

Operational Guidance Policy for Storage of Flammable Liquids

This guidance applies to above and below ground fixed bulk storage tanks. It applies to premises where flammable liquids are stored in individual tanks or groups of tanks. It may also be applied to portable or skid-mounted vessels with capacities in excess of 250 litres.

The purpose of this document is to advise licensees and site operators of their duties and responsibilities under their licence agreement. It is not a complete statement of requirements and is intended only as a guide. The information it contains is believed to be correct: but the document is not a substitute for appropriate legal advice. It is to control the risk of fire and explosion within the **workplace**.

A Dangerous Substance is a substance that could cause harm to people from fire or explosion due to its properties or use. This would include (among other things) petrol, liquefied petroleum gas (LPG), Diesel or Jet A1.

An **Explosive Atmosphere** is an accumulation of flammable gas, mist, dust or vapour combined with air.

Where does this policy apply?

At all workplaces where a dangerous substance is, or could be, present and there is a consequent risk to employees or others. Hence it will apply at any workplace where petroleum spirit is kept, and on any premises where petroleum is dispensed from a storage tank into the fuel tank of a vehicle. It is enforced by Authority within the St Helena Fire & Rescue Service.

The employer's responsibilities

The employer is required to:-

- Carry out a risk assessment of any activity involving a dangerous substance – on a petrol filling station these activities would typically involve fuel deliveries, dispensing, repair, modification and maintenance.
- Provide measures to eliminate or reduce risks, this could be by means of procedures to be followed along with maintenance and installation of suitable equipment.
- Provide equipment and procedures to deal with any incidents that may occur on the forecourt due to fire or explosion associated with fuel.
- Identify hazard zones on site where an explosive atmosphere may occur during certain activities.

The employer may be deemed to be the site operator and the person/company responsible for the equipment or the fuel on site, if they differ.

Each employer has duties to their own employees and to the employees of any other employer involved on the premises. Employers should co-operate by conducting periodic risk assessments.

The Risk Assessment

The recommended procedure for carrying out a risk assessment is to follow the five steps as published by the Health & Safety Executive. They are:-

STEP 1 Identify the hazards I, sources of ignition, etc. - such as fuel, sources of ignition etc.

Step 2 Identify those at risk – this would include members of the public who may be affected by an incident, they could be in neighbouring buildings etc.

STEP 3 Evaluate the risks – assess the risks and decide upon any control measures that would reduce them to an acceptable level.

STEP 4 Record finding and actions taken – the findings should show whether or not the existing control measures are adequate, and if not, what further action is required to reduce the risks to an acceptable level.

STEP 5 Review and revise the risk assessment – it is important that if any changes are proposed the risk assessment be reconsidered to assess whether or not there is any change to the level of risk arising from the changes.

Requirement of the risk assessment and how it should be carried out.

The criteria to be taken into account when carrying out the risk assessment include the following:

- The hazardous properties of the substances that are kept or used – these will be found on the Safety Data Sheets for the particular fuels that are kept.
- The methods of use and storage – this would include type and age of equipment used and systems in place to prevent or contain leaks or spillage.
- The possibility of a hazardous explosive atmosphere existing during any activities on the forecourt.
- All potential ignition sources.

If there are employees, including the site operator or contractors, then the findings of the risk assessment have to be recorded in writing. The document should contain (among other things) the following information:

- The measures that have been put into place to eliminate or reduce the risk of fire and explosion.
- Information to show that the workplace and equipment will be safe during operation and maintenance.
- Arrangements that are in place to deal with incidents, i.e. the emergency plan.
- The measures that have been taken to train and inform all employees in fire and explosion related safety matters.
- Details of the hazard zones on the forecourt.

The control measures identified by the risk assessment should be designed to achieve the aims set down in the following order.

1. Reduce quantities of hazardous substances to a minimum.
2. Avoid or minimise release – for instance leak prevention, leak detection and control of spillage.
3. Control releases at source.
4. Prevent the formation of explosive atmospheres.
5. Contain or remove any releases to a safe place.
6. Avoid ignition sources.
7. Avoid adverse conditions.
8. Keep incompatible substances apart.

Required Arrangements

Each petroleum storage area should have an Emergency Plan in place detailing actions to be followed in the case of any foreseeable incident that may occur. All staff should be aware of the Emergency Plan and their responsibilities under it. There should be a procedure for notifying the relevant emergency services and for evacuating the premises. Practice drills should be carried out on a regular basis to ensure that all staff are familiar with the process.

Training

All staff must be trained according to the requirements under their respective emergency plans. They should be made aware of the dangerous substances that are likely to be present and they should know the risks that these substances present. Up to date and detailed records of all relevant training should be maintained and used as supporting evidence to the findings of any risk assessment.

Control Measures

Containment

Flammable liquids should be stored in tanks or containers and systems constructed to a national or international standard to ensure their strength and integrity.

There should also be means to contain spillage and fire water to prevent it spreading to other parts of the premises.

Separation

Separation is an important means of providing protection for tanks containing flammable liquids. Separation has particular advantages because it protects people and property from the effects of a fire at the tank, and protects the tank from fires which may occur elsewhere on site.

Ventilation

Good ventilation ensures that any flammable vapours given off from a spill, leak or release will be rapidly dispersed. This may be achieved by locating storage tanks, transfer facilities, vent pipes etc. in the open air, in an unobstructed position. Locating plant and storage facilities in the open air normally ensures the best possible dispersion of dangerous substances to limit the formation and extent of hazardous explosive atmospheres. Certain features may affect the ready dispersal of any releases of dangerous substances, e.g. buildings, pits, and structures providing weather protection. Employers should ensure, as appropriate:

- these are sufficient distance away; or
- they are of suitable design to prevent the accumulation of dangerous substances; and
- where necessary, the ground is graded to direct vapours away from occupied buildings and vulnerable populations (e.g. to provide safe dispersal of vaporising liquid leaks from fixed liquefied gas vessels).

Control of ignition sources

In certain areas, flammable atmospheres may occur either during normal operation or due to accidental spills or leakage. These areas are called hazardous areas, and measures to control the introduction of sources of ignition are required in these areas. Common ignition sources include:

- unprotected electrical and mechanical equipment;
- naked flames including welding and cutting equipment;
- smoking materials;
- vehicles with internal combustion engines;
- hot surfaces;
- frictional heating or sparking;
- static electricity;
- lightning.

Fire Precautions

The likelihood of a major fire may be minimised by:

- good plant design and layout;
- sound engineering;
- good operating practice;
- tight control of non-routine operations such as repairs and modifications;
- instruction and training of personnel in routine operations and in emergency procedures.

Plant design and layout should include consideration of:

- water supplies;
- fire protection equipment;
- firefighting;
- means of escape;
- means of access for fire and rescue service appliances;
- arrangements to ensure an early call out of the fire and rescue service in the event of fire;
- ability of the drainage/interceptor facilities to cope with fire water.

For means of escape, at least two separate exits will normally be needed. Exits should open outwards and be easily opened from inside when the area is occupied. One exit may be sufficient if the distance from any part of the storage area to the exit is not more than 24 m, measured around the storage tanks and any other obstructions.

The St Helena Fire & Rescue authority should be consulted on these matters (at the planning stage in the case of new or altered facilities).

General Fire Precautions

General fire precautions' are primarily concerned with ensuring people can safely escape to a place of safety in the event of a fire in the workplace. This includes provision of:

- adequate and appropriate means of detection and giving warning in case of fire;
- adequate means of escape;
- suitable means of fighting fire;
- specifying the action to be taken in the event of fire; and
- appropriate and adequate training of staff in the company's fire safety procedures.

You are responsible for carrying out a risk assessment to determine the general fire safety requirements for your workplace. As part of this, you should also consider the potential impact of fire involving flammable liquids and adapt the general fire precautions as necessary so they remain sufficient to ensure people's safety in the event of fire.

General fire precautions are subject to separate legislation (building regulations/ fire service ordinance). This includes the requirement for the employer to ensure they are sufficient for people's safety in the event of a fire involving dangerous substances at the workplace.

Outside work areas

General fire safety legislation applies to the entire workplace. This includes indoor and outdoor work areas.

Detection and giving warning in case of fire

There should be an effective means of giving warning in case of fire in the process area. It should be audible to all those likely to be affected by the fire. This may vary from small process areas, where a shout of 'fire' might suffice, to larger areas where a klaxon or siren might be required. An assembly point in a safe location should be identified for people evacuating from such areas, where they can be accounted for.

Adequate means of escape

The layout of storage facilities and equipment should be planned and controlled to avoid dead-end situations where possible; i.e. where escape is only possible in one direction. Any that cannot be avoided should be as short as possible. Escape routes should be obvious, with directional escape signs as required. Operational needs should ensure that the gangway widths are adequate, but wherever possible, they need to have a minimum width of 1.5 metres.

Firefighting equipment and facilities

Under general fire legislation, it is the responsibility of the local fire and rescue authority to make provision for firefighting, and to equip and maintain a fire and rescue service to meet normal requirements. The fire authority may make arrangements with on-site works' fire teams to provide assistance but the local authority fire and rescue service will assume control of firefighting operations on arrival at a fire

The firefighting equipment for bulk storage of flammable liquids will depend on the quantity and type of liquid, and on the conditions of storage. Firefighting equipment should be provided at readily accessible locations at the storage area, including identifiable danger points such as pump rafts, hose pits and loading gantries. Protection against adverse weather, may be required. Firefighting equipment should be regularly maintained, and where appropriate, tested.

Dry powder or foam fire extinguishers (hand-held or trolley-mounted) are suitable to deal with fires from small leaks of flammable liquid. CO₂ extinguishers should be used for electrical ignited fires. To guard against equipment failure, it is preferable to have extinguishers grouped in pairs. Fire extinguishers should be regularly inspected and tested by a competent agency. Extinguishers should be to a recognised standard such as BS EN 3.

For other fires that might affect the storage, eg those involving rubbish or vegetation, water hoses are appropriate. Hoses may be in reels permanently connected to a water supply, or in lengths for connection to a hydrant, and should cover all parts of the storage installation. The St Helena Fire & Rescue Service can give advice on selecting, installing and maintaining portable firefighting equipment.

Facilities to deal with larger fires include an adequate water supply for fire and rescue service use. This may consist of hydrants, ponds, tanks etc and should be readily accessible and normally no more than 100 m from the storage area. The need for foam and the means of application may be discussed with the fire authority, taking into account the number, size, type, location and contents of tanks. Fixed foam pourers or high-capacity monitors designed to cover the entire liquid surface rapidly with foam together with the associated high capacity water pumps and other equipment has been shown to be able to rapidly extinguish full surface

fires and their provision should be considered. Rapid extinguishment of such fires can substantially reduce the potential for escalation and minimise property damage. The total quantity of fire water used is also significantly reduced thus reducing the risk of environmental pollution and reducing clean-up costs. Provision of such systems could be considered for larger sites.

An adequate supply of water will also be needed to provide cooling for tanks exposed to heat from a nearby fire. Advice on the required cooling rates for tanks can be sought from the SHF&RS. The required rate will vary with the fire to which the tank may be exposed, but a rate of 10 l/m²/min may be required if the tank could be enveloped in flame. The entire tank wall should be covered with water to prevent hotspots developing. Fixed water sprays or portable monitors are an advantage, but are normally required only where the storage conditions are less than ideal, such as where it is difficult to achieve adequate separation distances.

Fire water run-off may place a major strain on normal drainage facilities. Interceptors or special draining systems may be necessary, particularly at large installations, to minimise the risk of contamination of local watercourses.

GUIDANCE ON POWERS OF INSPECTION

This Operational guidance policy is supported by a Petroleum Ordinance 1966 and Petroleum Regulations 1978.

Who enforces the Petroleum Safety Legislation?

The St Helena Fire & Rescue Service appoints Fire Safety Officers to inspect premises and enforce any Petroleum Legislation on St Helena Island.

What will Fire Safety Inspectors do?

Their job is to ensure that Employers and Employees are operating in compliance with what the law requires. They will check to see **how you manage fire and explosion risks**. They will provide advice, that may require improvements to be made, and will enforce the law when needed. They will also investigate incidents and complaints in connection with the petroleum installation.

For new petroleum installations or material changes to existing ones, Fire Safety Inspectors will decide whether the petroleum licensing authority should grant a petroleum licence, and discuss any further action you may need to take to ensure safety. Fire Safety Inspectors will also liaise with the Land Planning & Development Control.

Inspection of storage facilities

Once operational (i.e. storing and dispensing petroleum), Fire Safety Inspectors may visit unannounced at all reasonable times. If requested, fire safety officers must show or display their identification before commencing an inspection.

Inspectors are also there to give help and advice. A proprietor may want to talk to an Inspector before carrying out any planned changes to a site.

If Inspectors find problems they will deal with it in a reasonable and fair way. Inspectors will explain everything needed to be done in order to rectify any problems/issues identified.

What powers do Fire Safety Inspectors have?

Fire Safety Inspectors have extensive powers, which include the right to enter any premises, talk to employees and safety representatives and take photographs and samples. If they consider there is a problem at any petroleum storage area, they can:

- Give advice or guidance on how to address the problem, this will always be confirmed by the Inspector in writing;
- Issue a notice which requires improvements to be made where the law has been breached;
- Issue a Prohibition Notice which stops a process or the use of dangerous equipment where a risk of serious personal injury exists; or
- Recommend to the petroleum licensing authority that an application to renew the petroleum licence is refused.

Before an inspector issues an improvement or prohibition notice, he will explain and discuss the item(s) of non-compliance with the owner or his/her representative. If one receive an Improvement or Prohibition Notice he/she have the right to appeal to Public Health Committee. Inspectors can prosecute a business or, under certain circumstances, an individual for breaking health and safety law, but they will take your attitude, management and safety record into account before taking such action.

If a Fire safety Inspector advisors to do something, he/she will always confirm in writing what needs to be done and give a time period for the work to be completed.