

Environment Alliance – working together

## pollution prevention guidelines

### Use and design of oil separators in surface water drainage systems: PPG 3

These guidelines will help you decide if you need an oil separator at your site and, if so, what size and type of separator is appropriate.

Following the good practice described does not remove your obligation to comply with relevant legislation and to prevent pollution from your site. Pollution of the environment is a criminal offence and compliance with one or more Guidance Note is not a defence to such offences. You should check the references to other sources of guidance to ensure they are still current.

These guidelines are produced jointly by the Environment Agency for England and Wales, the Scottish Environment Protection Agency, and the Environment and Heritage Service for Northern Ireland. You should consider the needs of each site individually and we advise you to contact us for advice as early as possible.

The Construction Products Regulations 1991 dictate the essential requirements that an oil separator must fulfil to be supplied legally in the UK. Where the word 'must' is used in this guidance, compliance with that particular part of the guidance is a legal requirement under these regulations. The Trading Standards Authorities enforce these regulations.

Throughout these guidelines we use the term 'separator' rather than the term 'interceptor'. These terms have the same meaning.

In these guidelines, the word oil means liquid hydrocarbons that float on water such as diesel, petrol and engine oil.

## 1. Introduction

### a. How do oil separators work?

Oil separators can be fitted to surface water drainage systems to protect the environment from pollution by oils. They separate the oil from the water, and then retain the oil safely until it is removed. They are installed to contain oil leaks from vehicles and plant and accidental spillages. To be effective, oil separators need to be correctly designed, installed and maintained.

### b. Where are separators needed?

Surface water may be contaminated by oil at a number of different sites. These sites need to have measures in place to prevent this oil from polluting the environment. These sites include:

- ◆ car parks typically larger than 800m<sup>2</sup> in area or for 50 or more car parking spaces
- ◆ smaller car parks discharging to a sensitive environment
- ◆ areas where goods vehicles are parked or manoeuvred
- ◆ vehicle maintenance areas
- ◆ roads
- ◆ industrial sites where oil is stored or used
- ◆ refuelling facilities
- ◆ any other site with a risk of oil contamination.

Trapped gully pots can provide adequate protection for car parks that are too small to justify the installation of a separator, but they must be properly maintained.

You might not need an oil separator if you use ‘sustainable drainage systems’ (SUDS). The SUDS approach should be used on all sites to minimise the impact of the development on the environment. In Scotland, the use of the SUDS approach is a legal requirement. Techniques that control pollution close to the source, such as permeable surfaces or infiltration trenches, can offer a suitable means of treatment for run-off from low risk areas such as roofs, car parks, and non-operational areas. In higher risk areas you might need other SUDS facilities such as constructed ponds, wetlands or swales. For detailed information on SUDS, see references 1-4. Where there is a high risk of oil contamination, it may be appropriate to use an oil separator as part of the SUDS scheme.

If you do need an oil separator, you will need to consider where it will discharge. It is important to speak to us as early as possible if you plan to discharge to surface water drains, to a watercourse or to the ground, as you might require our consent. In Northern Ireland any discharge from an oil separator will require consent. We do not issue these consents automatically and, if we allow a discharge, we might impose strict controls on the level of polluting substances in it such as oils. If you install a separator discharging to surface water you will need a Class 1 separator (see Section 3a)

If your separator will discharge to a foul sewer, you must contact your local sewer provider before doing so. For discharges to foul sewer you will need a Class 1 or Class 2 separator (see Section 3a). If your separator will discharge to a surface water sewer that is owned by the sewer provider, you must also contact them before you connect to that sewer.

Drainage from areas such as scrapyards, storage and handling areas for chemicals (solvents, acids etc), and washing bays are likely to be contaminated with substances other than oil, and should normally drain to the foul sewer with the approval of the sewer provider. The local sewer provider might require the discharge to have a separator and you must consult them. Discharge from such areas is not suitable for drainage to surface water drains, a watercourse or to the ground.

Drainage containing detergents should not pass to a separator that discharges to surface water because the detergents prevent the separator from working properly.

For general guidance on preventing pollution from your site, see Reference 9.

## 2. Choosing the right separator

Use the flow chart to help you select the appropriate system for your site. More than one separator might be required on larger sites or a site with many activities. You will need to consider the local circumstances and risk factors including:

- ◆ the discharge point of your proposed separator
- ◆ the environmental sensitivity of your location
- ◆ activities on your site

We advise that SUDS should be incorporated into the surface water drainage whenever possible and in Scotland, this is a legal requirement. This may remove the requirement for an oil separator.

### Notes to accompany the flowchart

<sup>1</sup> You must seek prior permission from your local sewer provider before you decide which separator to install and before you make any discharge.

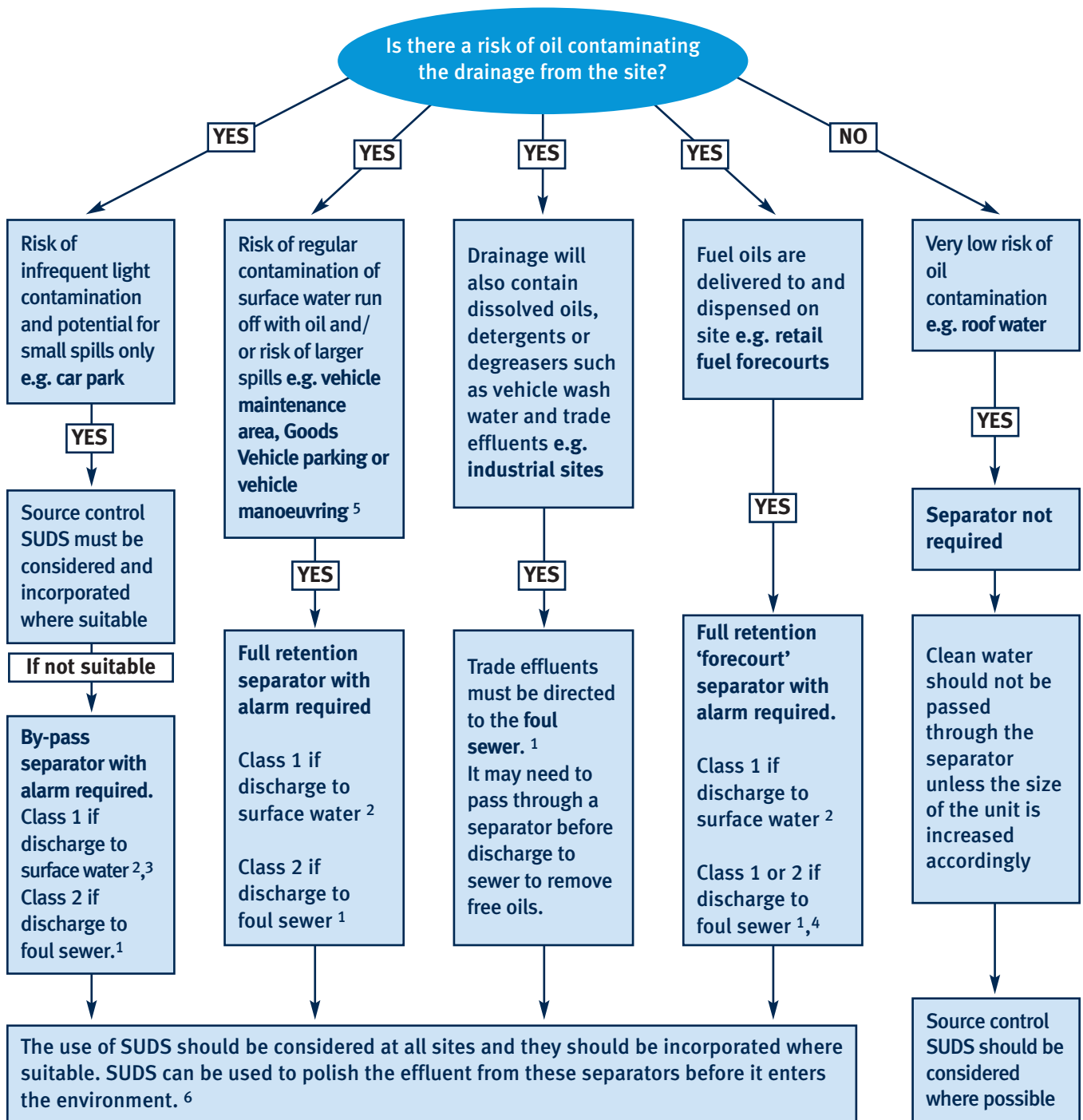
<sup>2</sup> You must seek prior permission from us before you decide which separator to install.

<sup>3</sup> In this case, if it is considered that there is a low risk of pollution a source control SUDS scheme may be appropriate.

<sup>4</sup> In certain circumstances, the sewer provider may require a Class 1 separator for discharges to sewer to prevent explosive atmospheres from being generated.

<sup>5</sup> Drainage from higher risk areas such as vehicle maintenance yards and goods vehicle parking areas should be connected to foul sewer in preference to surface water.

<sup>6</sup> In certain circumstances, a separator may be one of the devices used in the SUDS scheme. Ask us for advice.



### 3. Separator standards and types

The UK has adopted a two-part European Standard (BS EN 858-1:2002 and BS EN 858-2:2003; Reference 5) for the design, use, selection, installation, operation and maintenance of prefabricated oil separators. The Construction Products Regulations require that new prefabricated separators (made off site and then installed) must satisfy certain essential requirements. Demonstration of fulfilment of these requirements can be provided by compliance with the mandated clauses of BS EN 858-1. You can obtain a list of separators through our websites that identifies the separators for which evidence of oil separating performance has been supplied, examined and accepted. When using this list, you must check on the website that you are using the current version, as it will be updated regularly.

## a. Separator classes

BS EN 858 refers to two 'classes' of separator, based on performance under standard test conditions.

◆ **Class 1 separators** are designed to achieve a discharge concentration of less than 5 mg/litre of oil under standard test conditions. These separators are **required for discharges to surface water drains and the water environment**. Many Class 1 separators contain coalescing devices, which draw the oil droplets together and facilitate the separation.

◆ **Class 2 separators** are designed to achieve a discharge concentration of less than 100 mg/litre of oil under standard test conditions. They are suitable for dealing with discharges where a lower quality requirement applies such as **discharges to the foul sewer** (but check first with your sewer provider).

Both classes can be produced as 'full retention', 'bypass' or 'forecourt' separators (see below).

The oil concentration limits of 5 mg/litre and 100 mg/litre only apply under standard test conditions. You should not expect separators to always perform within these limits under field conditions. In addition, these levels of oil might be too high in some environmentally sensitive areas to allow the discharge to pass into the water environment without additional treatment.

## b. Full retention separators

Full retention separators treat the full flow that can be delivered by the drainage system. The 'full flow' is normally equivalent to the flow generated by a rainfall intensity of 65 mm/hour

Full retention separators are used where there is a risk of regular contamination with oil and a foreseeable risk of significant spillages e.g. vehicle maintenance areas and retail fuel forecourts.

You need to consider the flow rates of potential spillages delivered to the separator from the drainage system and the oil storage volume of the separator needs to be sufficient to retain the entire spillage. See Section 9 for more information about preparing for emergencies.

On large sites, some short-term storage upstream of the separator might be an acceptable means of limiting the flow rate and the size of separator needed. Any surface water stored cannot be pumped through the separator unless the separator is specifically designed to receive pumped inflows and a low-shear, non-emulsifying pump is used.

## c. Bypass separators

Bypass separators fully treat all flows, for the area served, generated by rainfall rates of up to 6.5 mm/hour. This covers most rainfall events. Flows above this rate are allowed to bypass the separator. These separators are used when it is considered an acceptable risk not to provide full treatment for high flows, e.g. where only small spillages can occur and the risk of spillage is small such as on short stay car parks.

In cases where a large spillage might occur, it is not acceptable to use a by-pass separator. The only exception to this is a major trunk road where the size and type of spillage is impossible to foresee and the surface area drained makes it impractical to provide a full retention separator. For major trunk roads a SUDS approach incorporating a number of SUDS techniques is likely to be more appropriate.

On sites where high levels of silt are likely to enter the separator, the build up of silt must not be allowed to compromise the operation of either the separator or the by-pass device. On such sites (e.g. major trunk roads and quarries) an adequately sized silt separation chamber should be installed upstream of the separator and appropriate management systems put in place to monitor the situation and remove the silt when necessary. The use of SUDS techniques can minimise the amount of silt in the surface water run-off.

## d. Forecourt separators

This document uses the term 'forecourt' to refer to all forms of liquid-fuel dispensing outlets, both retail and non-retail, including those where only diesel is dispensed. A forecourt separator must be a 'full retention' separator, large enough to serve the catchment area of the site and have a sufficient oil storage volume to retain any foreseeable spillages.

It is important to install a forecourt separator of an appropriate size. On a forecourt where tanker deliveries are received, a separator with an oil storage capacity of 7,600 litres will meet the requirements of BS EN 858-2, clause 4.3.6. If a smaller unit is proposed, the size should be determined by undertaking a risk assessment incorporating catchment size, potential spillages during delivery, and other risks such as safety issues. If the compartment size of the tanker that delivers to your site is greater than 7,600 litres your separator should be sized accordingly. For detailed information on the design of fuel dispensing forecourts see Reference 10.

## 4. Separator size

### a. Nominal size

Separators are tested in accordance with the standard test procedure in the European Standard. Each separator is allocated a nominal size (NS) on the basis of the test results. Full retention and bypass separators are referred to as NS and NSB, respectively.

The nominal size of a full retention separator that is required for a catchment area (A) is obtained using the following formula:

$$NS = 0.018 \times A \text{ (in m}^2\text{)}$$

For a bypass separator, the formula is:

$$NSB = 0.0018 \times A \text{ (in m}^2\text{)}$$

In addition, capacity for silt storage (C) must be provided for all separators – either as an integral part of the separator or as a separate upstream unit – according to the following:

$$C \text{ (in litres)} = NS \times 100 \text{ or } C \text{ (in litres)} = NSB \times 100$$

Silt capacity for a bypass separator must be provided either upstream of the separator or in the bypass weir chamber, and not in the main oil separating chamber.

Separators must be designed such that when the silt chamber or silt area of the separator is full of silt, this will not affect the operation of the separator, the skim pipe or the by-pass device.

### b. Oil storage capacity

The oil storage capacity is defined as the volume of separated oil that can be stored in the separator without any of the stored oil entering the inlet or outlet of the separator. The oil storage volume (V) is given by the following:

$$V \text{ (in litres)} = NS \times 10 \text{ or } V \text{ (in litres)} = NSB \times 15$$

On sites where significant oil spillages are foreseeable, make sure the oil storage capacity is sufficient to retain any such spillage and a separator larger than that identified in Section 4a may be required.

### c. Minimum size

The minimum working capacity (which excludes any provision for silt deposition) of a separator should be 1,000 litres; though for forecourts, it is likely that risk assessment will indicate the need for a larger separator. For bypass separators, the minimum capacity is defined as the working capacity of the oil separating chamber only.

## 5. Closure devices and alarms

### a. Closure devices

If too much oil is allowed to accumulate inside a separator, it will not work effectively and oil will escape. To avoid this, full retention separators must be provided with an automatic closure device that will prevent flow passing through the separator when the quantity of oil in the separator exceeds the oil storage volume (V).

Also, during emptying or maintenance the separator should be isolated to prevent the escape of waste oil. Open all isolation valves when the operation is complete.

Do not fit automatic closure devices to bypass separators unless they have been designed specifically to operate on such separators.

If the automatic closure device is activated the operator should be alerted by a high level alarm so that immediate maintenance can be carried out.

### b. Automatic Warning Devices/Alarm systems

Separators must be provided with a robust device to provide visual and audible warning (if necessary to a remotely located supervisory point) when the level of oil reaches 90 per cent of the oil storage volume (V) under static liquid level conditions. This automatic warning device indicates that the separator is in need of immediate emptying for it to continue to work effectively.

Also, as the build up of silt will prevent the separator from working effectively, we recommend that you install a silt level alarm or another suitable device in your separator to alert you to the build-up of excessive levels of silt. In many cases, oil and silt alarms can be fitted to an existing separator. Silt alarms are most useful on those sites where high volumes of silt are likely to enter the separator, such as quarries, builder's yards and major trunk roads.

Further equipment can be fitted to the separator, alongside a closure device and warning device, to alert the site operator to the routine maintenance requirements of the separator. This equipment might, for example, indicate when the next inspection is due and such 'separator management systems' will ensure that the separator continues to receive the appropriate level of attention.

Any electrical device used within a separator or used to monitor sensors placed within a separator must be intrinsically safe and certified to a suitable explosion protection standard. The location of the monitoring device, such as the alarm or 'separator management system' control panel, must be located within a safe area and conform to the requirements of BS EN 60079-10. For this reason it is important to always use qualified technicians who are familiar with the installation, calibration and servicing of intrinsically safe equipment. Regular maintenance and testing of equipment is essential.

## 6. Installation and labelling

### a. Installation

Any clean water should be discharged downstream of the separator. If any clean water is drained through your separator, you will need to consider this extra water volume when selecting the separator type and size.

If the discharge for the separator is subject to the controls of a permit to discharge granted by us, a sampling chamber will be required downstream of the separator, to allow representative samples to be taken.

Provide separators with sufficient access points to allow for the inspection and cleaning of all internal chambers. Keep access to the separator clear and do not use this area for storage.

If the separator is installed to retain flammable liquids, provide appropriate ventilation.

### b. Labelling

Provide separators with a visible and durable label that can be read after installation and which contains the following information:

- ◆ manufacturer's reference number and year of manufacture
- ◆ bypass/full retention
- ◆ unique identifier for the design of separator (name or number)
- ◆ class of separator
- ◆ nominal size
- ◆ oil storage capacity
- ◆ volume of separator
- ◆ silt storage capacity
- ◆ oil level warning device details
- ◆ depth of oil storage
- ◆ closure device details.

Mark the position of all separators clearly on all drainage plans and identify the separator on the ground by marking the manhole cover 'Separator'.

## 7. Maintenance and use

To prevent pollution and minimise your costs, you need to manage your separator effectively. To make this easy, all parts of the separator that have to be regularly maintained must be accessible at all times.

Every six months, or in accordance with manufacturer's instructions, experienced personnel should:

- ◆ Physically inspect the integrity of the separator and all mechanical parts
- ◆ Assess the depth of accumulated oil and silt
- ◆ Service all electrical equipment such as alarms and separator management systems
- ◆ Check the condition of any coalescing device and replace it if necessary

Some heavily used or high-risk sites might require more frequent inspections.



Keep a detailed log of when the separator is inspected, maintained, emptied and serviced. Also record specific events relating to the separator system such as cleaning, repairs, accidents and incidents.

All sites should empty their separator as soon as a significant quantity of oil and/or silt has built up. The retained waste, including the silt, must be removed and the separator must be refilled with clean water before being put back in to service to prevent damage and to prevent oil passing through it. In addition to normal emptying of the separator, it will also need to be emptied right away if oil or silt levels exceed 90 per cent of the storage volume of the separator and the alarm is activated (see Section 5b). When the oil or silt reaches this level or after a spillage, employ a registered waste removal company to empty the separator (see Section 8 for information about waste management). For all waste removal operations you must make sure that the waste removal company has experience in emptying separators and that they do not allow any of the contents to escape from the outlet during emptying.

Every five years it is recommended that separators be emptied and given a general inspection to test the integrity and performance of the system. The separator must be refilled with clean water following such an inspection.

Information on separator maintenance is in Part 2 of the European Standard (Reference 5).

## 8. Waste management

All waste must be handled, stored and disposed of correctly to avoid pollution. Waste oil is designated as hazardous/special waste and as a waste producer and holder, you are responsible for complying with the Hazardous Waste (England and Wales) Regulations 2005, the Special Waste Amendment (Scotland) Regulations 2004, or the Hazardous Waste (Northern Ireland) Regulations 2005 (see Reference 11).

You may need to register as a producer of hazardous/special waste, and you should refer to our websites for guidance. You must follow the Duty of Care Code of Practice (Reference 6) which requires you to make sure that the waste oil:

- ◆ does not escape from your control
- ◆ is transferred only to a registered waste carrier to be sent for recycling or disposal at a suitably licensed facility
- ◆ is accompanied by an appropriate transfer note with a full written description of the waste

Detailed guidance on how to comply with the regulations governing waste handling, storage and disposal is given in Reference 6. The detail of the Regulations themselves is in Reference 11.

The NetRegs website ([www.netregs.gov.uk](http://www.netregs.gov.uk)) provides information on waste legislation and how you can comply with it. In addition, you can contact our local office for advice or visit the waste sections of our websites.

## 9. Emergencies

Draw up a Pollution Incident Response Plan (PIRP) that includes all oil separators. Reference 7 offers advice on how to produce or update such a plan. Keep a spill kit on site.

Do not use a separator as the primary method of containing a large oil spill from above ground oil storage; this should be protected by a secondary containment system (see Reference 8 for details).

We recommend that all oil deliveries to the site be supervised.

Notify us immediately in the event of an emergency using the emergency hotline number 0800 80 70 60.

## 10. References

1. Sustainable Drainage Systems (SUDS) – an introduction. [www.environment-agency.gov.uk/suds](http://www.environment-agency.gov.uk/suds)  
SUDS – Setting the scene in Scotland from: [www.sepa.org.uk/publications/leaflets/suds/index.htm](http://www.sepa.org.uk/publications/leaflets/suds/index.htm)
2. [www.ciria.org/suds](http://www.ciria.org/suds)
3. Sustainable urban drainage systems -- design manual for Scotland and Northern Ireland. CIRIA C521. ISBN 0-86017-521-9.  
Sustainable urban drainage systems - design manual for England and Wales. CIRIA C522. ISBN 0-86017-522-7.  
CIRIA C521 and C522 are due to be replaced by a new SUDS Manual in autumn 2006. Please make sure you refer to the current guidance.  
CIRIA Tel: 020 7549 3300. [www.ciria.org](http://www.ciria.org)
4. British Water Technical Guidance – Guidance to proprietary sustainable drainage systems and components – SUDS. ISBN 1 9034810 4 10.  
British Water Tel: 020 7967 4554 [www.britishwater.co.uk](http://www.britishwater.co.uk)
5. BS EN 858-1:2002. Separator systems for light liquids (e.g. oil and petrol). Principles of product design, performance and testing, marking and quality control.  
BS EN 858-2:2003. Separator systems for light liquids (e.g. oil and petrol). Selection of nominal size, installation, operation and maintenance.  
BSI. Tel: 020 8996 9001. [www.bsi-global.com](http://www.bsi-global.com)
6. Waste management, the Duty of Care, a code of practice (revised 1996). ISBN 0-11-753210X.  
The Stationery Office. Tel: 0870 600 5522
7. PPG21: Pollution incident response planning. [www.environment-agency.gov.uk/ppg](http://www.environment-agency.gov.uk/ppg) or [www.sepa.org.uk/guidance/ppg/](http://www.sepa.org.uk/guidance/ppg/)
8. PPG2: Above ground oil storage tanks. [www.environment-agency.gov.uk/ppg](http://www.environment-agency.gov.uk/ppg) or [www.sepa.org.uk/guidance/ppg/](http://www.sepa.org.uk/guidance/ppg/)
9. Pollution Prevention Pays. Getting your site right – industrial and commercial pollution prevention. Available to download from the Preventing Pollution page of the business area of [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)
10. Design, construction, modification, maintenance and decommissioning of filling stations, 2005, ISBN 0 85293 419 X: Association for Petroleum and Explosives Administration/Energy Institute  
Portland Customer Services Tel: 01206 796 351
11. Hazardous Waste (England and Wales) Regulations 2005, SI 894, ISBN 0 110726 855  
Hazardous Waste (Northern Ireland) Regulations 2005, SR 300, ISBN 0 33796 064 X  
Special Waste Amendment (Scotland) Regulations 2004, SSI 112, ISBN 0 11069 0303

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