid or item which is removed must be transferred to a suitable storage facility as soon as possible.

2.1 An example depollution process flow diagram



Preliminary activities

These activities prepare the end-of-life HGV for the next stage of the process (removal of fluids and other items). The activities that need to be carried out are:

- Where available, use published material to obtain information on the location of hazardous components and the quantities of fluids held within the vehicle
- Determine if the HGV contains air bags
- Remove batteries
- Set heater control to maximum

3.1 Use of published material

A manufacturer's handbook or other published material may be available for the end-of-life HGV being depolluted. These sources may provide information on the location of hazardous components and the quantities of fluids such as engine oil and gearbox oil. If available, consulting the relevant published material will ensure that appropriately sized containers are used for the draining of each component.

Note: Relevant published material is not always available, particularly for vehicles that are no longer in production. Vehicles may also have been periodically updated, making it difficult to obtain written information for earlier variants. Older vehicles do not always follow any specific build and may have various different power units, transmissions and bespoke suspension modifications which will not be documented.

Published material is only one method of obtaining information relevant to the depollution of HGVs. Appropriate information should be sought from wherever suitable.

3.2 Removal of air bags

Air bags are usually only contained in more recent HGVs and even then may be restricted to more deluxe models. Where fitted, the air bags may have already been deployed if the HGV was damaged in a road traffic accident.

If a visual inspection identifies that the end-of-life HGV does contain one or more air bags which have not been deployed, then these will have to be either removed for subsequent detonation or deployed in-situ. For safety reasons, neither of these activities (which are described later in this guidance document) should be conducted until at least 20 minutes after the battery has been removed from the vehicle.

3.3 Removal of batteries

The battery or batteries must be removed as a preliminary activity for health and safety reasons. This is to prevent possible electrical discharge when the fuel tank is drained, and to minimise the risk of a fire or explosion when gas-cutting the vehicle. Their removal also ensures that no charge is left in the air bags or any other electrically charged component.

The batteries are usually bolted to the side of the chassis and are usually easily disconnected and removed with standard tools. However, due to the weight and positioning of most HGV batteries, two people will usually be required to lift them off the vehicle. Some older vehicles may have batteries under the cab floor, or will require the cab to be tilted for access.

With some HGVs, the removal of side guards is required before the battery can be removed. In the case of crash or fire damaged HGVs, the removal of bodywork or melted plastics may also be necessary. In the event of the HGV having suffered a fire, the battery may have been burnt, so extra care should be taken due to the possibility of released acid.

3.4 Heater controls

In order to ensure that the coolant in the heater unit can be drained, the heater controls must be set at the position that would provide the maximum amount of heat. As there may be health and safety concerns regarding entering and sitting in the vehicle to conduct this operation, it should be done by reaching into the vehicle. With larger HGVs, a stepladder or safety cage may be required to access the cab.

Removal of fluids and other items

Many components removed from an end-of-life HGV will require their fluids to be retained in order for them to be kept in working order for reuse. This section details the depollution procedures for hazardous parts and components that would not need to have their fluids retained, and would therefore most likely apply to all end-of-life HGVs.

The activities that would need to be conducted are:

Fluids	Other items
Drain fuel tank/Remove CNG tank	Remove ether canister (if fitted)
Drain screen washing fluid	Identify and remove switches or other items containing mercury
Drain coolant (antifreeze)	Identify and remove other hazardous waste
Empty methanol bowl (if fitted)	
Drain brake fluid (if applicable)	
Drain clutch fluid (if applicable)	
Remove grease reservoirs (if applicable)	

4.1 Fuel tank

Three stages of removing the diesel from the fuel tank are suggested.

Stage 1: The diesel can be initially pumped or siphoned from the tank with a tube or probe which enters the tank through the fuel tank cap. This would usually be carried out with the fuel tank in situ on the vehicle. However, this procedure is unlikely to achieve the required level of depollution due to the presence of baffles within many HGV tanks, and the difficulties in keeping the fuel tank level.

Stage 2: If there is a bung at the bottom of the fuel tank, significantly more diesel can usually be drained by placing a suitable container underneath the fuel tank and removing the bung. It may be necessary to raise up one end of the vehicle to position the drain bung at the lowest point.

Stage 3: Fuel tanks can usually be easily removed from the vehicle using standard tools, and are typically removed for reuse. Once removed, the fuel tank can be manually tipped over an appropriate container to allow the remaining diesel to be drained from all compartments.

End point – no significant further draining of fuel observed

Many HGVs will have two fuel tanks either side of the chassis (saddle tanks) with a link pipe connecting the two. When draining saddle tanks, difficulties may be encountered with fuel draining from one tank to the other through the link pipe. It may be possible to raise one of the tanks with a forklift truck to allow the residual fuel in the higher tank to drain into the lower tank. This should only be done following stage 1 draining of both tanks. Problems may arise with bodywork still attached to the chassis. Alternatively, the link pipe may be clipped in two places and cut in-between. Each length of the pipe can then be raised to allow the residual fuel within it to drain into the tank.

Some HGVs are fitted with slightly pressurised fuel tanks, creating possible health and safety issues. Many crash damaged HGVs may also have pressurised fuel tanks due to their cabs being pushed backwards into the fuel tank by the impact. Broken fuel pipes and subsequent heating in the sun may also pressurise the fuel within the tank.

If attended by the Fire Brigade, crash or fire damaged HGVs may have had their fuel tank(s) filled with foam or water. In this event, similar drainage methods should be employed and the contents of the tank should be assumed to be hazardous.

4.2 CNG tank

Currently, very few HGVs are fitted with compressed natural gas (CNG) tanks, but the number is likely to increase in the future. The usual procedure for removing these is to:

1. Turn off the isolating valves
2. Unscrew the connecting pipes
3. Unbolt the supportive clamps or straps
4. Remove the tank to safe storage

Given that there are health and safety issues involved with the removal, handling and storage of CNG tanks, site operators are recommended to check with the Health and Safety Executive (HSE) on current guidance.

Information on the subsequent degassing of the removed CNG tanks should be sought from authoritative sources (for example the CNG tank supplier or vehicle manufacturer). ATFs may wish to decide that subsequent degassing of CNG tanks is carried out by specialist third party decommissioners.

4.3 Screen washing fluid

This is removed by pumping the fluid from the reservoir into a suitable container. The pipe placed in the reservoir must be long enough to reach the bottom.

End point – no remaining fluid observed in the reservoir

Either commercially available equipment or a simple pump can be used. If a simple pump is used, the reservoir must be inspected to determine that it has been completely emptied. Fire or crashed damaged HGVs may already have lost their screen washing fluid.

4.4 Coolant (antifreeze)

The majority of coolant can be gravity drained by removing or cutting the bottom hose from the radiator and collecting the liquid in a suitable container with a minimum volume of 75 litres. If the pipes from the antifreeze reservoir are damaged, it may also be necessary to pump the fluid directly from the reservoir using similar equipment for the removal of screen washing fluid.

End point – no significant further draining observed from each point and reservoir visually empty

The cylinder block and oil cooler (if fitted) also require the removal of coolant. This should be drained by removing the drain plug or tap at the back of the block, or disconnecting the lowest hose, and draining into a suitable container. In the case of HGVs with an intarder or oil-cooled gearbox, the coolant pipes leading into the gearbox also require draining. This should be conducted by cutting the lowest pipe and draining the coolant into a suitable container.

A higher level of removal can only be achieved if the heater valve is set to maximum as part of the preliminary activities.

4.5 Ether canister

Older HGVs may have a sealed and pressurised ether canister fitted for cold starting engines. This can be easily removed by unscrewing from the frame. Ether is flammable and should be stored appropriately.

4.6 Methanol container

A methanol container may be fitted on some older HGVs to prevent the brakes system from freezing in frosty weather. This has been replaced in some newer vehicles by a screw-on cartridge dryer. If fitted, the methanol container should be unscrewed and emptied into a suitable container. There are health and safety issues with the removal and storage of the methanol due to its flammable nature.

End point – methanol container observed to be empty

4.7 Hydraulic oils

Most HGVS have full air brakes, although some smaller vehicles are fitted with air assisted hydraulic brakes. Other hydraulic oils which an end-of-life HGV may contain are clutch fluid and power-assisted steering fluid. Power-assisted steering fluid may have to be retained in order to

keep the steering system in working order for reuse and is therefore covered in the next section. Refrigerated vehicles may have a hydraulic pump on the side of the engine to drive the hydraulic motor on the refrigeration unit. The reservoir is usually mounted high on the fridge body.

Some recent HGVs may have a hydraulic gear shift with its own sealed system under the cab.

4.7.1 Brake fluid

The brake fluid within the pipes can usually be drained by cutting the pipes at their lowest point to allow gravity draining into a suitable container. The amount of brake fluid drained from the pipes can be increased by pumping the brake pedal. However, there are health and safety issues relating to an operative entering and sitting in an end-of-life HGV.

End point - drainage time of 10 minutes and no significant further drainage from the brake pipes and no visible fluid left in the reservoir

In the case of damaged pipes, the brake fluid may need to be removed from the brake fluid reservoir by pumping the fluid into a suitable container. The pipe placed in the reservoir must be long enough to reach the bottom of the reservoir. Either commercially available equipment or a simple pump can be used. If a simple pump is used, the reservoir must be inspected to determine that it has been completely emptied.

4.7.2 Power hydraulic braking systems

Older HGVs may have a power hydraulic braking system comprising an engine-driven hydraulic pump which is used to pressurise a small hydraulic system. There are usually two hydraulic accumulators, consisting of metal cylinders containing a bladder filled with compressed nitrogen. The hydraulic pump pressurises the accumulators to give a reserve for braking when the engine is not running. There are health and safety issues involved with draining these systems due to the high pressures involved, even when the engine has been stopped for some time. Before cutting the brake lines to remove the brake fluid the hand brake lever and footbrake pedal need to be operated several times with the engine stopped, to release the hydraulic pressures in the system. Only then is it safe to cut the hydraulic lines. Operating the brake lever and footbrake pedal, however, does not discharge the pressurised nitrogen contained in the hydraulic accumulators.

End point – no significant further draining observed from the hydraulic line

4.7.3 Clutch fluid

Almost all HGVs have hydraulically-activated clutch release cylinders, unless fitted with automatic or semi-automatic transmission. Most are air-assisted. Where clutch fluid exists, similar methods to draining the brake fluid from the brake reservoir can be used. The remaining fluid can usually be removed by gravity by piercing the clutch line, once the filler cap has been removed. The amount of fluid drained can be increased by pumping the clutch pedal, although there may be health and safety issues with entering and sitting in the cab to do this.

End point - drainage time of 10 minutes and no significant further drainage from the clutch line and no visible fluid left in the reservoir

4.8 Switches containing mercury

Some switches, such as tilt-based switches, may contain mercury and must be removed.

An acceptable level of depollution will be achieved if any switches which are clearly marked as containing mercury or suspected of containing mercury are removed. A visual inspection of areas which contain this type of switch must be made during the depollution procedure. An unmarked switch might be suspected of containing mercury where the manufacturer has provided information on mercury switches used in a particular location within the vehicle.

4.9 Lubrication systems

Larger HGVs may have oil or grease lubrication systems, which for example, may release oil or grease on an automatic timer or upon use of the brake pedal. Grease used in these systems may be contained in a reservoir which should be identified and removed as part of the depollution process. Excessive grease left on the trailer coupling turntable (fifth wheel) or drawbar hitch should also be removed.

4.10 Other hazardous items

Regulations require the location of any components which may contain asbestos to be identified on the vehicle, for example asbestos brake pads. A visual inspection of the vehicle must be made during the depollution procedure to identify if the vehicle contains any notices indicating parts which contain asbestos. If any asbestos-containing components are identified during this procedure, they must be removed.

The procedure used to remove the asbestos-containing components must follow all health and safety guidelines relating to asbestos.

End-of-life HGVs may also contain other hazardous items, such as liquid crystal displays (LCDs) used in the instrument panels of newer vehicles. There is currently no requirement to remove any of these items, but further guidance may be provided in due course.

4.11 Hazardous loads – waste arisings

End-of-life HGVs, especially those which have come to the end of their life as a result of a fire or crash, may contain hazardous materials as part of the loads that they were carrying. The removal of such material is not required by the ELV Regulations, and a vehicle could be depolluted for the purposes of the Regulations yet still contain hazardous cargo. The only legal obligation on the site operator is to ensure that the treated vehicle is properly described and that it goes to a

suitably licensed facility. However, the removal of non-hazardous and hazardous waste loads from end-of-life HGVs often forms part of the dismantling process.

Hazardous waste loads may be associated with most types of HGV, although particular implications will exist with end-of-life tankers and refuse vehicles. Before accepting an end-of-life vehicle containing extraneous waste, information should be obtained on the nature of the waste. This may be obtained from the hazard warning diamonds on the side of the vehicle or from safety data sheets. In the case of tankers, it is recommended that a contractor experienced in the removal of a specific hazardous material should be used to empty the vehicle and certify its depollution. The health and safety procedures relating to the removal of the hazardous materials identified must be followed.

All wastes delivered to the site should be assessed against the appropriate conditions of the site licence prior to acceptance. Those wastes not permitted under the licence conditions should be rejected.

Suitable containers should be made available on site for the storage of waste loads removed from end-of-life HGVs and designated storage areas for hazardous waste should be provided.

Optional removal of fluids from reusable components

This section details the depollution procedures for components that would often require their fluids to be retained, in order for them to be kept in working order for reuse. This is permitted by the relevant legislation, providing that the following storage requirements are met. Storage areas for oil-contaminated parts should include:

- Appropriate segregation and storage from other parts
- Placing parts containing oil on an impermeable surface with a sealed drainage system

Only components for reuse may be stored in such a manner. The following procedures for the depollution of these components are provided in the event that the condition of the component or the current market renders a particular component unsuitable for reuse.

The activities that may need to be conducted are:

Fluids	Other items
Drain engine	Remove oil and diesel filters
Drain gearbox	Remove water purifier canister
Drain rear axles	Remove gearbox oil filter (if fitted)
Drain power steering fluid	Remove rear axle differential filter
Drain shock absorbers	
Drain hydraulic rams	
Drain air conditioning unit	

5.1 Engine oil

This is gravity drained by removing the drain plug at the bottom of the sump and collecting the oil in a container with a minimum capacity of 80 litres.

With vehicles that have suffered significant corrosion on their underside, particularly vehicles that have been driven off-road, the drain plug may be difficult to remove. In such cases, the drain plug can usually be heated and loosened with a chisel. If this is impractical, the sump can be removed with the oil contained, but this will require two people.

End point - the oil must be allowed to drain for a minimum of 20 minutes, or until such time as no visible further draining of oil is occurring

The drain plug or a suitable bung should be inserted at the end of the draining process.

5.2 Oil and diesel filters

Oil filters may be fitted on the engine, gearbox or rear axle differential. These should be removed using a suitable spanner or tool which does not puncture the oil filter during removal. The same should be carried out for diesel filters if fitted. The oil and diesel filters should be placed upside down in appropriate containers and allowed to drain. Alternatively, oil filters may be crushed using commercially available equipment to squeeze out the oil. Some HGV engines also have water purifiers containing an inhibitor that is slowly released.

5.3 Transmission oils

5.3.1 Manual and semi-automatic gearbox

The gearbox can be gravity drained by removing the drain plug(s) and collecting the oil in a suitable container with a minimum capacity of 30 litres. If an external oil cooler is fitted, this needs to be removed and inverted over a container to empty the retained oil.

End point - the oil must be allowed to drain for a minimum of 20 minutes, or until such time as no visible further draining of oil is occurring

As with engines, if the vehicle has suffered significant corrosion on its underside, the drain plug may have to be loosened with a chisel following heating.

The drain plug or a suitable bung should be inserted at the end of the draining process.

5.3.2 Automatic gearbox

For those HGVs with an automatic gearbox, oil should be drained from both the gearbox and the torque converter. The gearbox will need to be removed from the engine to enable access to the torque converter which can then be separated from the main gearbox unit. The procedure for draining the gearbox is the same as for a manual gearbox. The torque converter may require drilling if of a welded construction. There may also be a remote chassis-mounted oil cooler or filter with this type of unit which will also require draining.

5.3.3 Rear differential

The rear axle or differential can be drained by removing the drain plug which is usually situated at the bottom. Rear axles may be drained whilst still attached to the vehicle, although it may be difficult to fully depollute if the vehicle chassis is not level, for example if the suspension has

collapsed. In such cases, it may be easier to drain the rear axle once it has been removed from the vehicle. A suitable container with a minimum capacity of 10 litres should be used. Double drive vehicles will have two rear differentials that will require depolluting.

Rear axles are particularly prone to corrosion and difficulties may be encountered with removing the drain plug. Heating and loosening with a chisel can be conducted if the drain plug cannot be removed using standard tools.

End point - the oil must be allowed to drain for a minimum of 10 minutes or until such time as no visible further draining of oil is occurring

The drain plug or a suitable bung should be inserted at the end of the draining process.

5.4 Hydraulic oils

5.4.1 Power steering oil

Power steering fluid should be extracted from both the reservoir and the connecting hose. The fluid from the reservoir is removed by pumping the fluid into a suitable container. The pipe placed in the reservoir must be long enough to reach the bottom. Either commercially available equipment or a simple pump can be used. If a simple pump is used, the reservoir must be inspected to determine that it has been completely emptied.

Fluid is removed from the hose by cutting it at the lowest point and allowing the fluid to gravity drain. The amount of fluid drained from the hose can be increased by turning the steering wheel, although there may be health and safety issues regarding this. The vehicle would need to be raised to take the weight off the axle in order to facilitate this.

End point - no significant further visible draining of oil

5.5 Hub and hub reduction units

Hubs on an HGV may be grease or oil filled. Oil filled hubs or hub reduction units have a drain plug which can be removed to allow drainage into a suitable container. The removal of the oil can be made easier if the chassis is raised to allow rotation of the wheel until the drain plug is at the lowest point. Full depollution can then be achieved.

End point - the oil must be allowed to drain for a minimum of 5 minutes or until such time as no visible further draining of oil is occurring

Grease filled hubs are usually sealed and are not required to be depolluted.

5.6 Suspension system

The suspension system on most HGVs is assisted by an independent shock absorber for each wheel. The air suspension fitted on many HGVs needs to be deflated before attempting to access the underside of the vehicle. Otherwise it is advised that either, stands are placed below, or blocks are placed between the top of the axle and the base of the chassis to prevent the vehicle dropping and the operative becoming trapped.

5.6.1 Shock absorbers

Shock absorber fluid can be removed from an end-of-life HGV by removing the shock absorbers. However, the time required to conduct this operation is considerable.

The recommended approach is to drain the fluid from the shock absorber without removing it from the end-of-life HGV. Shock absorbers contain fluid in both an inner and an outer cylinder. Lifting the chassis of the vehicle and allowing the shock absorbers to extend will release the pressure and make the removal of the oil easier. Each shock absorber should then be drilled at the base through both compartments in order to release the oil. Lowering the chassis will push the shock absorber down, thus ensuring the majority of the oil has been drained. The axle will generally be removed during the dismantling process which will disconnect the lower end of the shock absorber, thus making the depollution of the shock absorber easier.

End point – no significant further draining of oil observed

5.7 Hydraulic rams

Many HGVs contain hydraulic rams which will require depolluting, if they are not to be stored for reuse. Some hydraulic rams may contain drain plugs which can be removed to allow drainage of the oil into a suitable container. Those without drain plugs should be drilled in a similar manner to shock absorbers. With some rams, it may be easier to drain the oil after removal from the vehicle. This will allow the ram to be extended before being drilled or having the drain plug removed.

Some rams, such as those for tilting the cab, will have a lock valve incorporated which would need to be removed before they can be fully depolluted. Rams may be single acting (oil in one side only), or double acting (oil in both sides). The operative will need to identify which type applies, to ensure that the ram is fully depolluted. Double acting rams require drilling on both sides.

Some vehicles may also carry a hydraulic oil reservoir which will require draining. This may be undertaken by pumping the oil directly from the reservoir.

End point – no significant further draining of oil observed and no visible fluid left in the reservoir

5.8 Air conditioning units

Air conditioning, although rarely used on older HGVs, is now common on modern higher specification vehicles. Air conditioning systems are commonly reused as complete units.

The two types of refrigerant that are historically used in vehicle air conditioning systems are R12 and R134a. The type of refrigerant is often marked on the vehicle.

If it is necessary to drain the air conditioning unit, the refrigerant must be removed using specialist equipment. Two collection cylinders are required; one for R12 (a chlorofluorocarbon or CFC), and the other for R134a (a hydrofluorocarbon or HFC). This equipment is attached to the air conditioning filler valve, and takes about 10-12 minutes (the time depends on the system and the ambient air temperature) to remove all the fluid and transfer it to the collection cylinder. On removal, the reservoir will freeze up and then sweat. Time will then be required for the reservoir to return to ambient temperature before it can be drained.

Note: R12 can no longer be obtained and alternative replacement coolant may be used. It is usual for the coolant type to be marked somewhere on the system.

5.9 Refrigeration bodies

HGVs, such as articulated lorries or panel vans, may have refrigeration units and insulated bodies.

CFCs may be contained within both the refrigeration unit and the expanded foam panels within the body of the vehicle or trailer. The refrigeration unit should be drained following a similar method to the drainage of air conditioning systems.

The blowing agent used will need to be taken into consideration when determining the most appropriate waste management option for the expanded foam panels. Where it is identified that the panels contain hazardous substances, such as CFCs, an assessment will be necessary to determine if the panels are hazardous waste. Guidance on undertaking this assessment and in particular, the threshold test for H14 Ecotoxic, can be found in "Interpretation of the definition of hazardous waste Technical Guidance WM2" available from the Environment Agency's website www.environment-agency.gov.uk.

Removal or deployment of air bags

The Regulations require air bags to be either removed or deployed because they have explosive components. As air bags are electrically operated, they can be disabled by disconnecting the battery of the end-of-life HGV. However, they need to be removed or deployed in order to prevent problems occurring during subsequent metal recycling operations.

Undeployed air bags can be removed and stored. However, as they are explosive devices, the storage facility would have to meet all relevant regulations and requirements for the storage of explosive materials. There are also health and safety issues associated with the handling and storing of undeployed air bags. Consequently, the recommended procedures are to either:

- Remove the air bag and deploy it immediately, or
- Deploy the air bag within the vehicle

Air bags are generally only contained in modern high specification HGVs. This will usually be a single air bag contained in the steering wheel, and it is a relatively simple, and short procedure to remove this in accordance with the guidelines provided by the Health and Safety Executive. However, there must be a minimum period of about 20 minutes (check manufacturer's recommended delay times) from the time the battery is removed before any removal of air bags commences. This is because the air bag may retain a residual charge which might result in it being detonated when removed. Any residual charge is lost if the air bag is not connected to a battery for more than the manufacturer's recommended time period. The air bag can then be deployed in accordance with health and safety guidelines. Commercial equipment for this is available, but suitable equipment can also be constructed. As different air bags use different connections, a number of connection adapters will be required.

The equipment used for detonating air bags which have been removed from an end-of-life HGV or are left in situ must enable the operator of the equipment to be a minimum of 20 metres from the air bag or vehicle when it is deployed. Suitable procedures which ensure that no other person will be within 20 metres of the air bag when it is deployed must be followed.

The level of noise produced during the deployment of air bags must be assessed, and discussed with the local authority, particularly if the treatment facility is close to a residential area.

Although this guidance describes the general procedures, ATFs should ensure that any specific guidelines provided by vehicle manufacturers are followed.

6.1 Seat belt pre-tensioners

End-of-life HGVs which contain air bags may also contain seat belt pre-tensioners. These are designed to fire before or at the same time as the air bags are deployed and work by clamping the seat belt wearer to the seat preventing them from gaining too much acceleration or twisting before they hit the air bag. As seat belt pre-tensioners contain explosive devices, they need to be deployed as part of the depollution procedure.

Seatbelt pre-tensioners can easily be removed and then detonated, although the manufacturer's advice on this should be sought. Procedures designed to deploy air bags in-situ will also detonate seat belt pre-tensioners. Consequently, in-situ detonation at the same time as air bags is the recommended approach for these items.

End of depollution process

When all of the depollution activities described in this guidance document have been conducted, the non-reusable fraction of the end-of-life HGV may then be sent for recycling.

All fluids and other items which have been removed will need to be appropriately stored until they are either treated or sent for recycling or disposal through a suitably licensed waste management contractor.

1.1 Legislation

The relevant pieces of legislation are:

1. The End-of-Life Vehicles (ELV) Regulations 2003
2. The updated versions of both the European Waste Catalogue (EWC) and Hazardous Waste List (HWL) (2000/532/EC) and its subsequent amendments.

1.1.1 End-of-Life Vehicles Regulations

The ELV Regulations 2003 (Statutory Instrument 2003, No.2635) introduced measures to promote and increase recycling and to further protect the environment by requiring adequate depollution (for example the draining of fluids and removal of hazardous components) and sets minimum technical requirements for the treatment of ELVs. The End-of-Life Vehicles Regulations 2003 were implemented in England and Wales and the depollution requirements apply to all end-of-life motor vehicles. Parallel regulations were introduced in Scotland and Northern Ireland.

The facilities carrying out the depollution of end-of-life vehicles (Authorised Treatment Facilities or ATFs), are required by the ELV Regulations 2003 to have a waste management licence, issued by the Environment Agency.

The depollution requirements of the ELV Regulations 2003 are taken from the EC ELV Directive and are given below.

Extract from Part 2

Minimum technical requirements for treatment

3. Treatment operations for the depollution of a waste motor vehicle shall consist of:

- the removal of the battery or batteries
- the removal of the liquefied gas tank
- the removal or neutralisation of all potentially explosive components (including air bags)
- the removal and separate collection and storage of fuel, motor oil, transmission oil, gearbox oil, hydraulic oil, cooling liquids, antifreeze, brake fluids, air-conditioning system fluids and any other fluid contained in the end-of-life vehicle, but excluding any fluid which is necessarily retained for the reuse of the part concerned
- the removal, so far as is feasible, of all components identified as containing mercury.

The individual hazardous components and materials removed during depollution should be stored separately.

Clearly, ATF site operators need to remain vigilant for any other hazardous materials or items that might be encountered in the course of their operations.

1.1.2 European Waste Catalogue and the Hazardous Waste List

The European Waste Catalogue (EWC) and Hazardous Waste List (HWL) were first published in 1994. These are used for the classification of all wastes and hazardous wastes, and are designed to form a consistent waste classification system across the EU. They form the basis for all national and international waste reporting obligations, such as those associated with waste licences and permits, and the transport of waste. They were implemented in the UK by the Special Waste Regulations (1996).

Updated versions of both the European Waste Catalogue and Hazardous Waste List were published as a homogenised list of hazardous and non-hazardous wastes in 2001, and came into force on 1 January 2002.

The updated EWC now includes ELVs (Category 16 01) and lists a number of hazardous wastes in this category. This list is more comprehensive than that in the ELV Regulations, and also applies to all vehicles.

1.2 Health & safety considerations

Vehicle depollution will involve the removal and storage of fluids that may be flammable, explosive or corrosive. In addition, it should be noted that there may be several pressurised systems within the vehicle to be depolluted/dismantled. Care should be taken to identify potentially pressurised systems, and measures taken to handle them safely implemented.

The legislation covering these areas includes:

- The Management of Health & Safety at Work Regulations 1999 – these require the activities to be risk assessed and procedures put into place to ensure the appointment of competent people and the availability of health and safety information and training.
- The Control of Substances Hazardous to Health Regulations (COSHH) 1999 - these require the employer to risk assess each hazardous substance, and put procedures in place to protect the employees from the risks associated with them.
- The Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002 - these were introduced to protect people from the risks from fires, explosions and other similar events that may occur as a result of the presence or use of dangerous substances in the workplace. These regulations replace the requirements of the Highly Flammable Liquids and Liquefied Gases Regulations 1972.

Further guidance on health and safety considerations can be obtained in the Health and Safety Executive's leaflet "Reducing Ill Health and Accidents in Motor Vehicle Repair"(INDG356).

The procedures used for depolluting end-of-life HGVs must satisfy all relevant health and safety requirements and advice should be sought from the Health and Safety Executive (HSE).