

Personal Protective Equipment

It is very difficult to design out the risk of contact with oil, otherwise known as a hazardous substance, while working with an oil installation. This means some basic forms of protective clothing must be worn at all times. As a minimum these will include, but are not limited to:

- Cotton overalls – Nylon should never be worn;
- PVC gloves;
- Safety footwear.

All clothing worn for protective purposes must be robust and in good condition. Overalls which have absorbed small quantities of oil must be washed and those which have been heavily contaminated should be washed, dry-cleaned, laundered and starched to stiffen the fabric.

Other types of PPE likely to be required are, but not limited to:

- Eye protection

Safety goggles/glasses must be worn where there is any foreseeable risk of injury to the eyes. Types of hazard include, flying particles, oil vapours, splashes from chemicals, sparks and gases, all of which can be induced when removing oil residues, cleaning and purging a tank and carrying out any cutting/hot work.

- Ear protection

The Control of Noise at Work Regulations has designated an exposure level of 87dB as the point where ear protection must be worn by all personnel exposed to such noise levels. Correctly worn ear defenders are the most suitable form of ear protection.

Power tools used to cut up a tank and equipment used to clean and purge a tank are likely to generate sufficient noise levels, bringing about the need to wear ear protection.

- Head protection

A suitable safety helmet/hard hat must be worn where there is any foreseeable risk of injury to the head. Work on construction sites and tasks which involve entry into a confined space and the dismantling of a tank are likely to require the provision of suitable head protection.

- Respiratory protection

When working within a confined space, such as inside of an oil storage tank or area where oil vapours are likely to accumulate, full breathing apparatus with clean oxygenated air from a source independent of the immediate atmosphere must be worn. It is important that the breathing apparatus used is suitably tested and certified for use and that all technicians have valid breathing apparatus training certificates.

Face masks and other respirators which are designed to remove impurities from the air are not acceptable under these conditions.

Further information on PPE can be found in OFTEC Technical Book 1.

- Flammable gas detector to BS EN 60079-29-2

This device detects the presence of flammable vapours and gases in atmosphere and provides a warning when concentrations are approaching an explosive range (see example below). A flammable gas detector must be used during work which involves purging to certify a tank as being gas-free. It is also necessary to continuously monitor the volatility of the atmosphere within a tank during tasks that involve entry inside a tank and hot work. All flammable gas detectors must be tested and certified suitable for use by a UKAS accredited test house every 6 months.



Technicians using a flammable gas detector must receive prior training on the correct operation of the device. It is equally important to understand the limitations of the device as most will not detect solid matter or non-volatile liquids. A thorough understanding of such limitations is essential to avoid false readings. There is guidance in the HSE publication “The selection and use of flammable gas detectors”, which is available from the HSE website, www.hse.gov.uk.

Control of Substances Hazardous to Health Regulations (COSHH)

These regulations apply to hazardous substances and affect technicians who work with kerosene, gas oil or bio liquid/mineral oil blends. They require employers to assess the risks arising from hazardous substances to make sure such substances are worked with safely. Information on COSHH regulations can be found in OFTEC Technical Book 1.

Permit-to-work

A permit-to-work system is a formal check which is used to ensure that all the elements of a safe system of work are in place prior to undertaking any work which is categorised high risk, as identified by prior risk assessments.

Before any work forms part of a work permit, a method statement must be supplied, detailing how work will be carried out in a manner that is safe.

Types of work which require a work permit include, but aren't limited to:

- Entering confined spaces;
- Hot works.

A work permit must specify the type of work that will be done and by who, including the necessary safety measures that are needed having considered foreseeable hazards.

Guidance on permit-to-work systems, including the essential features of a permit-to-work form, should be taken from the HSE publication "Permit-to-work systems" (see extract below), which is available from the HSE website, www.hse.gov.uk.

1 Permit title	2 Permit reference number Reference to other relevant permits or isolation certificates
3 Job location	
4 Plant identification	
5 Description of work to be done and its limitations	
6 Hazard identification – including residual hazards and hazards associated with the work	
7 Precautions necessary and actions in the event of an emergency – people who carried out precautions, eg isolating authority, should sign that precautions have been taken	
8 Protective equipment (including PPE)	
9 Issue – signature (issuing authority) confirming that isolations have been made and precautions taken, except where these can only be taken during the work. Date and time duration of permit. In the case of high hazard work (paragraph 26) a further signature from the permit authoriser will be needed	
10 Acceptance – signature confirming understanding of work to be done, hazards involved and precautions required. Also confirming permit information has been explained to all permit users	
11 Extension/shift handover procedures – signatures confirming checks made that plant remains safe to be worked upon, and new performing authorities and permit users made fully aware of hazards/precautions. New expiry time given	
12 Hand-back – signed by performing authority certifying work completed. Signed by issuing authority certifying work completed and plant ready for testing and recommissioning	
13 Cancellation – certifying work tested and plant satisfactorily recommissioned	

Working in confined spaces

Oil storage tanks are considered to be a confined space and entering a tank to perform work should be avoided where possible. This may bring about the need to identify alternative methods of carrying out tasks so that entry is not necessary. For example, cleaning can often be achieved from outside of a tank using appropriate long reach equipment and tools, or remote cameras can be used for internal inspection of a tank.

If entering a tank is unavoidable, guidance should be taken from the HSE publication 'Safe work in confined spaces', which is available from the HSE website, www.hse.gov.uk.

Isolation / Removal of Residues

Preparation

Before work on an oil storage tank can begin, technicians should be adequately prepared to deal with an oil leak or spill. An oil spill kit should be readily available nearby and all technicians working on the tank should know how to use its contents. Typical spill kits contain sorbent materials, drain blockers and leak sealing putty, which can reduce the chance of a leak or spill causing pollution (see example below).



Further guidance on how to deal with oil spills can be found in Pollution Prevention Guidance note 'Dealing with spills: PPG 22', which is available from:

- Environment Agency - www.environment-agency.gov.uk
- NIEA - www.doeni.gov.uk
- SEPA - www.sepa.org.uk

Tanks should be checked for the grade and volume of oil held. The person responsible for ordering the fuel should have this information available. It is important to establish if the tank was previously used to hold any different classes of fuel such as heavy fuel oils, in which case additional safety and environmental measures may need to be taken.

Containers which are to be used to store oil residues must be checked for sound condition to make sure there are no splits or unsealed openings where oil can escape. This is a legal requirement in Scotland under the Oil Storage Regulations. The container should be able to contain the oil residues without damage and consideration should be given to the potential weight of the container when full to avoid personal injury being caused if it will need to be moved. Containers with a capacity above 200 litres used in England and Northern Ireland, or 200 litres or more in Scotland, will be subject to Oil Storage Regulations and must be provided with secondary containment.

Isolation

Prior to commencing work on an oil storage tank, the tank should be isolated from any downstream equipment.

Removal of residues

Liquids should be transferred into suitable containers using appropriate equipment such as:

- Hand pumps

These are manually operated suction pumps which are ideal for extracting small quantities of oil. Some units have an integral containment facility.

- Changeover pumps

Less time consuming than hand pumps, these are electrically driven suction pumps capable of transferring oil from one tank to another, or into suitable containers ready for transportation.

- Vacuum tankers

Similar to an oil delivery vehicle, vacuum tankers can be considered where large volumes of oil need to be extracted. Some waste management companies offer a service that allow a quantity of oil to be uplifted and held on board for immediate transportation.

Caution should be exercised when using changeover pumps or vacuum tankers to avoid high transfer rates and splashing, both of which could generate static electricity.

Residues at the bottom of a tank can be flushed out by putting a layer of water into the tank. This allows the oil to float up to a level where it can be removed by a suction pipe. Where the extracted residues, including any water put into the tank are to be disposed of, these should be safely stored in suitable containers which are appropriate for transportation and labelled appropriately. Refer to the “Transportation” and “Waste Management” sections of this guidance for further information on environmental legislation and registrations/licences which apply to this type of work.

Where the oil is to be re-used, e.g. distressed tank replacement, the oil should be stored in clean containers that are able to hold the oil without being damaged. It is important that any oil that will be put back in a new tank is kept free of contamination such as water or chemicals.

Before a tank is cleaned, purged, dismantled or transported, it is important that all oil and liquid residues are removed.

Cleaning

Cleaning is the removal of solid and liquid residues from an oil storage tank. Tanks that will need hot work, for dismantling purposes, will need to be cleaned and purged before hot work starts. Refer to the “Purging” and “Dismantling” sections of this guidance for further information.

Tanks can also be cleaned as part of a tank maintenance schedule to promote good tank husbandry or where water contamination or bacterial growth is suspected. Cleaning may also be necessary where the tank is to be re-used for storing a different class of oil in order to prevent cross-contamination.

When performing any cleaning process, detergents should be selected that are compatible with the tank material and are able to provide effective removal of the residue. Provision must be made so that no liquids are lost to the environment during the cleaning process.

Liquids or waste resulting from the cleaning process should be treated as hazardous or special waste. Refer to the “Transportation” and “Waste Management” sections of this guidance for information on environmental legislation and registrations/licences which apply.

Suitable cleaning methods are:

- Water washing

This process typically involves using a small jet washer to spray a high-pressure jet of hot detergent solution onto all internal surfaces of a tank. During the process, residues should continuously be removed from the tank and appropriately contained.

- Steam cleaning

Steam cleaning should be done with extreme caution, especially when a tank has previously contained kerosene or where tank cleaning is to be performed on domestic premises. Advice should also be taken from the tank manufacturer to check if the tank material structure is likely to be altered when coming into contact with steam.

Steam cleaning involves passing pressurised dry steam freely into a tank. The internal surfaces of the tank should rise in temperature sufficiently to encourage removal of the residues. As the steam condenses, residues are flushed to the bottom where they can be removed into appropriate containers.

It is important to make sure that thermal expansion of the tank, from the steam, does not put any undue stress on fixed pipework or fittings connected to the tank and that a vacuum is not created once the tank cools as this could cause the tank to implode. Therefore, it is important that access hatches are left open after steam cleaning has been completed to prevent a vacuum forming.

After cleaning, a thorough internal inspection of the tank should be carried out to ensure that all solid and liquid matter has been removed before the cleaning process can be considered complete. Where the tank has limited openings, mirrors and torches can be used but it is essential that any lighting and electrical equipment used inside the tank is intrinsically safe and designed for use in flammable atmospheres.

The HSE publication “CS 15” provides guidance on suitable methods of cleaning a tank containing flammable residues and is available from the HSE website, www.hse.gov.uk.

Purging

Purging is the removal of flammable gases or vapours from the immediate atmosphere inside an oil storage tank. Purging must be completed prior to entering a tank and before hot work is started.

For hot work to take place, the atmosphere inside a tank must have a Lower Flammable Limit (LFL) of 1% or less.

Vapour dispersion

During the purging process, arrangements should be made to control the dispersion of flammable vapour being expelled from a tank. Good ventilation is important and wherever practicable, the work should be performed in open air and remote from large buildings, structures and people. Consideration should be given to the avoidance of low lying areas with features such as open drains and sewers. Where large volumes of vapour may be released, the surrounding area should be monitored to indicate any build up of vapour. Warning signs must be appropriately placed on the tank and a safety zone established whilst work is in progress (see example below).



The Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) apply where flammable gases are present. These regulations mean technicians must protect people, including the public, whose safety may be put at risk from fires or explosions which could occur. Guidance on technician's responsibilities under DSEAR should be taken from the HSE website, www.hse.gov.uk.

Gas-freeing

The gas-freeing of tanks is commonly carried out in conjunction with cleaning, but it must not be assumed that because a tank has been cleaned, it will be gas-free. To confirm that a tank is gas-free, the atmosphere inside the tank must be monitored at different points throughout the tank during the entire process using a UKAS certified, calibrated combustible gas detector. Where the atmosphere inside a tank is found to be within limits, a gas-free certificate can be issued and the tank should be marked accordingly. A gas-free certificate is only valid for a 24 hour period. If this period of time is exceeded, a tank cannot be assumed to be gas-free and the purging process should be performed again.

The HSE publication "CS 15" provides further guidance on methods of gas-freeing a tank containing flammable residues and is available from the HSE website, www.hse.gov.uk.

Inerting

Where it is impracticable to clean and gas-free a tank, 'inerting' can be considered to prepare a tank for hot work. This involves reducing oxygen levels within a tank to the point where combustion is not supported.

Inerting can be achieved by passing inert gas, such as nitrogen or carbon dioxide freely into a tank. Where an inert gas is used, care must be taken to make sure that the gas is uniformly mixed within the tank by monitoring the flammable vapour concentration throughout the tank using a UKAS certified, calibrated combustible gas detector.

Where the atmosphere inside a tank is found to be within limits, a gas-free certificate can be issued and the tank should be marked accordingly. A gas-free certificate is only valid for a 24 hour period. If this period of time is exceeded, a tank cannot be assumed to be gas-free and the inerting process should be performed again.

The HSE publication "CS 15" provides guidance on methods of inerting a tank containing flammable residues and is available from the HSE website, www.hse.gov.uk.

Dismantling

It is normally advantageous for an oil storage tank to be removed from site to a more environmentally secure location before any dismantling works are started. Where hazardous or special waste is moved to other premises, refer to the "Transportation" section of this guidance for information on environmental legislation and registrations/licences which apply.

If removal is not practical due to access restraints, a tank could be dismantled on site using cold cutting methods such as the use of hydraulic shears or cutters and pneumatic chisels. This is to avoid the risks associated with hot work.

Hot work

This involves dismantling a tank using equipment which can generate flames, sparks or heat, such as oxygen/acetylene torches, flame cutters or disc cutters.

Before starting hot work, it is important that a tank is isolated, emptied and successfully cleaned and certified gas-free. Refer to the previous sections of this guidance. Technicians who carry out hot work should be appropriately insured and they must be accompanied at all times by a colleague who stands on 'Fire Watch' with appropriate fire safety equipment to hand.

The heat generated during hot work can vaporise residues. The presence of flammable vapour should be monitored throughout the tank using a UKAS certified, calibrated combustible gas detector.

HSE publication "Hot work on small tanks and drums" provides further guidance on tank dismantling and is available from the HSE website, www.hse.gov.uk.

Transportation

All oil wastes containing a mineral element are classified as hazardous waste in England, Northern Ireland and Wales, and as special waste in Scotland. Decommissioned oil storage tanks, pipework, filters, etc, which have been in contact with such oil are likely to be classified as hazardous or special waste. Under waste management legislation, technicians who transport these wastes on UK highways must register as an upper tier waste carrier with the environment agency responsible for the location where their principal place of business is. These environment agencies are:

- England and Wales - Environment Agency
- Northern Ireland - Northern Ireland Environment Agency (NIEA)
- Scotland - Scottish Environment Protection Agency (SEPA)

Options for business or individual registration are available and submissions to register or renew as a registered waste carrier can be completed online in some UK countries. Please see the waste carriers and brokers pages of the following environment agency websites:

- Environment Agency - www.environment-agency.gov.uk
- NIEA - www.doeni.gov.uk
- SEPA - www.sepa.org.uk

Registered waste carriers are permitted to perform waste carrying activities throughout England, Northern Ireland, Scotland and Wales, but a cross-border consignment note may be required where waste is transferred between jurisdictions. Further information on this is available from the aforementioned environment agencies. Technicians should also be aware that the length and cost of registrations may vary between issuing environment agencies.

If hazardous or special waste is transported on UK highways, carriers must comply with controls on the carriage of dangerous goods, details of which can be found on the HSE website, www.hse.gov.uk.

Waste consignment note

Before hazardous or special waste is removed from premises, technicians have a legal duty of care under waste management legislation to make sure a completed consignment note accompanies all transported hazardous or special waste.

A consignment note has multiple pages so that a copy can be retained by all parties involved with the transfer of waste, these being:

- The producer/holder/consignor (whom the waste is being collected from);
- The carrier (whom transports the waste); and
- The consignee (whom receives the transported waste).

A sample of a waste consignment note, including necessary criteria to be completed and by whom, can be obtained via the environment agency websites. It is important that consignment notes are kept for a minimum time period by all parties involved with the movement of waste. Refer to the environment agency websites for further guidance.

Before hazardous or special waste is transferred in Northern Ireland and Scotland, technicians must notify their environment agency (NIEA or SEPA) of waste movement or the first movement in a series from the same producer at least 72 hours before the expected transfer date.

All waste should be transferred to the consignee as quickly as possible.

Waste Management

Good practice waste management includes the removal and management of any waste generated during decommissioning work as part of the contract of work.

Where a decommissioned oil storage tank is to remain on site, even temporarily, all oil and liquid residues should be removed and the oil supply pipe should be disconnected. The oil supply pipe and all tank connections should be capped. Where a tank is disconnected from an extended fill pipe, both ends of the fill pipe should be capped.

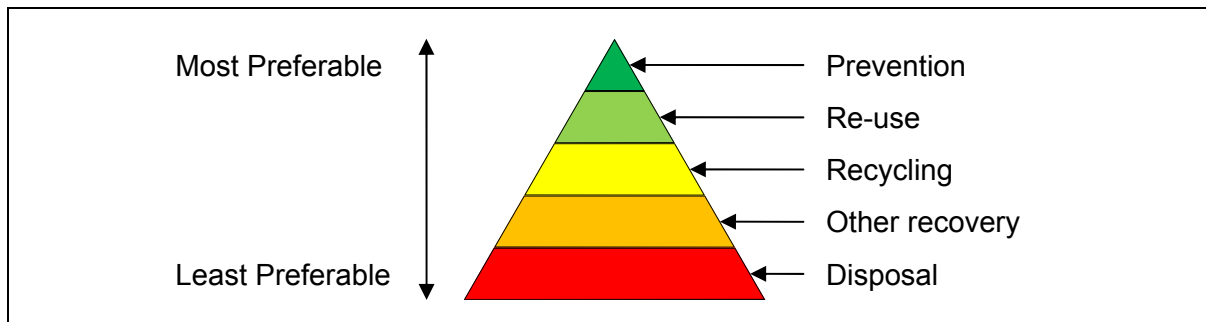
To prevent the delivery of oil in error to a decommissioned tank, such tanks and any associated extended fill pipework should have a warning label affixed stating “Do Not Fill”, e.g. utilising an OFTEC Warning Sticker. Stickers should be located in a prominent location adjacent to any fill connections.

To minimise fire risk, decommissioned tanks remaining on site should be filled with hydrophobic foam or water and the building insurance providers should also be notified.

Waste management hierarchy

The waste management hierarchy encourages those involved with the transfer of waste to consider more environmentally friendly ways of managing it, other than disposal.

The hierarchy sets out, in order of priority, the waste management options that should be considered:



When hazardous waste is transferred in England, Northern Ireland and Wales, a declaration must be made on the waste consignment note that the waste management hierarchy has been considered and applied in priority order. To help reduce waste, the waste management hierarchy should also be applied in Scotland.

Further information on the waste management hierarchy can be found on the environment agency websites or via the government on-line business and support services.

Re-use of waste

A means of satisfying the waste management hierarchy would be, wherever possible, to re-use or recycle waste materials.

Where a quantity of contamination free oil is to be removed from site, consideration should be given to it being sold on as clean fuel for re-use in other equipment via a company who is a Registered Dealer in Controlled Oils (RDCO) as certified by HM Revenue and Customs.

Where an oil tank is to be disposed of, consideration should be given to recycling the material. Both steel and plastic tanks can be recycled where facilities exist. Arrangements can also be made with licenced waste management companies who can collect and recycle such waste.

Removal of waste

All oil wastes containing a mineral element are classified as hazardous waste in England, Wales and Northern Ireland and as special waste in Scotland. Decommissioned oil storage tanks, pipework, filters, etc, which have been in contact with such oil are likely to be classified as hazardous or special waste. These wastes must be disposed of appropriately at licenced waste sites. In England, Northern Ireland and Wales, a fragmentation certificate will be issued to confirm that the waste has been disposed of appropriately. Refer to the "Transportation" section of this guidance for information on environmental registrations/licences that are required to transport these wastes.

There is an on-line search tool to help find licenced waste facilities in England, Northern Ireland, Scotland and Wales on the government on-line advice and support service websites.

Where the removal of waste is to be arranged by a domestic customer, technicians should stress the importance of safe and appropriate disposal. Appropriate means of disposal include contracting the services of a licenced waste management contractor or identifying through their local council the nearest appropriately licenced waste site that will accept hazardous or special waste.