



Guidelines for Implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008

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the Protection of the Environment Operations
(Underground Petroleum Storage Systems)
Regulation 2008**



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1. Introduction

Leaking underground petroleum storage systems (UPSS) have been identified as a very common and significant source of soil, groundwater and surface water contamination. Approximately 30% of the contaminated sites regulated by the Department of Environment and Climate Change (DECC)¹ under the *Contaminated Land Management Act 1997* (CLM Act) are the result of leaking UPSS. Contamination from leaking systems can be very expensive to clean up when it goes unchecked for a prolonged period. A proactive approach to prevent leaks from occurring in the first place is in the interest of both site owners and the general community.

The Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008 (the 'UPSS Regulation') focuses on a preventative approach to minimise the risk of contamination of soil, and ground and surface waters. In developing the Regulation, DECC has adopted industry best practice for the design, installation and ongoing maintenance and monitoring of UPSS.

The objectives of the UPSS Regulation are to:

- reduce the environmental risks and harm from leaking UPSS
- provide a mechanism to ensure early detection of leaks from UPSS
- ensure the operators of UPSS adopt appropriate operational management systems to investigate and report on leaks and consistently record and keep details about them.

The UPSS Regulation, which commenced on 1 June 2008, may be viewed at www.environment.nsw.gov.au/clm/upss.htm, along with these guidelines.

1.1 Aim and scope of these guidelines

In line with the UPSS Regulation, these guidelines aim, where possible, to promote the adoption of industry best practice in the design, installation and ongoing operation of underground tanks used to store petroleum², both as fuel or as used (waste) oil.

The guidelines are designed to assist those responsible for UPSS to comply with the Regulation and summarise current industry best practice. Readers are advised to refer to other relevant and appropriate publications, especially where new practices and processes receive industry endorsement. The 'References and further reading' section of these guidelines provides a source of useful documents but is by no means complete.

The scope of these guidelines does not extend, however, to other related legislation and legal obligations that owners and operators of UPSS are required to meet. Issues such as occupational health and safety, for example, are not specifically discussed. Naturally, they still need to be considered in all areas associated with the operation and use of UPSS.

In the case of any inconsistency between the UPSS Regulation and these guidelines, the Regulation prevails to the extent of the inconsistency.

At the time the first draft of these guidelines was prepared, the Australian Institute of Petroleum's Code of Practice *CP4* (AIP 2002) was regarded as industry best practice.

¹ DECC exercises certain statutory functions and powers, including those set out in the *Contaminated Land Management Act 1997*, *Protection of the Environment Operations Act 1997* and the Protection of the Environment Operations (UPSS) Regulation 2008, in the name of the Environment Protection Authority (EPA).

² 'Petroleum' means any fuel that consists predominantly of a mixture of hydrocarbons derived from crude oil, with or without additives (such as ethanol), that is used, or could be used, as a fuel or lubricant and is liquid at standard conditions of temperature and pressure. It includes liquids such as petrol, gasoline, motor spirit, two-stroke, aviation fuel, used (waste) oil, heating oil, kerosene and diesel, but not LPG.

Since then, *CP4* has been revised and incorporated into *AS4897–2008: Design, installation and operation of underground petroleum storage systems (AS 2008a)* and these final guidelines now cite this document as representing current industry best practice.

1.2 Protection of the Environment Operations Act

The *Protection of the Environment Operations Act 1997* (the 'POEO Act') is the primary legislation used to prevent and regulate pollution in NSW. Under the Act, it is an offence to pollute land and waters, including groundwater.

Leaks from UPSS can cause significant contamination to land, groundwater and surface water. It is an offence under section 116 of the POEO Act to wilfully or negligently cause any substance to leak, spill or otherwise escape in such a way that it harms, or is likely to harm, the environment and human health. The Act also prohibits pollution of waters, including groundwater, by making it an offence to place matter in a position from where it is likely to percolate into any waters. Vapours from hydrocarbon-contaminated groundwater plumes are also known to sometimes impact buildings or structures above or in the vicinity of the plume. This may be in breach of the provisions of the Act that make it an offence to cause air pollution.

The UPSS Regulation, which aims to improve the environmental management of storage systems, has been made under the Act.

1.3 Benefits from the Regulation for industry

A cost-benefit analysis (CBA) by DECC in 2006 showed that the benefits of implementing the UPSS Regulation would significantly outweigh the costs. The analysis was released for public comment in February 2006 as a Regulatory Impact Statement, along with a draft of the proposed Regulation. The CBA was revised following new cost figures provided by the petroleum retail industry during the consultation period. The updated CBA still showed that the benefits outweighed the costs. The revised CBA summary is available on the UPSS web page at www.environment.nsw.gov.au/clm/upssris.htm.

Benefits identified for industry included:

- reduced loss of petroleum product because leaks are detected earlier
- fewer restrictions on future land use as a result of remediation of contaminated sites and their surrounds (often over an extended period)
- a consistent level of preventative pollution control across the petroleum industry, providing fairer competition for all individual retailers and distributors
- lower investigation and clean-up costs, including fewer disruptions to business operations which can occur where extensive remediation is required
- reduced potential for litigation arising from contamination of groundwater and offsite (third party) properties.

1.4 Application of the Regulation

The UPSS Regulation applies to all underground petroleum storage systems in NSW, which are defined as storage systems that include:

- one or more tank(s) which are completely or partially buried in the ground which contain, or are intended to contain, petroleum
- any piping to, from or associated with the tanks to the inlet port of any dispensers, **but not** vent and vapour recovery piping.

The UPSS Regulation does not apply to:

- storage systems with tanks situated wholly above ground (regardless of where any associated pipes and other equipment are situated)
- sumps, separators, stormwater or wastewater collection systems, catchment basins, pits, septic tanks or other like structures, unless petroleum routinely passes through the structure from one part of the storage system to another
- bunded tanks situated below ground level but which are not buried in the ground (such as in a basement, cellar or tunnel)
- liquefied petroleum gas (LPG) storage systems
- UPSS that are classed as a 'scheduled activity' under Schedule 1 to the POEO Act, namely those systems which store over 2000 tonnes of petroleum products or more than 20 tonnes of petroleum waste, as these are regulated through an environment protection licence issued under that Act
- underground storage systems that do not contain petroleum.

1.5 Categories of UPSS under the Regulation

The UPSS Regulation was gazetted in March 2008 and took effect on 1 June 2008. The timeframe for implementing a specific requirement of the Regulation is dependent on whether a 'new' or 'old' UPSS is involved:

'New' UPSS: All UPSS which received development approval on or after the commencement of the Regulation on 1 June 2008 are considered 'new' UPSS and must comply fully with the Regulation before being commissioned.

'Old' UPSS: All UPSS which received development approval before the commencement of the Regulation on 1 June 2008 are considered 'old' UPSS. These systems need to comply with all requirements of the Regulation but over a deferred timetable. However DECC encourages operators of these sites to consider the benefits of compliance in any minor upgrades and daily operations.

'Significantly' modified UPSS: Any 'significant' modification to an old or new UPSS triggers the need for the system to comply fully with the Regulation. 'Significant' means any modification to a system that involves:

- replacement of half or more of the tanks (at any one time), or
- work which requires development approval.³

The specific requirements of the UPSS Regulation are detailed in Sections 2–6 of these guidelines. Many of these requirements are based on industry best practice, such as *AS4897–2008: Design, installation and operation of underground petroleum storage systems* (AS 2008a) and *AS4976–2008: The removal and disposal of underground petroleum storage tanks* (AS 2008b).

Figures 1 and 2 summarise the requirements of the Regulation and the timeframe for their adoption by new and old UPSS, along with where these are discussed in the guidelines.

³ Individual councils have discretion to identify what works require development approval.

Figure 1: UPSS Regulation – Requirements for ‘new’ and ‘significantly modified’ UPSS

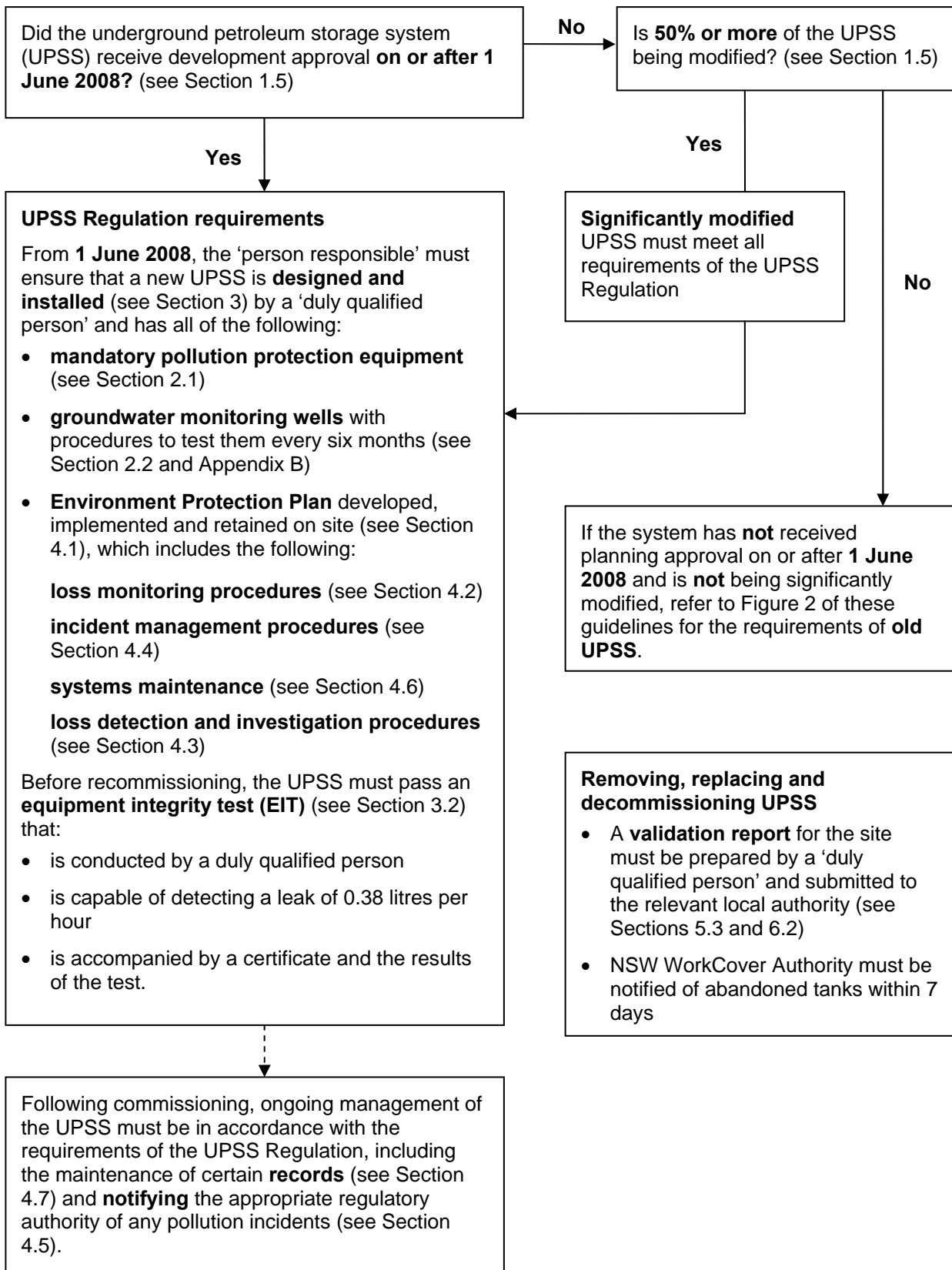
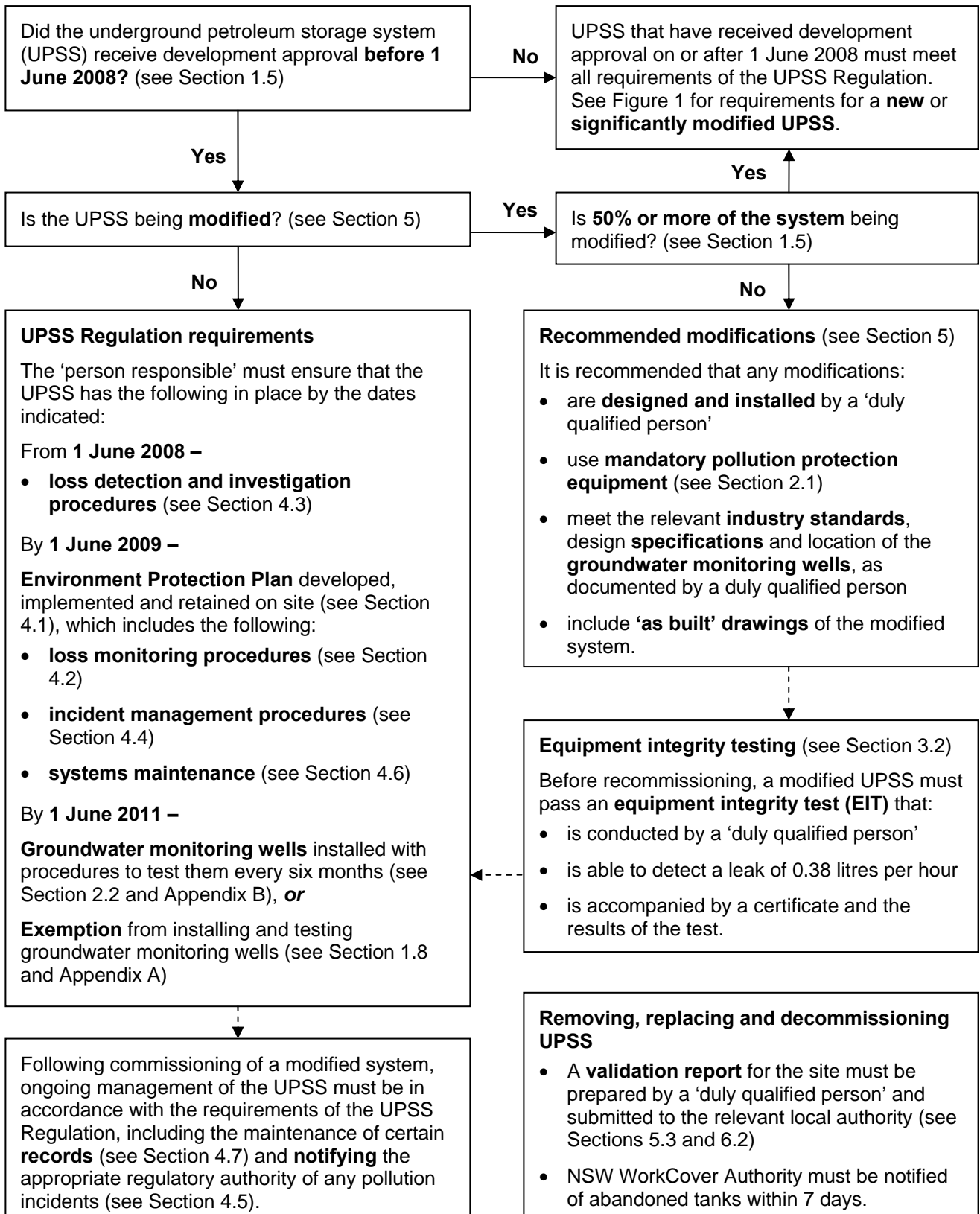


Figure 2: UPSS Regulation – Requirements for ‘old’ UPSS



1.6 Person responsible

The UPSS Regulation defines the 'person responsible' for a UPSS as the person who has management and control of the storage system. The person responsible must ensure the UPSS complies with the requirements of the Regulation. Where a system has been decommissioned, this is the person who had management and control immediately before it ceased operation.

Where a body or corporation is responsible for a UPSS, an individual must be nominated as a representative contact.

DECC recognises that at some UPSS sites more than one party may be involved in managing the site through specific legal/contractual arrangements. These arrangements could be used to nominate someone as being responsible for meeting the specific requirements of the UPSS Regulation, as well as managing and controlling the storage system.

1.7 Appropriate regulatory authority

Administering the Regulation

DECC has been declared the appropriate regulatory authority (ARA) for matters arising from the UPSS Regulation for four years, until 31 May 2012. After this date, local councils will take on the responsibility for administering the Regulation in their areas, while DECC will remain the ARA for public authorities and premises licensed under the POEO Act.

With the Regulation relatively new and untested, declaring DECC the ARA for the initial four years is assisting to ensure consistency in the statewide enforcement of its requirements. During this period there will be a strong emphasis on building the capacity of local councils to take up their role as the ARA for regulating all aspects of UPSS sites at the end of the introductory period.

Administering all other aspects of the Act

Local councils continue to be responsible for administering the environmental legislation related to all other aspects of sites not covered by the UPSS Regulation. For example, councils will still deal with noise and odour issues, above-ground spills, other surface contamination and general stormwater management at these sites.

Planning issues

Planning authorities (usually local councils) have several consent roles under the *Environmental Planning and Assessment Act 1979* (EP&A Act), including those involving UPSS. These roles and the planning process are not affected by the UPSS Regulation.

UPSS do not require integrated development approval (IDA) unless the proposed system needs development approval from a consent authority (usually the local council) and one or more of the other consents/permits/authorisations listed in s.91 of the EP&A Act (including environment protection licences issued by DECC).

The Regulation does, however, require specific conditions to be met in the design, installation and commissioning of all new and significantly modified UPSS, as well as when a tank is to be removed or replaced or the system decommissioned. These requirements should be considered at the planning stage and addressed in the development application submitted to council as part of the development approval process.

To assist planning authorities in assessing development applications which include UPSS, DECC has produced a separate document in consultation with the Department of Planning and the Local Government and Shires Association: *Incorporating requirements of the POEO (Underground Petroleum Storage Systems) Regulation 2008 in the planning and development process* (DECC 2009a), downloadable from www.environment.nsw.gov.au/clm/upss.htm.

1.8 Exemptions

Clause 28 of the UPSS Regulation allows DECC to exempt a person responsible for a UPSS from complying with one or more of its requirements. There are four classes of exemptions:

- **Class 1** – exempted from most requirements of the Regulation for certain types of UPSS
- **Class 2** – exempted from requirements to install and test groundwater monitoring wells where a UPSS is located outside an ‘environmentally sensitive zone’⁴
- **Class 3** – exempted from requirements to install and test groundwater monitoring wells where a UPSS is located within an environmentally sensitive zone and measures are in place to prevent environmental harm in the event of a leak or spill
- **Class 4** – exempted from specific requirements of the Regulation where it can be shown that it is not possible to comply with these provisions and alternative measures are in place to provide an equivalent environmental benefit.

Applications for an exemption must be made in writing to DECC on the prescribed application form, accompanied by supporting information and any fee, if required. Some classes of exemption do not attract a fee.

‘Appendix A: UPSS Regulation Exemption Plan’ has detailed information on exemptions from the Regulation. This plan is also available at www.environment.nsw.gov.au/clm/upssexemptionplan.htm

1.9 Compliance

Auditing

DECC will undertake a compliance audit program, involving a random and targeted selection of UPSS sites, to verify that the requirements of the UPSS Regulation are being implemented appropriately. Site audit inspections will usually occur during normal business hours and may be announced or unannounced.

DECC will seek to engage relevant local authorities when it plans to undertake site inspections and audit programs.

Enforcement notices

Certain enforcement powers are available to ARAs under the POEO Act in order to effectively manage and prevent pollution incidents. These include issuing clean-up notices and prevention notices requiring actions to be taken at UPSS sites.

⁴ An ‘environmentally sensitive zone’ is the surface area around a sensitive feature, such as a groundwater bore or surface water body, which DECC estimates is necessary to provide acceptable protection of the feature in the event of a leak or spill from a nearby UPSS.

Clean-up notices

Under the POEO Act, an ARA may issue a clean-up notice requiring a person to take certain action where it reasonably suspects that a pollution incident has occurred or is occurring. Actions to be taken may include:

- appropriate measures to prevent, minimise, remove, disperse, destroy or mitigate any pollution resulting, or likely to result, from the pollution incident
- ascertaining the nature and extent of the pollution incident and any actual or likely resulting pollution
- preparing and/or carrying out a remedial plan of action as agreed to by the ARA.

Prevention notices

Under the POEO Act, an ARA may issue a prevention notice when it reasonably suspects that an activity has been or is being carried out in an 'environmentally unsatisfactory manner' as defined in the Act (see also the 'Glossary' in these guidelines).

Examples of the types of preventative actions that may be required are listed in the Act and include:

- installing, repairing, altering, replacing, maintaining or operating control equipment or other plant
- monitoring, sampling or analysing any pollution or otherwise ascertaining the nature and extent of pollution or the risk of pollution
- preparing and carrying out a plan of action to control, prevent or minimise pollution or waste
- providing regular progress reports to the ARA on implementing the action(s) required to be taken by the notice.

Penalties and offences

The person responsible for a UPSS is guilty of an offence if they contravene a provision of the UPSS Regulation or authorise or permit a contravention. A person who is guilty of an offence under the Regulation may receive a penalty notice or be prosecuted by the ARA. The Regulation outlines the maximum penalties for offences.

Penalties and offences under the POEO Act may also apply to the operation of a UPSS. For example, it is an offence for a person to wilfully or negligently allow a substance to leak, spill or escape from a storage system in a manner that harms, or is likely to harm, the environment. It is also an offence to pollute waters or land.

Under the POEO Act, the EPA may require a wide range of documents to be provided to it. In these circumstances, anyone furnishing information or making a statement to the EPA that they know is false or misleading in a material respect is guilty of an offence.

1.10 Relevant contacts

Environment Line	Phone (02) 9995 5555 or 131 555 (from anywhere in NSW)
Email	upssreg@environment.nsw.gov.au
Postal address	Attention: Contaminated Sites – UPSS Department of Environment and Climate Change NSW PO Box A290, Sydney South NSW 1232
Street address	Department of Environment and Climate Change NSW 59 Goulburn Street, Sydney NSW 2000

2. UPSS infrastructure

All UPSS which received development approval on or after the commencement of the Regulation on 1 June 2008 are considered '**new**' UPSS and must comply fully with the Regulation before being commissioned.

All UPSS which received development approval before the commencement of the Regulation on 1 June 2008 are considered '**old**' UPSS. These systems need to comply with all requirements of the new Regulation but over a deferred timetable. However DECC encourages operators of these sites to consider the benefits of compliance in any minor upgrades and daily operations.

Any '**significant**' modification to an old or new UPSS, that is replacement of half or more of the system or modification that requires development approval, triggers the need for the system to comply fully with the Regulation.

2.1 Mandatory pollution protection equipment

All new and significantly modified UPSS must have the following 'mandatory pollution protection equipment' installed as specified in clause 7 of the UPSS Regulation:

- non-corrodible tanks and piping⁵
- secondary containment⁶ of tanks and piping
- overfill protection devices.

The mandatory pollution protection equipment specified in the Regulation represent minimum requirements that must be adopted in new or significantly modified UPSS from an environment protection perspective. This is not intended to limit the use of alternative materials, design, technology and methods where they can be shown to offer the same or better protection to the environment and human health as the specified equipment.

Non-corrodible tanks and piping

Non-corrodible tanks

The UPSS Regulation requires all new and significantly modified UPSS to have non-corrodible tanks. This means tanks must be:

- constructed of fibre-reinforced thermosetting resin composite which is compatible with the storage of petroleum products
- constructed of steel in accordance with Category 4 of *AS1692–2006: Tanks for flammable and combustible liquids* (AS 2006) and cathodically protected as in Section 2.3 of these guidelines
- constructed of a fibre-reinforced thermosetting resin composite outer wall separated by an interstitial space from a steel inner wall which is compatible with the storage of petroleum products
- constructed and protected from corrosion in a manner that will provide at least the same protection of the environment and human health and safety as any of the three previous options.

⁵ 'Piping' is defined as pipework within a UPSS that is integral to the transfer and routine containment of petroleum. Vent piping and vapour recovery piping are not classified as piping.

⁶ For the purpose of these guidelines, 'secondary (leak) containment' means equipment and infrastructure, such as double-walled tanks and double-walled piping (with an interstitial space), which are designed to contain a leak and/or prevent it from escaping beyond the containment area of a UPSS.

Where no nationally recognised standard currently exists for any of the above tanks, the person responsible for a UPSS must ensure the manufacturer provides a written specification and performance warranty for the tank. The person responsible must retain this documentation as part of the Environment Protection Plan (EPP) for the system (see Section 4.1) and for seven years from the date of decommissioning of the tanks, in accordance with clauses 5(b)(i) and 26 of the UPSS Regulation.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation and the EPP retained onsite.

Non-corrodible piping

The UPSS Regulation requires that all new and significantly modified UPSS have non-corrodible piping which is:

- constructed of fibre-reinforced thermosetting resin composite which is compatible with the storage of petroleum
- constructed of flexible plastic which meets the requirements of UL971⁷ or an equivalent standard in terms of protection for the environment and human health and safety and is compatible with the storage of petroleum
- constructed and protected from corrosion in a manner that will provide at least the same protection for the environment and human health and safety as either of the previous options.

Piping will also need to conform with any other specifications required under state and federal statutory requirements relevant to UPSS and the storage of flammable liquids.

The person responsible for a UPSS must ensure the piping manufacturer provides a written specification and performance warranty for the piping and the person installing the piping written documentation that it has been installed in accordance with the manufacturer's specifications. The person responsible must retain this documentation as part of the EPP and for seven years from the date of decommissioning of the piping and associated infrastructure, in accordance with clauses 5(b)(i) and 26 of the UPSS Regulation.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation and the EPP retained onsite.

Secondary containment of tanks and piping

The UPSS Regulation requires secondary containment of tanks and piping for all new and significantly modified UPSS.

Secondary containment of tanks

Secondary containment of tanks should consist of double-walled tanks with an interstitial space or another form of tank infrastructure that will provide equivalent protection for the environment and human health and safety. The external containment layer must be non-corrodible as specified in the previous section.

⁷ UL971 (an Underwriter's Laboratory Standard: UL 2005) is an independent third-party standard for non-metallic underground piping. This reference is cited by *AS4897-2008* for the purpose of setting a minimum standard for flexible non-corrodible plastic piping. UL971 is used to evaluate non-metallic thermoplastic (flexible) and thermoset (rigid) primary carrier pipes, secondary containment pipes, integral primary/secondary containment pipes, vent and vapour recovery pipes, and pipe fittings intended for use underground in the distribution of petroleum-based flammable and combustible liquids, alcohols and alcohol-blended fuels.

Where tanks providing secondary containment are new to the market, the person responsible for a UPSS must ensure the tank manufacturer provides a written specification and performance warranty for the product. This should certify that the tank meets industry-recognised standards and specifications that are at least equivalent to a double-walled structure. The person responsible must retain this documentation as part of the EPP and for seven years from the date of decommissioning of the tanks, in accordance with clause 5(b)(i) and 26 of the UPSS Regulation.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation and the EPP retained onsite.

Secondary containment of piping

Secondary containment of piping should consist of double-walled piping with an interstitial space or another form of equipment/infrastructure that will provide at least the same protection for the environment and human health and safety.

Where piping or other associated infrastructure providing secondary containment is new to the market, the person responsible for a UPSS must ensure the manufacturer provides a written specification and performance warranty for the product. This should also certify that the piping or associated infrastructure meets industry-recognised standards and specifications that are at least equivalent to a double-walled structure. The person responsible must retain this documentation as part of the EPP and for seven years from the date of decommissioning of the piping and associated infrastructure, in accordance with clause 5(b)(i) and 26 of the UPSS Regulation.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation and the EPP retained onsite.

Overfill protection

The UPSS Regulation requires all new and significantly modified UPSS to have overfill protection devices.

Overfill protection should:

- significantly reduce the possibility of a tank being overfilled when petroleum is being delivered into the tank
- have a system in place for the safe operation and maintenance of the equipment, including recording of incidents.

2.2 Groundwater monitoring wells

All new and significantly modified UPSS must have groundwater monitoring wells installed and tested. Department of Water and Energy (DWE) approval for the installation of groundwater wells may be required.

Old UPSS must have groundwater monitoring wells in operation at the site by 1 June 2011.

The UPSS Regulation requires the wells to be:

- located, installed and sampled appropriately
- tested at least every six months for the presence of groundwater contamination from any UPSS on the site

- sampled and analysed in a laboratory for the presence and concentration of specific chemicals within 30 days of –
the installation of the wells
the discovery that groundwater may be contaminated by petroleum
the discovery of a leak through loss monitoring for tanks and piping, inventory control, discrepancy or loss investigation, or some other method.

Only a suitably qualified person experienced in designing and/or installing groundwater monitoring wells, such as an environmental consultant⁸ or groundwater well driller, should undertake the following installation tasks:

- positioning of wells onsite
- construction of wells to ensure that groundwater is intercepted
- initial sampling and analysis.

‘Appendix B: Installation and testing of groundwater monitoring wells’ has more detailed guidance on the installation and testing of groundwater monitoring wells and also outlines procedures for record keeping when undertaking groundwater testing, sampling and analysis.

In accordance with clauses 17 and 18 of the UPSS Regulation, the person responsible for a UPSS must ensure a duly qualified and experienced person designs and/or installs a groundwater well and provides them with a written groundwater monitoring well report. This should outline final construction details, the industry standards met in the installation and confirm that the well’s design, location and installation satisfy industry best practice requirements.

The person responsible must retain this documentation for seven years from the date of decommissioning of the UPSS, in accordance with clauses 19(2)(f) and 26 of the UPSS Regulation.

The person responsible must also keep all groundwater monitoring well test results and associated reports for a minimum of seven years from the date they are created.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation.

Exemption from installing groundwater monitoring wells

Clause 28 of the UPSS Regulation provides for exemptions from installing and testing groundwater monitoring wells.

DECC may grant the person responsible for a UPSS a Class 2 or Class 3 Exemption from complying with clauses 16–18 and 21, requiring the installation and testing of groundwater monitoring wells.

‘Appendix A: UPSS Regulation Exemption Plan’ outlines the specific requirements that need to be met in order to qualify for an exemption.

Where an exemption has been granted and the loss monitoring/investigation system confirms a leak has occurred, DECC may revoke the exemption and require installation of groundwater monitoring wells.

⁸ Advice on engaging consultants in NSW is provided on DECC’s website at www.environment.nsw.gov.au/clm/selectaclmcons.htm

2.3 Recommended equipment and practices

Equipment or infrastructure which is not required under the UPSS Regulation but is considered to be part of good environmental practice at storage sites includes tank pit observation wells, additional monitoring/sensor probes and automatic shutdown/cut-off valves integral to the operation of the system. *AS4987–2008: Design, installation and operation of underground petroleum storage systems* (AS 2008a) has further information.

Tank pit observation wells

Tank pit observation wells are used to check whether liquid in the tank pit contains leaked or spilled petroleum and also check for vapours. While the UPSS Regulation does not require the installation of the wells, industry best practice recommends the use of at least one for each tank pit excavation. This should be located at the down gradient/low point of the excavation to intercept any leaking petroleum.

'Appendix B: Installation and testing of groundwater monitoring wells' has more on installing and monitoring tank pit observation wells.

Fill points

Current industry best practice recommends that the design and installation of each fill point should:

- be dedicated to one tank only
- be accessible from the vehicle unloading or loading position with a hose no more than 6 metres long
- have a spill containment device with a minimum capacity of 15 litres
- have a system for the safe removal of any petroleum (or contaminated water) that collects in the spill containment device
- allow adequate access for visual inspection
- be identified on site drawings.

Dispenser sumps

Current industry best practice recommends that all dispenser sumps should:

- be designed and installed by duly qualified persons to meet all relevant standards and manufacturer's specifications
- be located underneath the dispenser
- collect and contain any leaks from the dispenser
- have a system for the safe removal of any petroleum (or contaminated water) that collects in the dispenser sump
- be able to prevent the release of petroleum to the environment.

Consideration should be given to keeping a record of the date, quantity and nature of any petroleum that is removed from a dispenser sump. While not required by the UPSS Regulation, these records may be useful for reconciliation purposes or in determining whether loss from a system to a dispenser sump is an ongoing problem that needs to be rectified.

Cathodic protection for tanks and piping

All new and significantly modified UPSS with steel tanks and piping should be cathodically protected against corrosion and designed and installed in accordance with *AS2832.1–2004: Cathodic protection of metals – Part 1 Pipes and cables* (AS 2004a) and *AS2832.2–2003: Cathodic protection of metals – Part 2 Compact buried structures* (AS 2003). An effective cathodic protection system should minimise the risk of corrosion and the potential for petroleum to leak from a UPSS.

Cathodic protection of steel tanks and piping

For steel tanks and piping, cathodic protection should be designed and installed in accordance with Parts 1 and 2 of AS2832 and conform to the following requirements:

- Tanks and piping should be coated with a suitable di-electric material.
- The cathodic protection system should be designed by a corrosion specialist and installed in accordance with their instructions. They should certify that the installation meets the requirements of Parts 1 and 2 of AS2832 and this section of the guidelines. This document should be retained as part of the EPP and for seven years from the date of decommissioning of a system by the person responsible for the UPSS.
- The cathodic protection system should have permanent test points to enable maintenance and testing in accordance with this section.
- A UPSS should be electrically isolated from all components to which it is physically connected and for which cathodic protection is not intended, including being isolated from electrical earth.

The Department of Water and Energy maintains a register of cathodically-protected tanks in NSW.

Inspection and testing

Cathodic protection systems should be inspected and tested within 12 weeks of installation and at least every year thereafter, in accordance with Parts 1 and 2 of AS2832 and instructions from a corrosion specialist.

Where impressed current cathodic protection systems are used, the system should be monitored monthly in accordance with a corrosion specialist's instructions to ensure correct operations.

If inadequate corrosion protection is discovered, the person responsible for a UPSS should ensure corrective measures are taken so that the site-specific requirements of the EPP are met to minimise the potential for any leaks and/or address any contamination as the result of a leak.

Maintenance of cathodic protection systems

The person responsible for a UPSS with cathodic protection should undertake works in accordance with the maintenance and testing requirements recommended by the manufacturer.

Maintenance checks of the cathodic protection system should be conducted in accordance with the recommendations of a corrosion specialist and meet the requirements of Parts 1 and 2 of AS2832.

Maintenance requirements and inspection and testing procedures must be documented and retained in the EPP.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the UPSS Regulation and the EPP retained onsite.

Earthing of UPSS

All new and significantly modified UPSS should be earthed in accordance with the requirements of *AS/NZ1020–1995: Control of undesirable static electricity* (AS/NZ 1995) and *AS/NZ3000–2007: Electrical installations* (AS/NZ 2007). This will minimise the potential for static build-up and hence the possibility of explosion and the discharge of petroleum.

Earthing of fill points and vapour recovery points must meet the requirements outlined in 'Appendix C: UPSS earthing requirements'.

The resistance to earth should be tested at the time of installation by a competent and experienced person and the person responsible for a UPSS should retain all test records as part of the EPP and for seven years from the date of decommissioning of the UPSS. Where the person responsible for a UPSS changes (such as through sale/transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the UPSS Regulation.

Used oil removal points

Design and installation of each used oil removal point should:

- incorporate the dip point
- be dedicated to one tank only.

The person responsible for a UPSS should contact the original equipment manufacturer, if possible, for advice on matters relating to the tank that is being used for the storage of used oil and any specific issues with the removal point.

3. Designing and installing UPSS

All UPSS which received development approval on or after the commencement of the Regulation on 1 June 2008 are considered '**new**' UPSS and must comply fully with the Regulation before being commissioned.

All UPSS which received development approval before the commencement of the Regulation on 1 June 2008 are considered '**old**' UPSS. These systems need to comply with all requirements of the new Regulation but over a deferred timetable. However DECC encourages operators of these sites to consider the benefits of compliance in any minor upgrades and daily operations.

Any '**significant**' modification to an old or new UPSS, that is replacement of half or more of the system or modification that requires development approval, triggers the need for the system to comply fully with the Regulation.

3.1 Design, installation and commissioning requirements

All new and significantly modified UPSS coming into operation for the first time (being 'commissioned') must be designed, installed and tested in accordance with the provisions of clauses 5–8 of the UPSS Regulation.

To meet the requirements of the Regulation, a UPSS must:

- be designed by a 'duly qualified person'⁹
- be installed by a duly qualified person
- include the mandatory pollution protection equipment specified in the Regulation
- pass equipment integrity testing.

To meet industry best practice, a UPSS is required to comply with:

- all relevant Australian Standards, recognised Codes of Practice and other relevant state and federal statutory requirements specific to the design and installation of underground systems that store petroleum products, such as *AS4897–2008: Design, installation and operation of underground petroleum storage systems* (AS 2008a)
- equipment manufacturers' instructions that address design and/or installation requirements and specifications.

The duly qualified person who designs and installs a UPSS must provide details of all relevant industry standards and specifications used and met to the person responsible for the system as a reference for the future. This is important as standards and specifications may vary over time and this document will be a summary of those used at the time the system was installed.

'As-built drawings'¹⁰ must be finalised at the completion of the installation.

⁹ A 'duly qualified person' is a person who has competencies and experience (in relation to a specific activity) that are recognised as appropriate for that activity by the relevant industry.

¹⁰ 'As-built drawings' are defined by the UPSS Regulation as drawings that depict the current configuration of the system in relation to the storage site (that is, as installed below ground level). They should be detailed site plans (to a recognisable scale) which depict the final installed configuration of any part of a UPSS and any construction deviations showing all features of the storage site as *currently* built. They do not include the pre-constructed drawings.

3.2 Equipment integrity test

An equipment integrity test (EIT)¹¹ must be performed on all new, repaired and (significantly) modified UPSS after installation is complete and other planning consent requirements have been met, before the full commissioning of the system. The person performing the test must provide the person responsible for a UPSS with a certificate stating that the system has passed the test, as well as the results of the test. These documents must be kept for seven years after decommissioning, in accordance with clause 26 of the UPSS Regulation.

Minimum requirements for equipment integrity tests

An EIT should be:

- capable of detecting a leak of 0.38 litres per hour, with a probability of detection of at least 95% and of false detection of 5% or less in accordance with *AS 4897–2008* (AS 2008a)
- conducted by a duly qualified person in accordance with the manufacturer's written instructions specific to the UPSS
- a nationally approved and certified method of testing that meets, at a minimum, the requirements or certification standards of the United States Environmental Protection Agency (USEPA 1990).

In general, either a vacuum or pressure EIT may be performed.

For pressure-testing of tanks, only inert gases should be used. The use of nitrogen to pressure-test piping is sufficient to qualify as an EIT for piping, because the smaller volume and higher pressures used provide better accuracy.

Air pressure tests should **not** be used as an EIT for tanks once the tank has contained petroleum. This is because pressure tests are not considered accurate enough to reliably detect small leaks using the maximum allowable pressure for the tank of 35 kPa (5 psi). There is also the risk of explosion.

Pneumatic pressure-testing should **not** be used as an EIT for installed tanks.

Frequency of equipment integrity testing

An EIT is required:

- immediately before a new UPSS is commissioned
- immediately following any modification (upgrade), repair or reuse of tank(s) and/or piping
- as necessary from time to time to assess whether a UPSS is leaking or has been.

It should be noted that loss monitoring methods, such as statistical inventory reconciliation analysis (SIRA) (see 'Appendix D: Loss monitoring methods'), can be used to determine whether a UPSS is losing or gaining volume. Where appropriate, these results can be used to determine whether an EIT is necessary.

¹¹ Some documents may refer to an EIT as 'precision leak testing'.

3.3 Record keeping

The UPSS Regulation requires certain documents to be kept for specified periods of time. See Section 4.7 of these guidelines for details.

Where the person responsible for a UPSS changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation and the EPP retained onsite.

4. Operation of UPSS

All UPSS which received development approval on or after the commencement of the Regulation on 1 June 2008 are considered '**new**' UPSS and must comply fully with the Regulation before being commissioned.

All UPSS which received development approval before the commencement of the Regulation on 1 June 2008 are considered '**old**' UPSS. These systems need to comply with all requirements of the new Regulation but over a deferred timetable. However DECC encourages operators of these sites to consider the benefits of compliance in any minor upgrades and daily operations.

Any '**significant**' modification to an old or new UPSS, that is replacement of half or more of the system or modification that requires development approval, triggers the need for the system to comply fully with the Regulation.

Before a new or significantly modified UPSS may come into operation, Part 4 of the UPSS Regulation relating to the use of storage systems requires the following measures to be in place:

- an Environment Protection Plan (see Section 4.1)
- loss monitoring procedures (Section 4.2)
- loss detection and investigation procedures (Section 4.3)
- incident management procedures (Section 4.4)
- system maintenance (Section 4.6).

For old UPSS, the commencement dates for some of these measures are deferred.

4.1 Environment Protection Plan

A UPSS must not be used unless an Environment Protection Plan (EPP) has been developed and implemented at the site, in accordance with the requirements of clause 19 of the UPSS Regulation. This requirement applies to new and significantly modified UPSS from 1 June 2008 and old UPSS from 1 June 2009.

The Regulation requires the EPP to contain the procedural documents and records specific to the UPSS. The EPP must be kept onsite so that practical written procedures are on hand to detect leaks and spills and take appropriate action when they are identified.

The EPP must be kept up-to-date and amended as required and include all of the following:

- a loss monitoring procedure for the system (Section 4.2)
- an incident management procedure for the system (Section 4.4)
- maintenance for the system (Section 4.6)
- current as-built drawings¹² for the system
- a plan of the storage site showing the location of –

¹² Where the *current* as-built drawings are not available, an approximate diagram of the layout of the underground structures should be included indicating: 'This is a best approximation'.

the storage system

all buildings and associated infrastructure

all fences and gates

all groundwater monitoring wells (including any codes by which they are designated)

any unsealed ground surfaces

- a list of industry standards that were complied with for design, installation and operation of UPSS infrastructure
- copies of all specifications adopted in the design, installation and operation of the UPSS
- contact and other details about the UPSS itself –

name, postal address and 24-hour phone number for the person responsible for the UPSS, or where a body or organisation is responsible, for an individual who is authorised to act on behalf of the company in relation to the control of the system

the street address of the UPSS

land title particulars, such as the lot and DP numbers of the land on which the UPSS is situated

name of the person who owns the storage site, if different from the person responsible for the UPSS

details of access to the system and its security, including information on all locks, gates, fences and the like, and how to open them

the onsite and offsite location(s) of all records that are required to be kept in accordance with Part 5 of the Regulation.

An EPP may be kept in an electronic format, but it must be available at all times and able to be supplied (as hard copy if necessary) to the appropriate regulatory authority (ARA) upon request.

It is recommended that suitably qualified and experienced persons prepare procedural documents, the maintenance schedule, site drawings and details of industry standards and specifications (required by clause 19(2)(a)–(g) of the UPSS Regulation) to ensure these documents are accurate and complete.

Where the person responsible for the storage system has evidence demonstrating that they have taken all reasonable steps to obtain the details of industry standards and manufacturer's specifications, this must be included in the EPP in support of their attempt to obtain such documentation (clause 19(7)).

Clause 19 of the UPSS Regulation requires that an up-to-date copy of the EPP to be kept on the premises where the UPSS is located. Where records which are a required component of the EPP are stored offsite, this location must be disclosed in the EPP (clause 19(3)(g)).

The person responsible for a UPSS must retain each version of the EPP for at least seven years after the decommissioning of the UPSS, in accordance with clause 26(1).

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation and the EPP retained onsite.

4.2 Loss monitoring procedures

Loss monitoring procedures are designed to detect any losses of petroleum from UPSS tanks or piping before they pollute the soil, surface waters or groundwater. The frequency, sensitivity and reliability of loss monitoring should lead to a high level of confidence that any potential product loss will be detected in time to allow a response before a risk is posed to human health or the environment.

Loss monitoring is mandatory for all new and significantly modified UPSS from 1 June 2008 and for old systems from 1 June 2009.

Various methods of loss monitoring are available (see 'Appendix D: Loss monitoring methods') but to satisfy the requirements of the UPSS Regulation, the loss monitoring procedure must at least meet the detection limit of 0.76 litres per hour, with at least 95% accuracy.

To achieve industry best practice, all loss monitoring methods should also, as a minimum:

- be certified as meeting the requirements of the Regulation by an independent third party, consistent with the current United States Environmental Protection Agency (USEPA) protocols and system of verification (USEPA 1990)
- use equipment that has been installed, calibrated and commissioned in accordance with the manufacturer's instructions for the loss monitoring system
- be undertaken by a person suitably trained in each element of the procedure
- be conducted according to the service provider's instructions
- have a system in place that ensures the appropriate regulatory authority (ARA) is informed if there is a significant loss and appropriate corrective action is undertaken.

The person responsible for a UPSS must retain a written description of the routine operation, maintenance and service requirements of the loss monitoring system as provided by the manufacturer. This must be kept as part of the Environment Protection Plan's maintenance schedule requirement, in accordance with clause 19(2)(c) of the UPSS Regulation.

The raw data produced as part of the loss monitoring system (such as data from daily tank dipping or automatic tank gauging) should be kept until it is assessed and incorporated into a final report (refer to Section 4.7 for record-keeping requirements). The final reports must be kept as part of the EPP and for seven years from the date of decommissioning of the UPSS.

Where it is not practicable to implement a loss monitoring system, an application for an exemption from this requirement must be submitted to DECC, together with a proposed alternative process to check for any loss from the system on a regular basis. 'Appendix A: UPSS Regulation Exemption Plan' has more details.

4.3 Loss detection and investigation procedures

All UPSS must have appropriate loss detection procedures documented and in place to identify and investigate any discrepancy indicated by the loss monitoring procedure discussed in Section 4.2.

The person responsible for a UPSS must ensure any discrepancy is investigated to determine its cause as soon as possible after it becomes apparent.

This may involve system checks, such as reviewing inventory records and checking measuring equipment and records (see 'Appendix E: Loss detection investigation'). Alternatively, the person responsible may engage a qualified person with suitable experience in discrepancy or loss investigations to identify the cause of the discrepancy.

As soon as practicable after a discrepancy is confirmed as a leak or spill, the person responsible for a UPSS must follow the incident management procedure to remove the risk of harm to human health and the environment (Section 4.4).

The person responsible for a UPSS must keep a record of any discrepancy or loss investigation and findings, including the action taken, for at least seven years from the completion of the final report (clauses 22 and 25 of the UPSS Regulation).

Where a leak or spill at a UPSS is causing material harm or is likely to, the person responsible must notify both the appropriate regulatory authority (ARA) and DECC's Environment Line (phone 131 555 or (02) 9995 5555). A written report must be submitted to the ARA within seven days of this notification. Section 4.5 has more details on notification requirements.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the UPSS Regulation.

4.4 Incident management procedures

All UPSS (both new and old) must have documented incident management procedures in place by 1 June 2009. These procedures must be retained as part of the EPP and outline how the person responsible will verify whether the loss is the result of a leak or spill or some other cause (such as incorrectly calibrated equipment or faulty accounting procedures).

Where a discrepancy is identified as a leak or spill, the procedures should detail the following responses:

- notification of the incident to the appropriate regulatory authority (ARA) and DECC's Environment Line (see Section 4.5 for details)
- actions taken as soon as practicable to prevent any further release of petroleum into the environment
- identification and mitigation of any fire, explosion or vapour hazards
- all steps taken to prevent migration of any petroleum that has leaked or spilled
- all steps taken to recover or remove petroleum that has leaked or spilled, so that the site does not pose a threat to the environment or human health and safety
- removal or, where practicable, repair of leaking UPSS components in accordance with industry best practice.

DECC recommends that the person responsible for a UPSS engages a suitably qualified and experienced person to assist in the development of an incident management procedure.

Incident logs

Under clause 24 of the UPSS Regulation, the person responsible for a UPSS must ensure that an incident log is maintained which records:

- actions by anyone acting on their own behalf, rather than at the direction of the person responsible, that have affected, are affecting, or could affect the integrity of the UPSS
- any unplanned or abnormal incidents, including operational disruptions or equipment failures, that have affected, are affecting, or could affect the integrity of the UPSS.

In accordance with clauses 24 and 26, the incident log must be kept onsite or at a location specified in the EPP and retained for at least seven years from the date the UPSS is decommissioned by the person responsible.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation and the EPP retained onsite.

4.5 Incident notification

Where a leak or spill at a UPSS is causing or likely to cause material harm to the environment or human health, the person responsible must notify both the appropriate regulatory authority (ARA) and DECC's Environment Line (phone 131 555 or (02) 9995 5555) as soon as practicable. Failure to report such pollution incidents is an offence under Part 5.7 of the POEO Act.

Incidents at UPSS which must be notified include (but are not limited to):

- a leak or spill from a UPSS verified in accordance with loss detection or incident management procedures that is causing or threatens material harm to human health or the environment
- evidence on the site of free-phase hydrocarbons in surface water or groundwater
- evidence that offsite migration of hydrocarbons could occur, is occurring or has occurred.

A written report on the incident must also be submitted to DECC within seven days of the verbal notification, using the UPSS Regulation Leak Notification form in Appendix F of these guidelines.

The local council must also receive a validation report within 60 days of the removal of a tank, decommissioning of a UPSS or completion of remediation work, in accordance with the requirements of clauses 13 and 15 of the UPSS Regulation (see Sections 5 and 6 for details).

4.6 System maintenance

Details about maintenance of the UPSS must be documented in the EPP.

Under clause 20 of the UPSS Regulation, a storage system must not be used unless all gauges, indicators, probes, sensors and any other measuring instruments in the system are checked and maintained (and where necessary calibrated) in accordance with the manufacturer's specifications and/or the maintenance. All data produced by these measuring instruments should be recorded in a format that is suitable for the intended end use (refer to Section 4.7 for record-keeping requirements).

All data produced by any measuring instruments of a UPSS must be retained by the person responsible for at least seven years from when the data was produced, in accordance with clause 25 of the Regulation.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation and the EPP retained onsite.

4.7 Record keeping

Part 5 of the UPSS Regulation prescribes who is responsible for records management, what needs to be retained and how long certain records must be held.

Where the person responsible for a UPSS has documents and reports required by the Regulation that were prepared prior to 1 June 2008, these are included in the record-keeping requirements and must be retained for the period specified in Part 5 of the Regulation.

Periods for retaining records

It is the responsibility of the person responsible for a UPSS to ensure that all the *required documents* specified in the relevant clause of the UPSS Regulation are kept in accordance with clauses 25 and 26.

Records must be retained by the person responsible for a UPSS for the periods specified below.

Seven years from the date of document creation

Under clause 25 of the UPSS Regulation, the person responsible for a UPSS must retain the following required documents for a minimum of seven years from their date of creation (when they were finalised):

- all validation reports prepared under clause 13 and submitted to the relevant local authority
- all documents containing data produced by any measuring instrument in accordance with clause 20 (raw data from measuring devices, including groundwater monitoring wells, tank gauging and tank pit observation wells, only needs to be kept for two years once this data set has been incorporated into a final report)
- all documents containing details of action taken as a consequence of a loss detection investigation, in accordance with clause 22
- all notifications of a pollution incident involving a storage system that are given to the appropriate regulatory authority (ARA), including copies of the formal notifications, such as the UPSS Regulation leak notification form (Appendix F).

Seven years from date of decommissioning of a UPSS

Under clause 26 of the UPSS Regulation, the person responsible for a UPSS must retain the following required documents for a minimum of seven years from the date on which the system is decommissioned:¹³

- each certificate (and associated documentation) relating to equipment integrity testing issued for the system under clauses 8, 12 or 14
- all validation reports associated with decommissioning of the system, prepared in accordance with the requirements of clause 15 and submitted to the relevant local authority
- a groundwater monitoring well report prepared in accordance with the requirements of clause 18
- each version of the EPP prepared (and updated) in accordance with clause 19
- all records of significant modifications made in accordance with the requirements of clause 23, including the as-built drawings current at that time

¹³ When a UPSS is decommissioned, the person responsible immediately before the decommissioning remains responsible for retaining all relevant documents as part of the record-keeping requirements of the UPSS Regulation.

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- the incident log kept for the system under clause 24
- all reports made as a consequence of action taken under Part 5.7 of the POEO Act in connection with a pollution incident involving the system.

Changes in responsibility

Clause 27 of the UPSS Regulation requires that, within 30 days of a change in responsibility for a UPSS, the person formerly responsible for the system must deliver to the newly responsible person all the documents they have for the system that are required to be retained.

Access to records

Access to the EPP or other information must be provided to an officer authorised under the POEO Act upon request.

If necessary, further information and records can be requested via a notice issued under the Act. This information and/or records must be produced within the timeframe specified in the notice.

5. Modifying UPSS

Any 'significant' modification to an old UPSS (that is replacement or upgrade to half or more of the system or works requiring development approval) must meet the requirements of a new UPSS. However where a system is to be modified but not 'significantly', DECC recommends that the person responsible for the UPSS should consider the benefits of meeting the mandatory pollution protection equipment requirements for a new UPSS.

The person responsible for a UPSS must ensure that any modification to a storage system is designed and installed by a duly qualified person in accordance with relevant industry standards and design specifications for the equipment used in the modification. These designers and installers must provide the person responsible for the UPSS with a list of all relevant specifications and industry standards used in the modifications and revised as-built drawings for future reference. This is particularly important where the standards or specifications used differ from the existing structure.

An equipment integrity test (Section 3.2) must be performed on the system before it is recommissioned. The person undertaking the test must certify that the system has passed the test and also provide the results of the test.

The person responsible for a UPSS should ensure that all equipment and infrastructure is repaired or reused in accordance with *AS4897–2008: Design, installation and operation of underground petroleum storage systems* (AS 2008a) and the procedures outlined in this section. Repairs must leave systems both structurally sound and fully functional.

Recommendations and requirements relating to the repair and testing, reuse and documentation of modifications are discussed in the following sections.

5.1 Repair of UPSS

General repair of equipment

As a minimum, repair of UPSS equipment must meet:

- the equipment manufacturer's instructions for repair
- the equipment's original specifications
- the design, installation and recommissioning requirements of the UPSS Regulation described in Section 3.1.

Steel tanks

Steel tanks should only be repaired if they have been inspected internally by a competent and experienced person who should certify that the tank:

- is suitable for repair
- is structurally sound
- has not previously been repaired using an internal lining.

Where a competent and experienced person has certified that the tank is suitable for repair, the installation should:

- be supervised by a lining equipment manufacturer
- meet the requirements of industry best practice and occupational health and safety legislation.

When installation of the internal lining is complete and prior to its commissioning, the repaired tank:

- should be inspected internally by a competent and experienced person and certified to be structurally sound
- should be cathodically protected (Section 2.3)
- must pass an equipment integrity test (Section 3.2).

The person responsible must also arrange for loss monitoring procedures (Section 4.2) to be in place for the repaired tank.

The person responsible for a UPSS must ensure the duly qualified person repairing or testing a system provides written documentation that work has been performed in an appropriate manner and, where relevant, in accordance with the manufacturer's specifications.

All relevant documentation associated with the repair must be retained by the person responsible for a UPSS for at least seven years from the date the system is decommissioned, in accordance with the requirements of clause 26 of the UPSS Regulation.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation and the EPP retained onsite.

Other tanks

Tanks constructed of fibre-reinforced thermosetting resin composite or with a fibre-reinforced thermosetting resin composite outer wall and a steel inner wall should be repaired in accordance with the tank manufacturer's instructions and the requirements outlined in this section.

Tanks should only be repaired if they have been internally inspected by a competent and experienced person, who should certify that the tank has been repaired in accordance with the tank manufacturer's instructions.

The person responsible must ensure that the person repairing the system provides written documentation that it has been repaired in an appropriate manner and, where relevant, in accordance with the manufacturer's specifications.

All relevant documentation associated with the repair must be retained by the person responsible for a UPSS for at least seven years from the date the system is decommissioned, in accordance with clause 26 of the UPSS Regulation.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation and the EPP retained onsite.

Steel piping

Any steel piping, with the exclusion of serviceable items, which has leaked, is suspected of leaking, or is otherwise in need of repair, should **not** be repaired or reused, but replaced.

Other piping

Piping other than steel piping that has leaked or is suspected of leaking should either be replaced or repaired in accordance with the piping manufacturer's instructions, or abandoned.

It is strongly recommended that piping to be replaced meets the minimum mandatory pollution protection equipment requirements outlined in the UPSS Regulation. An equipment integrity test must be performed prior to recommissioning the system (Section 3.2).

5.2 Reuse of UPSS tanks

The NSW WorkCover Authority must be notified beforehand and approve of any proposed change to the contents of a tank, such as from diesel to unleaded petrol.

Non-steel tanks

The reuse of non-steel tanks should meet the following requirements:

- The tank has been designed and installed in accordance with the requirements of Section 3.1.
- An equipment integrity test has been performed in accordance with Section 3.2.
- The tank manufacturer has inspected and certified that the tank to be reused meets all the relevant requirements of this section and provided a warranty appropriate for the expected life of the UPSS.

All relevant documentation associated with the reuse of the tank must be retained by the person responsible for a UPSS for at least seven years from the date the system is decommissioned, in accordance with clause 26 of the UPSS Regulation.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation and the EPP retained onsite.

Steel tanks

Steel tanks should only be reused when they meet all of the following requirements:

- The tank conforms with the requirements of *AS1692–2006: Tanks for flammable and combustible liquids* (AS 2006).
- The tank manufacturer has inspected the tank internally and externally and certified that it is suitable for reuse because –
 - the tank has not been repaired previously
 - the tank is structurally sound
 - no areas of the tank's walls are less than 100% of their original thickness
 - the tank di-electric coating has been tested and meets the requirements for a new tank, including condition, thickness and electrical insulation.
- The tank is installed in accordance with the requirements of Section 3.1.
- An equipment integrity test has been performed in accordance with Section 3.2.

All relevant documentation associated with the reuse of the tank must be retained by the person responsible for a UPSS for at least seven years from the date the system is decommissioned, in accordance with clause 26 of the UPSS Regulation.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation and the EPP retained onsite.

5.3 Site validation reports

If the modification of a UPSS involves the removal or replacement of a tank, clause 13 of the UPSS Regulation requires preparation of a validation report for the storage site, which confirms it is suitable for continued use and to assist with any future planning decisions for the site.

The validation report should be prepared in accordance with the relevant sections outlined in *Site validation reporting* (DECC 2009c), *Guidelines for consultants reporting on contaminated sites* (EPA 1997) and, where relevant, *Guidelines for assessing service station sites* (EPA 1994). The validation report should provide a clear conclusion stating whether or not the site is suitable for its existing or any proposed future use.

Clause 13 of the Regulation also requires the validation report to be submitted to the relevant local authority, within 60 days of the tank being removed, replaced or, where relevant, the remediation of the site, before the UPSS is recommissioned.

A validation report written as the result of a tank removal or replacement must be retained for seven years from the date the report is finalised, in accordance with clause 25.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation and the EPP retained onsite.

5.4 Retention of records

Modifications

All as-built drawings and relevant documents produced as part of the design, installation and testing phases of a modified system (such as the list of industry standards and manufacturer's specifications complied with and the equipment integrity test records) must be retained for seven years from the date of decommissioning of a UPSS by the person responsible, in accordance with clause 26 of the UPSS Regulation.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation and the EPP retained onsite.

Significant modifications

Details of any significant modifications to a UPSS must be documented and kept in accordance with the requirements of clause 23 of the UPSS Regulation.

This includes, as a minimum:

- a comprehensive description of the modifications
- the dates the modifications commenced and were completed
- the results and certification of the equipment integrity test that was carried out in accordance with clause 12 of the Regulation to ensure that the system is both structurally sound and fully functional

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- a revised copy of the as-built drawings which reflects the modifications and included with the EPP.

All documentation relating to significant modification of the system must be retained for seven years from the date a UPSS is decommissioned, in accordance with clause 26 of the Regulation.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation and the EPP retained onsite.

6. Decommissioning UPSS

Under the UPSS Regulation, 'decommission' means to permanently abandon the use of a system or render it permanently unusable. It is industry best practice to remove UPSS that are no longer required. Where two years have elapsed since fuel was put in or taken from a tank, it must be abandoned (after removing the fuel) in accordance with the Occupational Health and Safety (Dangerous Goods) Regulation 2001.

6.1 UPSS abandonment and decommissioning

The NSW WorkCover Authority is responsible for occupational health and safety issues relating to decommissioning and removal of tanks from a site. The following WorkCover requirements must be met during decommissioning:

- the tank and contents made safe in line with *Code of Practice: Storage and handling of dangerous goods* (NSW WorkCover Authority 2005)
- WorkCover notified of the abandonment within seven days using the prescribed approval form, so the tank can be removed from its database.

If the tank is to be removed from the ground, it must be correctly disposed of in accordance with NSW environmental and safety requirements and industry best practice: *AS 1940–2004: Storage and handling of flammable and combustible liquids* (AS 2004b) and *AS 4976–2008: The removal and disposal of underground petroleum storage tanks* (AS 2008b).

When removal is not practicable, such as where it poses risks to other structures or extraction is impossible or dangerous to the structure, the disused UPSS must be emptied and decommissioned *in situ* and the tank filled with an inert solid material, such as a concrete slurry, sand or foam.

Where the tank is to be temporarily decommissioned and used again within two years, WorkCover requires that it is filled with water and a corrosion inhibitor, or made safe by other approved methods. Where a disused tank is recommissioned, the UPSS Regulation will apply to the tank and any associated piping.

6.2 Site validation and record keeping

The person responsible for a UPSS at the time of decommissioning must ensure that the site is investigated for contamination and a validation report prepared for the storage site in accordance with the requirements of clause 15 of the UPSS Regulation. The validation report should be prepared by a suitably qualified and experienced person, such as a contaminated land consultant.¹⁴

Where tanks are decommissioned *in situ*, the validation report should state this and provide a site drawing showing the location of all equipment and associated infrastructure that remains at the site.

Clause 15 of the Regulation also requires the validation report to be submitted to the relevant local authority, along with any other specified documentation¹⁵ within 60 days of:

¹⁴ Advice on engaging contaminated land consultants in NSW is provided on DECC's website at www.environment.nsw.gov.au/clm/selectaclmcons.htm.

¹⁵ Section 17 of *State Environmental Planning Policy No. 55: Remediation of land* (DUAP 1998) requires that within 30 days of the completion of work, a notice of completion of remediation work on any land must be given to the council for the local government area in which the land is situated or, if within the unincorporated area, to the Western Lands Commissioner.

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- the decommissioning of a UPSS, if no soil or groundwater remediation (associated with the decommissioning of a UPSS) is required
- the completion of any soil or groundwater remediation associated with the decommissioning of a UPSS, if remediation is required.

The validation report must be prepared in accordance with *Site validation reporting* (DECC 2009c), *Guidelines for consultants reporting on contaminated sites* (EPA 1997) and, where relevant, *Guidelines for assessing service station sites* (EPA 1994). The validation report should provide a clear conclusion stating whether or not the site is suitable for its existing or proposed future use.

A validation report written as the result of the decommissioning of a UPSS must be retained for seven years from the date of decommissioning.

Where the person responsible changes (such as through sale, transfer of ownership of the site or business or contractual changes), all documents must be transferred to the new person responsible, in accordance with clause 27 of the Regulation and the EPP retained onsite.

In situations where there is a change of land use, additional site investigation, remediation and/or validation procedures may be required, consistent with the requirements of the relevant planning authority and *State Environmental Planning Policy No. 55* (DUAP 1998).

Appendix A: UPSS Regulation Exemption Plan

A1. Exemptions to meeting requirements of the UPSS Regulation

Under clause 28 of the UPSS Regulation, the Department of Environment and Climate Change (DECC) has the power to exempt the person responsible for a UPSS from complying with certain requirements of the Regulation.

DECC adopts a risk-based approach to assessing and granting exemptions. Exemptions are mainly being applied to the operations of 'old' UPSS (installation approved before 1 June 2008), where the operator/owners are able to demonstrate that either the UPSS is not in a DECC defined 'environmentally sensitive zone',¹⁶ or the site is not contaminated and that appropriate systems are in place to ensure any leak or spill from the system will not pose any risk to health or the environment.

Exemptions may also be granted for 'new' or 'significantly' modified UPSS (installation approved after 1 June 2008) which can similarly demonstrate an absence of contamination and that no environmental or health risks will be posed from any leak or spill from the system.

A2. Classes of exemption

There are four classes of exemption as summarised in the table below.

Class	Exempted requirements
Class 1	<p>Clauses 16–18 and 21: exempted from the need to install and test groundwater monitoring wells</p> <p>Clauses 19, 20 and 22: exempted from the need to adopt an Environment Protection Plan (EPP) for the system</p> <p>Clause 24 and partial exemption from some of the requirements of clauses 25 and 26: exempted from maintaining certain records, but not those related to equipment integrity testing and validation reports on tank removal and replacement or decommissioning</p>
Class 2	<p>Clauses 16–18 and 21: exempted from the need to install and test groundwater monitoring wells because the UPSS site is outside an environmentally sensitive zone and any leak or spill from the system is unlikely to cause significant environmental harm to a sensitive receptor</p>
Class 3	<p>Clauses 16–18 and 21: despite being in an environmentally sensitive zone, exempted from the need to install and test groundwater monitoring wells because the systems and equipment installed at the UPSS will be able to detect a leak or spill before it causes significant environmental harm</p>
Class 4	<p>Exempted from complying with one or more requirements of the UPSS Regulation where it can be demonstrated that the system is unable to meet those requirement(s) and suitable alternatives which will still meet the intentions of the Regulation are approved by DECC</p>

¹⁶ An 'environmentally sensitive zone' is the buffer around a sensitive feature, such as a groundwater bore or surface water body, which DECC estimates is necessary to provide an acceptable level of protection in the event of a leak or spill from a nearby UPSS.

General exemption principles

1. Granting an exemption from meeting one or more requirements of the UPSS Regulation does not exempt the person responsible for a UPSS from meeting any of the other requirements. The person responsible may be required to provide evidence that their UPSS is compliant with all other relevant requirements of the Regulation.
2. An exemption will **not** be granted where contamination has been identified at the site, unless a validation report confirms the site has been remediated to a level appropriate for ongoing use and no offsite migration of contamination has occurred.
3. The person responsible for a UPSS which has an exemption must notify DECC within 21 days of the discovery of contamination at the site. DECC will then consider whether to revoke the exemption. Where this occurs, the person responsible will need to comply with the relevant requirements of the UPSS Regulation within a timeframe agreed to by DECC.
4. Applicants should be aware that some exemptions attract a fee to cover the costs related to the administration and assessment of an application. Where this takes more than the standard 10 hours to assess, an additional hourly fee may be charged. DECC will discuss any additional fee for service with the proponent prior to incurring the costs associated with this work.

Class 1 Exemptions

A Class 1 Exemption applies to persons responsible for tanks which provide fuel to a stationary device such as:

- a back-up generator in commercial or residential premises
- a furnace used to heat premises

or tanks used to store used (waste) oil.

Applying for a Class 1 Exemption

No application or fee is necessary for a Class 1 Exemption.

DECC has made a decision to automatically grant an exemption to persons responsible for UPSS which meet any of the above criteria.

In some cases, however, DECC may request written confirmation from the person responsible that their UPSS conforms with these criteria. When it is satisfied that the system does comply, DECC will notify the person responsible of the Class 1 Exemption. In such cases, DECC will issue a formal acknowledgement of the Class 1 Exemption.

Class 1 Exemptions and the criteria on which they are based will be reviewed within four years of the commencement of the UPSS Regulation.

See Sections A4–A6 below for details on the term of exemptions, and transferring and renewing them.

Notes on Class 1 Exemptions

1. A Class 1 Exemption for one or more UPSS at a multi-UPSS site does **not** extend to other systems at the site. These other systems will need to comply with the UPSS Regulation.
2. Regardless of the conditions of a Class 1 Exemption, pollution that is causing material harm to the environment, or has the potential to, must be reported to the appropriate regulatory authority (ARA), in line with Part 5.7 of the *Protection of the Environment Operations Act 1997*.

Class 2 Exemptions

The person responsible for a UPSS may be granted an exemption from the requirements to install and test groundwater monitoring wells (clauses 16–18 and 21 of the UPSS Regulation), where it can be shown that the site is located **outside** an environmentally sensitive zone as shown on sensitivity maps prepared and held by DECC.

The DECC website (www.environment.nsw.gov.au/clm/envsensitivezones.htm) describes how these zones have been determined (see also Section A8 of this plan). The website also provides a set of indicative maps so that potential applicants for Class 2 Exemptions can assess whether their site falls within a sensitive zone.

Applying for a Class 2 Exemption

There is no fee for applying for a Class 2 Exemption.

To obtain a Class 2 Exemption, the person responsible for a UPSS should complete the exemption application form at the end of this appendix and send it to DECC. Where a new or significantly modified UPSS is involved, the exemption application should be made at the same time as the development application to the local council. Council should be advised that a Class 2 Exemption is being sought to ensure consideration is given to this when issuing its development approval.

DECC will confirm the exemption based on the address provided for the site (or geographic coordinates where the tanks are located on part of a site), where this demonstrates that the UPSS is not located in an environmentally sensitive zone.

See Sections A4–A6 below for details on the term of exemptions, and transferring and renewing them.

Class 3 Exemptions

The person responsible for a UPSS located **within** an environmentally sensitive zones may be granted an exemption from the requirements to install and test groundwater monitoring wells (clauses 16–18 and 21 of the UPSS Regulation) where it can be shown that:

- A records from an industry-recognised loss monitoring system demonstrate that there has been no petroleum leak from the UPSS over the previous 18 months (or the lifetime of the system, where it is less than 18 months)

AND EITHER

- B(1) there is no existing significant soil or groundwater contamination on the UPSS site, as determined by an appropriate level of assessment,¹⁷ and
the UPSS has all necessary systems in place to detect or prevent any leak or spill before it impacts the environment (i.e. mandatory pollution protection equipment as defined in the UPSS Regulation)

OR

- B(2) a comprehensive site sensitivity assessment of the site has been undertaken by a suitably qualified and experienced person in accordance with the appropriate DECC guidelines.

¹⁷ Assessments must be undertaken and documented by a suitably qualified and experienced person. Advice on engaging a consultant in NSW is provided on DECC's website at www.environment.nsw.gov.au/clm/selectaclmcons.htm

Applying for a Class 3 Exemption

A standard fee of \$430 is required to accompany an application for a Class 3 Exemption to cover the cost of technical assessment by DECC officers. However where it becomes necessary to spend more than the standard 10 hours to review more complex applications, an additional hourly fee may be charged.

Discussion with DECC before lodgement of the application is strongly recommended. Applications should be prepared by a suitably qualified and experienced environmental consultant.

To obtain a Class 3 Exemption, the person responsible for a UPSS should complete the exemption application form at the end of this plan and send it to DECC. Where a new or significantly modified UPSS is involved, the exemption application should be made at the same time as the development application to the local council. Council should be advised that a Class 3 Exemption is being sought to ensure consideration is given to this in its development approval.

See Sections A4–A6 below for details on the term of exemptions, and transferring and renewing them.

Notes on Class 3 Exemptions

1. *Site sensitivity assessment* (DECC 2009b) provides assistance on meeting the requirements of the UPSS Regulation and is available at www.environment.nsw.gov.au/clm/upss.htm
2. A suitably qualified and experienced person must document and justify their conclusion that the installation of groundwater monitoring wells on the site will not provide an effective groundwater monitoring system. In reaching this conclusion, consideration must be given to contaminant fate and transport mechanisms, actual and potential receptors, and exposure pathways.

Class 4 Exemptions

Under a Class 4 Exemption, the person responsible for a UPSS can apply to DECC requesting an exemption from complying with specific requirements of the UPSS Regulation, where it can be shown that it is not possible to meet those particular provisions.

The person responsible will need to provide DECC with:

- a detailed explanation why it is not possible to comply with the requirements of the UPSS Regulation
- details of alternative equipment, infrastructure, processes or actions that will minimise the risk of soil, surface water and groundwater contamination to the extent required by the UPSS Regulation.

Applying for a Class 4 Exemption

DECC may determine that a fee of \$430 is required to accompany an application for a Class 4 Exemption to cover the cost of technical assessments by DECC officers. Where it becomes necessary to spend more than the standard 10 hours to review more complex applications, an additional hourly fee may be charged.

Applications should be prepared by a suitably qualified and experienced environmental consultant. Discussion with DECC before lodgement of the application is strongly recommended.

To obtain a Class 4 Exemption, the person responsible for a UPSS should complete the exemption application form at the end of this plan and send it to DECC.

See below for details on the term of exemptions, and transferring and renewing them.

A3. Assessing and issuing exemption orders

Except for Class 1 Exemptions, DECC will assess applications and, where appropriate, issue exemption orders in writing, in accordance with clause 28 of the UPSS Regulation. Orders will be issued to the person responsible for a UPSS at the address provided in the application.

A4. Term of exemption orders

Unless otherwise stated, exemption orders will be issued for a term expiring on 31 May 2012.

This policy will be reviewed prior to this date as part of a planned review of the UPSS Regulation. Stakeholders will be informed of any changes.

Where the person responsible for a UPSS becomes aware that circumstances at the site no longer meet the criteria upon which an exemption was granted (e.g. a leak or pre-existing contamination has been identified), the appropriate regulatory authority must be notified in accordance with the UPSS Regulation. The conditions of the exemption order may change following review of any new circumstances relating to the UPSS.

A5. Transferring exemption orders

Class 2, 3 and 4 Exemption Orders are specifically granted to the person responsible for a UPSS. As a result, where the responsibility changes, the new person responsible must notify DECC in writing so a replacement exemption order can be issued in the new name.

For Class 1 Exemptions, there is generally no requirement to notify DECC about any change in circumstances. However, where DECC has formally acknowledged the exemption as explained under Class 1 Exemptions above, the new person responsible is required to notify DECC in writing of the ownership change.

Upon transfer of responsibility, a new application for an exemption will not be required unless the new person responsible becomes aware of a change in circumstances that could affect the conditions under which the order was issued. The exemption order will remain valid for the original period granted.

A6. Renewal of exemption

The person responsible for a UPSS may apply for a renewal of an existing exemption. This should be submitted to DECC **within six months of the date of expiry** shown on the current exemption order.

Application for renewal must be completed on the exemption application form at the end of this plan. There will be no fee for an application for renewal where the circumstances remain the same and no additional documentation is required to be assessed by DECC.

A renewal fee of \$430 may be incurred if the person responsible for a UPSS identifies a discrepancy under which the current exemption order applies, such as contamination identified or a new groundwater well installed next to the site. The fee will cover any extra documentation which needs to be reviewed by DECC.

If a renewal is not sought and granted within 30 days of the expiry of a valid exemption order, the person responsible for the UPSS must comply with the specific exempted provision(s).

A7. Review of exemption classes

DECC expects to review the effectiveness of the UPSS Regulation and the exemption classes within four years of the commencement of the Regulation and, if appropriate, update them. Stakeholders will be consulted before any significant changes are made.

If there are any changes after the review period, a deferment period will allow time for compliance with any amendments to the Exemption Plan and specified requirements of the UPSS Regulation. The deferment period will relate specifically to any changes that are made.

The DECC website always has the most up-to-date Exemption Plan at www.environment.nsw.gov.au/clm/upssexemptionplan.htm

A8. Environmentally sensitive zones

DECC defines an 'environmentally sensitive zone' (as shown on the sensitivity maps at www.environment.nsw.gov.au/clm/envsensitivezones.htm) as the area within:

- 500 metres of any surface waters, such as a river, stream, lake, lagoon, swamp, wetlands, unconfined surface water, natural or artificial watercourse, dam or tidal waters (including the sea)
- the following exclusion radiuses of any groundwater bores licensed by the NSW Department of Water and Energy (DWE) –
 - 5000 metres of mineral water extraction, public/municipal and town water supply, artificial recharge
 - 1000 metres of domestic bores
 - 500 metres of aquaculture, bank revegetation, citrus plantings, farming, feedlot, grape vines, horticulture, irrigation, irrigation and drainage development, pecan nuts, fish farming, soil conservation, stock, commercial, general use, recreation-high security, recreation-medium security, recreation-low security, recreation (groundwater), railway, make-up allocation, prevention of soil erosion
- a national park, reserve, estate or other lands that are administered for conservation purposes
- land known to be part of a 'recharge zone' for groundwater with a high to medium level of protection as shown in vulnerability and/or embargo maps published by DWE, based on hydrology and geology
- land above a region where groundwater is planned to be used for water supply (when this information becomes available to DECC).

From time to time environmentally sensitive zones may be amended to reflect new information, and refinements to the model used. DECC will **not** apply such information retrospectively to existing exemptions.

Exemption Application Underground Petroleum Storage Systems (UPSS)

under clause 28 of POEO (Underground Petroleum Storage Systems) Regulation 2008

*This form should be used in conjunction with the UPSS Regulation Exemption Plan
(available as Appendix A of the UPSS Guidelines and at
www.environment.nsw.gov.au/clm/upssexemptionplan.htm)*

Section A: UPSS site details

Site name:

Street address:

Postcode

Use of site (e.g. service station, car yard, store with bowser, bus depot):

An Environment Protection Plan (EPP) has been prepared for this site.

Yes / No

Local Government Area (Council):

Lot and DP Number:

Geographic coordinates (if UPSS is located on a large property):

Latitude (S):

Longitude (E):

Environment Protection Licence number
(if applicable):

Dangerous Goods Licence Number
(if applicable):

Name of contact person (for the site):

Position and contact phone no. (e.g. site owner/operator):

Section B: Person responsible* for the UPSS (see Section 1.6 of the UPSS Guidelines)

** This application must be signed by the person responsible for the UPSS. The person responsible is the person who has management and control of the system. Where a body or corporation is responsible for a UPSS, an individual must be nominated to act on the organisation's behalf. If another person becomes responsible, that new person must advise DECC of the change. A new application for an exemption will not be required unless the new person responsible becomes aware of a change in circumstances that could affect the conditions under which the Exemption Order was issued.*

Name:

Address:

Postcode

Phone no:

ABN/ACN:

Postal address (if different from above):

Postcode

Signature:

Date:

Section C: Type of exemption

Please select the exemption/renewal you are applying for (tick the relevant box).

Applicants are strongly advised to contact DECC to confirm eligibility prior to lodging an exemption application

For Class 3 and 4 exemption applications, Sections D and E MUST also be completed

Class 3 and 4 exemption applications must be accompanied by a fee of \$430 unless otherwise advised by DECC

Class 2 Exemption from installing and testing groundwater monitoring wells

where it can be demonstrated that the site is located outside an environmentally sensitive zone

Class 2 Exemption renewal to be effective from (date current exemption expires) _____

Class 3 Exemption from installing and testing groundwater monitoring wells

where it can be demonstrated that, although the site is located within an environmentally sensitive zone:

- A records from an industry-recognised loss detection system demonstrate that there has been no petroleum leak from the UPSS over the previous 18 months (or the lifetime of the system, where it is less than 18 months)

AND EITHER

- B(1) there is no existing significant soil or groundwater contamination on the UPSS site, as determined by an appropriate level of assessment, and
the UPSS has all necessary systems in place to detect or prevent any leak or spill before it impacts the environment (i.e. mandatory pollution protection equipment as defined in the UPSS Regulation)

OR

- B(2) a comprehensive site sensitivity assessment of the site has been undertaken by a suitably qualified and experienced person in accordance with the appropriate DECC guidelines.

- Class 3 Exemption renewal** to be effective from (date current exemption expires) _____

Class 4 Exemption from complying with one or more requirements of the UPSS Regulation

where it can be demonstrated that the system is unable to meet those requirements of the Regulation and a suitable alternative is considered acceptable by DECC

Specify clause(s) and requirement(s) of the UPSS Regulation from which exemption is sought

- Class 4 Exemption renewal** to be effective from (date current exemption expires) _____

Section D: Documentation supporting exemption application

This section must be completed in order to be considered for a Class 3 or 4 Exemption.
Please list supporting documents/reports included with this application (including date of report or document signed): *refer to the Exemption Plan to ensure the correct documentation is provided with this form.*

Section E: Exemption application fee (for Class 3 and Class 4 only)

The exemption application fee of \$430* is attached.

** This is the nominal flat application fee. An additional hourly rate may be charged where DECC determines that an officer has to spend more than the standard time (10 hours) reviewing an application because of the detailed nature of the information provided and/or the need to seek more information in support of the application.*

Please make cheque payable to 'Department of Environment and Climate Change NSW' and submit with the completed form and any supporting documents to:

Manager Contaminated Sites Section
Department of Environment and Climate Change NSW
Application for Exemption (UPSS Regulation)
PO Box A290
Sydney South NSW 1232

In, or in connection with, any certificate, application, environment management plan, document or requirement under the UPSS Regulation, it is an offence for a person to provide any information or make any statement or record that is false or misleading in a material particular knowing it to be false or misleading. There is a maximum penalty of \$44,000 for a corporation and \$22,000 for an individual.

Appendix B: Installation and testing of groundwater monitoring wells

All reporting on UPSS should be consistent with the *Guidelines for consultants reporting on contaminated sites* (EPA 1997).

Copies of all consultant reports relating to investigation, remediation, monitoring and/or validation of soil and/or groundwater contamination on the premises must be kept by the person responsible for a period of at least seven years from the date a UPSS is decommissioned (see Section 4.7 of these guidelines).

B1. Installing groundwater monitoring wells

A duly qualified person should design the groundwater well monitoring (GWM) system. The following should be undertaken as a minimum when designing the GWM system and selecting the locations:

Identify the likely location/direction/flow of any existing or potentially contaminated groundwater plume/flow by determining:

- the location of all tanks, pipework, filling points and dispensers that are part of any UPSS on the site
- the hydraulic gradient on the site (to estimate the direction of groundwater flow, at least three wells are required in an approximately triangular pattern)
- topographic slope and boundary conditions on the site
- any variations, such as seasonal, that may occur to the site's hydraulic gradient
- the location of any barriers or preferential pathways, such as service trenches, which may be present in the substrate of the site.

Develop a conceptual three-dimensional groundwater model (also known as a conceptual site model or CSM¹⁸) to:

- maximise the likelihood of intercepting any groundwater contaminated by hydrocarbons on the site
- maximise the likelihood of intercepting groundwater entering the site, such as on the site boundary up the hydraulic gradient from the UPSS.

Approval from the Department of Water and Energy (DWE) is required to install groundwater monitoring wells prior to any drilling onsite. Further information is available from the DWE website at www.naturalresources.nsw.gov.au/water/lic_bore.shtml or by contacting the DWE Information Centre on (02) 8281 7777 or information@dwe.nsw.gov.au.

Installation of the groundwater monitoring wells should be undertaken by an appropriately licensed and experienced drilling company and overseen by a duly qualified person, such as an experienced contaminated land consultant.¹⁹

The monitoring wells should be installed in accordance with 2nd edition of the *Minimum construction requirements for water bores in Australia* (LWBC 2003).

¹⁸ For CSM content, refer as a minimum to the Reporting Requirements (Preliminary Site Investigation Report Checklist) in *Guidelines for consultants reporting on contaminated sites* (EPA 1997) and Section 2.2 of *Guidelines for the assessment and management of groundwater contamination* (DEC 2006).

¹⁹ Advice on engaging contaminated land consultants in NSW is provided on DECC's website at www.environment.nsw.gov.au/clm/selectaclmcons.htm

In addition to the above, more detail is provided below on the following installation issues:

Local geology

Groundwater monitoring wells should be drilled to a depth that will enable groundwater at the site to be monitored effectively. If a confining layer has been encountered and groundwater is not found by a depth of 10 metres, drilling can cease, unless contamination is present or local geology, such as unconsolidated sediments or fractures in the confining layer, indicates that contamination could find its way to a greater depth into the subsurface.

In line with the UPSS Regulation Exemption Plan (Appendix A), the person responsible for a UPSS may apply for a Class 3 Exemption from complying with the requirements of clauses 16–18 and 21 of the UPSS Regulation where specific criteria can be met.

Soil permeability is **not** considered the primary method for determining the sensitivity of a site or rate of impact to the subsurface and should not be relied upon solely in making a decision on site sensitivity or whether groundwater monitoring wells need to be installed. See *Site sensitivity assessment* (DECC 2009b) for more details.

Some geology, such as sandstone, can be porous which allows the transport of contamination and is not a suitably impermeable barrier. In this case drilling may need to continue so that the extent and degree of contamination or potential for impacts are properly investigated. Where it is decided to stop drilling for the well before groundwater is encountered, a scientifically defensible justification should be provided in writing by the suitably qualified and experienced person responsible for the decision.

Well dimensions and components

Monitoring wells should:

- have a minimum internal diameter of 50 mm
- have sampling ports of suitable strength (e.g. 'class' of well casing), with machine-slotted sections appropriately located to enable sampling of groundwater
- be gravel packed
- have cement/bentonite seals between the sections.

The porous media surrounding the monitoring bores should be composed of a material that does not affect the accuracy of the sample (e.g. no solvents should be used during the construction process).

The standpipe of monitoring wells should:

- be adequately sealed near ground level with cement-based grout
- have a security cover over the top
- be constructed in such a way as to prevent surface water and extraneous material, such as insects, entering the wells.

Well location

As well as locating groundwater monitoring wells in such a way as to maximise the likelihood of intercepting groundwater contaminated by hydrocarbons and up-gradient water entering the site, consideration should be given to installing wells near the site boundary down the hydraulic gradient from the UPSS to assist in resolving any possible offsite migration issues. This recommendation particularly applies where contamination is detected in wells installed on a site in a remote location.

The number of groundwater wells to be installed at a site is not fixed. As a minimum, one well should be installed up-gradient of the UPSS and two wells should be installed down-gradient. The location and number of groundwater wells installed on a UPSS site should be determined by a competent and experienced person to ensure adequate information is provided on up- and down-hydraulic gradient areas of any UPSS.

B2. Access to monitoring wells (location) plan

An up-to-date as-built drawing showing the location of each monitoring well and its designated number (e.g. MW 1, MW 2, etc.) must be kept on the site as part of the Environment Protection Plan and the plan made available upon request to any officer authorised under the *Protection of the Environment Operations Act 1997*, during a site audit or inspection.

B3. Record of groundwater well installation

A duly qualified person, such as an experienced contaminated land consultant, must provide the person responsible for a UPSS with records that demonstrate that all relevant design, installation and monitoring requirements for groundwater wells have been met. These should be included in the groundwater monitoring well report, required by clause 18(1)(d) of the UPSS Regulation.

Clause 26(1)(c) requires the groundwater monitoring report from the installation of monitoring wells to be kept for seven years from the date of decommissioning of a UPSS. This comprehensive groundwater monitoring well report should include, but is not limited to:

- a list of industry standards followed in the installation of wells
- the type/quantity of materials used in construction of the wells
- the geology intersected during drilling works
- details of the drilling/consulting company engaged
- the quality assurance/quality control and methods used during installation.

In addition, as-built schematic drawings of all groundwater wells on the site must be retained by the person responsible for a UPSS. The following should be noted on relevant as-built drawings:

- the site boundary
- the location of all tanks, pipework, filling points and dispensers that are part of any UPSS on the site
- the location of all groundwater monitoring wells and any tank pit observation wells
- a designated number (e.g. MW 1, MW 2, etc.) for each groundwater monitoring well and any tank pit observation wells
- a key for the groundwater monitoring wells indicating the surrounding geology (profile) and well construction materials used, including measurements showing depth to specific features, such as groundwater observed during installation
- the groundwater flow direction (noting any known or likely variations) at the time the plan was prepared
- survey (or similar) points showing elevations and how groundwater flow direction was measured

- the elevation of groundwater above the Australian Height Datum (AHD) in each groundwater monitoring well at the time the groundwater flow direction was determined
- the location of any barriers or preferential pathways, such as service trenches, in the substrate
- the approximate location and/or distance to any sensitive potential receiving environments near the site
- the date the plan was prepared
- where known, the location of any other potential sources of (hydrocarbon) contamination immediately up-gradient of the site
- any other relevant information that provides the rationale for the location of the groundwater monitoring wells and any tank pit observation wells.

The plans and notes are required to demonstrate that the groundwater wells are located in such a manner as to maximise the likelihood of intercepting groundwater contaminated by hydrocarbons. The plans should be updated as necessary: for example, any additional wells or new information on groundwater flow direction must be noted.

B4. Tank pit observation wells

Tank pit observation wells are used for environmental sampling of tank pit liquid and vapour. They are typically installed at the time a UPSS is installed, prior to backfilling of the tank excavation. A tank pit observation well does not have to penetrate the groundwater table as this is not its specified purpose, but if it does, it may be installed in addition to groundwater monitoring wells.

Tank pit observation wells may even be installed *instead of* groundwater monitoring wells where:

- the receiving environment of any groundwater flow that could potentially contain hydrocarbons is particularly sensitive and in close proximity to tanks, such as when the UPSS site is near surface waters or a dwelling with a basement
- the UPSS is located directly adjacent to the site boundary.

A tank pit observation well should only be used as a groundwater monitoring well if it intercepts the aquifer and conforms to the other requirements of these guidelines.

Installation

When installing a tank pit observation well, a competent and experienced person should confirm all of the following construction details have been met:

- the well is installed to intercept the tank excavation area or be as close to it as is technically feasible
- the tank pit excavation is graded to a low point where a tank pit observation well has been installed to within 150 millimetres of the low point
- at least one tank pit observation well is installed in each individual tank excavation (and there is a minimum of two wells for excavations with two or more tanks)
- the well does not penetrate the bottom of the tank excavation and terminates at least 150 millimetres below the bottom of the tank
- the well is able to detect the presence of petroleum vapour and/or enable confirmation of free-phase petroleum in the tank excavation
- the well is clearly marked and secured to avoid unauthorised access and tampering

- the well is sealed from the ground surface to the top of the filter pack.

Monitoring/sampling

When necessary (and when groundwater is present), a water sample should be obtained from a tank pit observation well and inspected or analysed for evidence of petroleum. Inspection may include visual assessment for a sheen and, if warranted, the use of an interface meter. A water sample for laboratory analysis may be obtained using a portable (disposable) bailer or other suitable device (see 'Section B5: Visual test' below on using a bailer to sample from the subsurface).

If no water is present in the tank pit observation well, a portable vapour detection device should be used to sample for the presence of petroleum vapours in the well.

B5. Groundwater testing

Testing²⁰ of groundwater should include, as a minimum, preliminary detection methods such as visual checks and/or the use of interface probes (IPs) as outlined below.

More sophisticated sample collection and assessment methods, *in situ* monitoring and laboratory analysis techniques can also be used to test groundwater.

Clause 21(1)(a) of the UPSS Regulation requires the groundwater in each monitoring well to be tested for the presence of hydrocarbons every six months. Testing may include:

- visual assessment to check for a sheen on top of a water sample collected from the monitoring well²¹
- using an interface probe (IP) monitoring device test.

The test procedures must be performed at least every six months until the UPSS is decommissioned or as a part of an investigation when a leak from a system is suspected or identified.

Visual test

For each groundwater monitoring well, the following tests should be undertaken using a transparent bailer, which is one of the following:

- a disposable bailer, used only once
- a bailer designated for exclusive use for that well
- a bailer that has been properly decontaminated prior to being reused in another well.

The well should be checked for the presence of hydrocarbons by using the bailer to obtain a single groundwater sample, with the following checks made immediately after the sample is raised from the well:

- visual check for a sheen by looking across the water surface in a bright light
- visual check of the outside of the bailer for a sheen or any sign of hydrocarbons.

Interface probes being used to detect the presence of phase-separated hydrocarbons should be undertaken prior to inserting the bailer into the monitoring well.

²⁰ 'Testing', in the context of the UPSS Regulation, means visual assessment or use of interface probes and/or gauges to detect whether hydrocarbon contamination is present.

²¹ All occupational health and safety precautions must be followed when assessing groundwater for contamination using monitoring devices (including odour/visual).

The bailer should be slowly lowered into the monitoring well and not completely immersed, to record any petroleum which may be on top of the water within the groundwater well. This allows any petroleum present to be viewed when the bailer is slowly removed.

All health and safety precautions should be followed in accordance with the Occupational Health and Safety Plan for the site.

Interface probe test

The interface probe test should be:

- performed before any water samples are collected from the monitoring well
- conducted by an appropriately qualified and experienced person
- able to detect the presence of a minimum thickness of three millimetres of free-phase hydrocarbons.

The interface probe should be slowly lowered into the monitoring well to intercept the top of the water table, in order to detect the presence of any phase-separated hydrocarbons.

An interface probe with a resolution of one millimetre should be used, as this will assist in detecting any leaks at an early stage before more significant contamination occurs.

Groundwater test records

The details of these tests should be recorded on the UPSS Regulation Groundwater Monitoring Test Record below. The records should include:

- the date and time of the tests
- any observations, such as evidence of an odour or sheen or indication of the presence of free-phase hydrocarbons
- the name and signature of the person who conducted the tests.

Copies of these records must be kept for at least seven years after the date the tests occurred (see Section 4.7 of these guidelines)

If it is determined that there are free-phase hydrocarbons on the site or it is likely that offsite migration of hydrocarbons is occurring or has occurred, the appropriate regulatory authority (ARA) must be notified using the UPSS Regulation leak notification form (Appendix F).

Groundwater monitoring test record sheet
Six-monthly visual inspection

Site name (or name of business)		WorkCover dangerous goods notification no. and expiry date	
Address			
Lot and DP no.			

Well no.	Date	Time	Type of test (Visual inspection)*	Observations (Visible evidence of sheen or evidence of free-phase hydrocarbons, etc.)	Name of sampler/company/ABN (print)	Signature

Note: This form must be kept for at least seven years from the date of the last test recorded.

* Record of interface probe results should be recorded on a separate sheet by a suitably qualified and experienced person.

Temporary suspension of six-monthly test

The six-monthly tests may be temporarily suspended when the appropriate regulatory authority has been informed that hydrocarbon contamination has been detected on a site being investigated, remediated, monitored or validated, provided an equivalent alternative groundwater monitoring program is introduced during the suspension.

The suspension of testing should only occur where all of the following requirements can be met:

- it can be demonstrated that for the period during which the six-monthly tests are suspended, equivalent alternative groundwater monitoring will be conducted on the site and this monitoring is at least as likely to detect any groundwater contamination as the six-monthly tests
- a duly qualified person, such as an experienced contaminated land consultant, designs and implements the equivalent alternative groundwater monitoring, and monitors and manages the contamination on the site for the period of the temporary suspension
- all reports related to the investigation, remediation, monitoring or validation of hydrocarbon contamination on the site, and the temporary suspension of the six-monthly tests, provide clear details indicating:
 - when the equivalent alternative groundwater monitoring commenced (or is likely to commence) and when it ceased (or is likely to cease)
 - how the equivalent alternative groundwater monitoring occurring on the site is (or was) at least as likely to detect any groundwater contamination as the six-monthly tests
- the six-monthly tests will be resumed within six months of the equivalent alternative groundwater monitoring regime ceasing.

B6. Groundwater sampling and analysis

Groundwater must be sampled from each of the monitoring wells and analysed²² in the laboratory for the presence of hydrocarbons within 30 days of:

- the installation of a new groundwater monitoring well on the site
- the discovery that groundwater may be contaminated (as a result of the six-monthly test, other visual observation or an interface probe)
- the discovery of a leak in the storage system whether as a result of the loss monitoring (Section 4.2 of the UPSS Guidelines) and/or loss detection investigation procedures (Section 4.3) or otherwise.

Where hydrocarbon contamination is identified, all necessary corrective action should be taken to identify and remove the source (stop the leak or spill) and remediate both soil and groundwater as necessary.

The early detection of leaks is likely to reduce the cost of remediation significantly.

Further information on sampling, assessing and analysing groundwater can be obtained from:

- *Guidelines for the assessment and management of groundwater contamination* (DEC 2006)

²² 'Sampling and analysis', in the context of the Regulation, means laboratory analysis to determine whether any hydrocarbons are present and their concentrations.

- *AS/NZS 5667.1–1998: Water quality sampling – Part 1 Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples* (AS/NZS 1998)
- *Approved methods for the sampling and analysis of water pollutants in New South Wales* (DEC 2004).

Sample handling

Samples should be collected and handled in a manner that is consistent with the collection, handling and preservation principles in the following documents or any updated versions of them, where appropriate:

- *Murray–Darling Basin groundwater quality sampling guidelines: Technical report no. 3* (Murray–Darling Basin Commission 1997)
- ‘Schedule B(2): Guideline on data collection, sample design and reporting’ in *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPC 1999a)
- ‘Schedule B(3): Guideline on laboratory analysis of potentially contaminated soils reporting’ in *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPC 1999b)
- *Standard methods for the examination of water and waste water*, 21st edition (section 1060) (APHA 2005)
- *Test methods for evaluating solid waste: Physical/chemical methods SW-846*, 3rd edition (USEPA 1992)
- *Groundwater Issue: Low-flow (minimal drawdown) groundwater sampling procedures* (USEPA 1996).

Contact a National Association of Testing Authorities (NATA) laboratory for advice on appropriate sampling, handling and preservation procedures.

The samples should be collected and handled:

- by an appropriately qualified and experienced person
- so that they are representative of the condition being investigated
- in a manner that minimises the loss of any volatiles.

Samples should be submitted to a laboratory under appropriate conditions and within the holding time of the test being performed.

The samples should be collected and transported under a chain of custody system²³ that fully records, for each sample, the following:

- identification code
- person who conducted the sampling
- receiving laboratory
- nature of sample
- collection time and date
- analyses to be performed
- sample preservation method

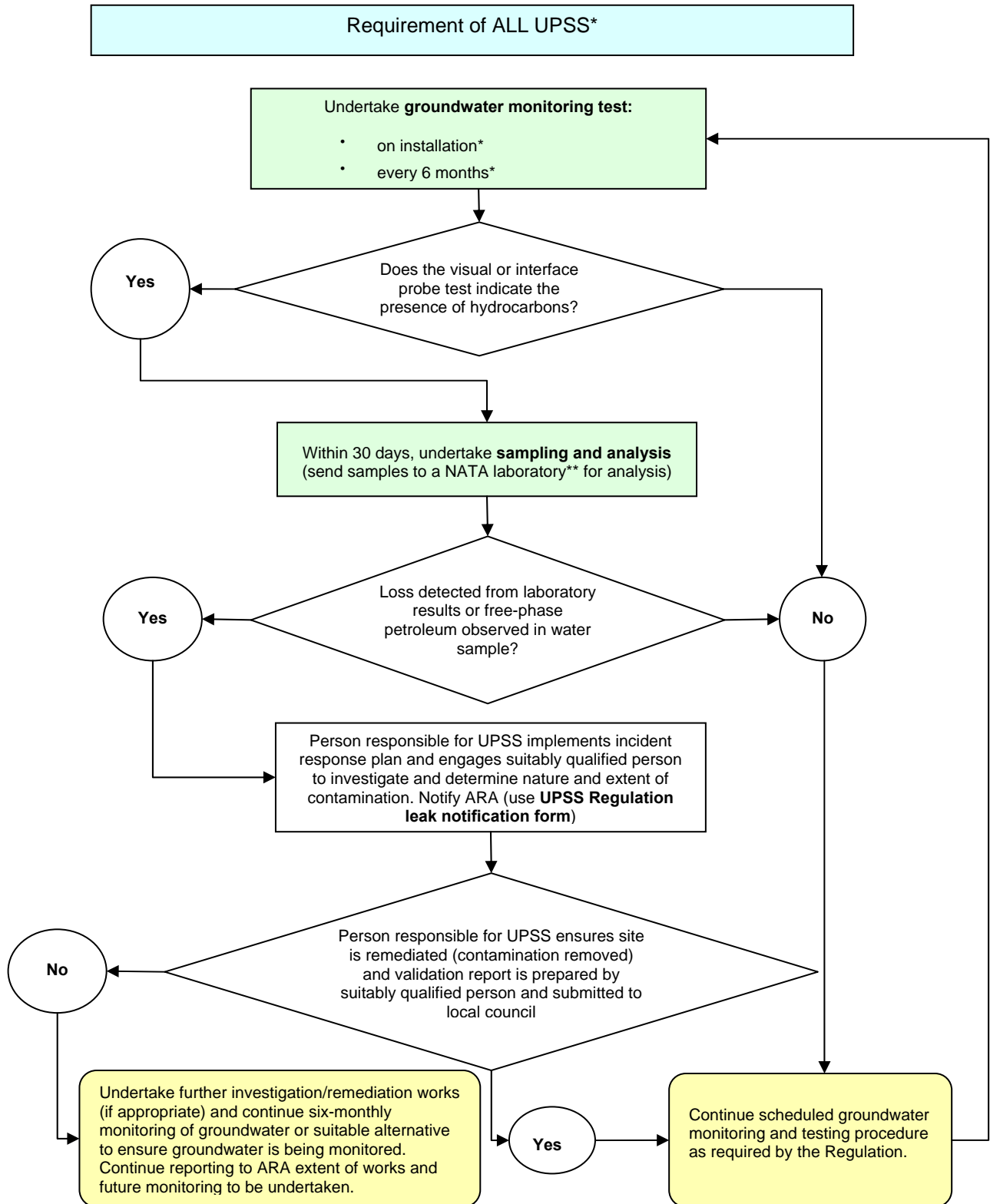
²³ Consistent with Schedule B(2) of the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPC 1999a).

- departure time from the site
- dispatch courier(s).

Analysis

Analyses are to be undertaken by a laboratory accredited to perform these tests by an independent accreditation body acceptable to DECC, such as a NATA-registered laboratory or equivalent. The report by the laboratory should include checking of internal QA/QC procedures.

Testing, sampling and analysing for groundwater contamination



* Old UPSS must install and sample groundwater wells by 1 June 2011.

** Laboratory accredited by the National Association of Testing Authorities

Appendix C: UPSS earthing requirements

Industry best practice requires that earthing for fill points and vapour recovery points in a UPSS should meet the requirements of *AS4897–2008: Design, installation and operation of underground petroleum storage systems* (AS 2008a), as below:

Steel piping

The vertical riser beneath the fill point and the vapour recovery point should be buried in direct contact with the backfill, bonded to any steel fill point fitted with a spill containment device, and not wrapped with any tape or material.

Where possible, the resistance to earth should not exceed 100 ohms. Where this cannot be achieved, an earth rod should be installed.

Non-steel piping

The fill adaptor and vapour recovery adaptor should be connected to an earth rod and bonded to any steel fill point fitted with a spill containment device.

The resistance to earth should not exceed 10 ohms. Alternatively, a steel vertical riser should be installed and buried in direct contact with the backfill, bonded to any steel fill point fitted with a spill containment device, and not wrapped with any tape or material.

Appendix D: Loss monitoring methods

Section 4.2 of the UPSS Guidelines outlines the requirements for loss monitoring. Under clause 19(4) of the UPSS Regulation, the loss monitoring procedure must be able to measure discrepancies between the amount of petroleum that should be in the system, and the actual amount present. The loss monitoring method must be certified as able to detect losses of petroleum from any part of the system at 0.76 litres per hour, with at least 95% accuracy.

Individually, inventory control and stock reconciliation information are insufficient to meet the detection levels required by the UPSS Regulation. However it is important to maintain these records as they can be used as input for a more precise means of loss monitoring. The person responsible should ensure appropriate tank dipping and/or gauging, checks for water, and records of sales and deliveries are kept, as described in *AS4897–2008: Design, installation and operation of underground petroleum storage systems (AS 2008a)*.

This appendix presents an overview of various loss monitoring methods that may be used to meet the specific requirements of the UPSS Regulation.

D1. Statistical inventory reconciliation analysis

Statistical inventory reconciliation analysis (SIRA) is an acceptable method of loss monitoring if it is certified as able to meet the performance criteria in clause 19(4): able to detect losses of petroleum from the system at 0.76 litres per hour, with at least 95% accuracy.

SIRA is a procedure based on the statistical analysis of a series of daily inventory records taken at a UPSS site and is usually provided as a service by a vendor.

If being used as a loss monitoring system, SIRA must:

- meet the standard requirements of *AS4897–2008 (AS 2008a)* or an equivalent standard in terms of protection of human health and the environment
- be carried out in accordance with the manufacturer's written instructions for the specific SIRA requirements.²⁴

A loss monitoring result for a particular period that satisfies the performance target criteria is considered a 'PASS', as defined in the table below. Where a 'FAIL' or 'INCONCLUSIVE' result is registered, effective and fail-safe procedures should be in place to ensure appropriate follow-up action is taken by the person responsible to check whether a leak has occurred.

SIRA results and definitions

SIRA result	SIRA-related definition
PASS	According to the analysed data, the UPSS does not appear to have been leaking over the time period being tested.
FAIL	Analysed data indicates a loss of petroleum from the system or an influx of groundwater or petroleum. A FAIL result does not necessarily indicate that the system is leaking and it might be a false alarm which needs to be checked. Where an error is subsequently detected, this should be corrected to ensure this does not happen in the future.

²⁴ The person responsible for a UPSS should retain all records relating to the certification of the method, performance standard and operational requirements of SIRA.

SIRA result	SIRA-related definition
INCONCLUSIVE	<p>Analysed data cannot differentiate between PASS or FAIL.</p> <p>There is a chance that the information provided to the SIRA vendor is missing or not usable and therefore it is not possible to make a determination.</p> <p>Whatever the reason, an INCONCLUSIVE result means, in effect, that there has been a <i>failure</i> to conduct an accurate loss detection assessment of the UPSS over the time period being tested.</p>

If the reason for a FAIL or INCONCLUSIVE result cannot be easily identified, the person responsible for the UPSS must implement the loss detection and investigation procedure outlined in Section 4.3 and Appendix E of these guidelines.

Monetary reconciliation analysis for accountancy processes and determining profit/loss margins related to petroleum sales (e.g. WetStock) is not a suitable substitute for SIRA. It can, however, be used in conjunction with SIRA to enhance or provide another form of reconciliatory evidence for loss monitoring.

A SIRA-based loss monitoring system is not appropriate for UPSS containing used (waste) oil, although under a current Class 1 Exemption, these facilities do not need to have a loss monitoring procedure. See 'Appendix A: UPSS Regulation Exemption Plan' for details.

D2. Tank gauging (automatic or manual dipping)

Tank gauging may be manual using a calibrated dipstick or automated when automatic tank gauging (ATG) systems or sensor probes are used. Whatever method is used to gauge the depth of petroleum (and water) in a tank, it should be undertaken by a competent person trained to use that system and the results reported in a format appropriate for the intended end use.

ATG systems

ATG systems can operate in TEST or INVENTORY mode. They are evaluated and certified by a third party and have different capabilities in terms of tank size, product stored, and probability of detection versus a false alarm. Where they are certified as capable of meeting the performance requirement of clause 19(4) in TEST mode (able to detect losses of petroleum from the system at 0.76 litres per hour, with at least 95% accuracy), ATG can be used as a loss monitoring method. Where they do not meet these criteria, the data collected can be used to feed into SIRA systems of loss monitoring (see above).

Water around a tank may hide a leak by temporarily preventing the product from leaving the tank. To detect a leak in this situation, the ATG system should be capable of detecting water in the bottom of a tank.

Manual dipping

Manual tank dipping alone cannot meet the detection limit of 0.76 litres per hour and is therefore **not** an acceptable loss monitoring method. However, it can provide data for SIRA. It is a relatively simple procedure but must be performed properly to obtain an accurate result. Following the correct procedure minimises the potential for errors in readings from petroleum creeping up the stick and/or vaporisation of the petrol while the reading is being taken. The correct procedure for manual tank dipping is available from industry representatives who supply loss monitoring services, such as SIRA.

The dip stick should be made of non-sparking material and be in good condition. Sticks that have worn or cut-off ends and worn-off numbers and varnish coatings are not acceptable and should be replaced.

The quality of readings from a dip stick improves if a petroleum-sensitive paste is smeared over about 150 mm of the stick where the water/petroleum interface is thought to be. The paste changes colour where it comes into contact with the petroleum level. A water-sensitive paste can also be used on the end of the stick to monitor for the presence of water in the bottom of the tank. While water in the tank may originate with deliveries or as the result of condensation of moisture inside the tank, it can also come from groundwater leaking in through holes or loose fittings associated with the tank.

D3. Interstitial monitoring

Interstitial monitoring is a method used in double-walled (secondary containment) tanks and piping systems. This method detects leaks before they are released into the environment by monitoring the space between the tank and/or piping and a second barrier. The monitoring may be done:

- manually by visual inspection or using a dipstick
- by measuring a change in the level of brine in the interstitial space
- by electronic sensors
- by pressure balancing methods.

A regular inspection program (usually monthly) should be implemented by a competent and experienced person in accordance with the manufacturer's specifications to ensure:

- the system is operational
- loss monitoring measurements (e.g. liquid or pressure levels) are within the manufacturer's recommended tolerances
- loss monitoring measurements are recorded and all discrepancies documented
- any losses that exceed the manufacturer's leak detection tolerances are reported to the person responsible for the UPSS immediately.

Interstitial monitoring may be used as the sole method of loss monitoring if all the tanks and piping are monitored using this method and it has been certified by a third party as able to meet the performance criteria of the UPSS Regulation (able to detect losses of petroleum from the system at 0.76 litres per hour, with at least 95% accuracy).

D4. Loss monitoring for piping

In combination with tank monitoring, loss monitoring methods for piping include secondary containment with interstitial monitoring, vapour monitoring, groundwater monitoring, SIRA and tightness testing.²⁵ Any leak detection system must be able to detect a leak of 0.76 litres per hour with at least 95% accuracy, in line with requirements of the UPSS Regulation.

UPSS may have suction piping or pressurised piping.

²⁵ For further information, see the US Environmental Protection Agency website on leak detection for underground piping: www.epa.gov/OUST/ustsystem/leakpipe.htm

Suction piping

Suction piping which meets the following design and installation requirements may not require loss monitoring, as this system should ensure suitable leak prevention:

- the piping normally operates at less than atmospheric pressure
- the piping allows its contents to drain back into the tank if the suction is released
- a single check valve is installed vertically in the piping and located directly below, and as close as practical to, the suction pump dispenser.

A suitably competent and experienced person must determine that the piping satisfies the above requirements.

If, however, more than one check valve is in the line and/or a check valve is located on top of the tank,²⁶ the above design and installation requirements will not be met. In these cases, the suction piping should be used in conjunction with an appropriate loss monitoring system. The piping must be calibrated and commissioned in accordance with the manufacturer's instructions for the loss monitoring system.

Pressurised piping

Pressurised piping must have an automatic line leak detector and be able to be activated and operational whenever the piping is in use.

The system must be installed, calibrated and commissioned in accordance with the manufacturer's instructions for the loss monitoring system.

D5. Equipment integrity testing

Equipment integrity testing (EIT) of a UPSS is not the preferred method for loss monitoring. It can be costly and thus is not carried out frequently enough to qualify. However if it is necessary to use EIT for loss monitoring, discussed with DECC on a site-by-site basis.

An explanation of the requirements of EIT to test and investigate a UPSS for a leak is outlined in Section 3.2 of these UPSS guidelines.

D6. Loss monitoring for UPSS storing used (waste) oil

In some cases where a UPSS contains used (waste) oil, loss monitoring procedures may be the same as for a UPSS containing petroleum, although there are some exceptions. However it should be noted that statistical inventory reconciliation analysis (SIRA) is not a suitable method.

Inventory control as a loss monitoring system for UPSS containing waste oil should be performed using manual tank gauging on tanks with a capacity of 5500 litres or less.

The person responsible for a waste oil UPSS should maintain a system of inventory control reconciliation in accordance with industry-accepted practices, such as AS4897–2008 (AS 2008a).

Tank gauging performed on waste oil tanks must comply with industry-accepted practices.

²⁶ If a single check valve is located immediately beneath the dispenser, any leak in the piping will either release the suction and the petroleum will drain back into the tank or the dispenser will not operate properly. However if there is more than one check valve on the line or the check valve is located immediately above the tank, the product could be held in the piping, increasing the risk of a leak and making loss monitoring a requirement.

Appendix E: Loss detection investigation

To assist in determining the cause of a discrepancy identified during loss monitoring, the following system checks may be initiated (where appropriate) by the person responsible for a UPSS.

Suggested loss detection investigation: System checks

Suspected issue to investigate	Loss/Gain?	System check
Inventory records	Loss or gain	Check the inventory control records of the preceding three months (or to a point when records are deemed satisfactory) to ensure the discrepancy has not been caused by a record-keeping error
Security/pilfering	Loss	Check the following: <ul style="list-style-type: none"> • for sites that do not operate continuously (non-24 hour sites), that all tank openings (e.g. dip and fill points) are secured), in particular after hours • on self-serve sites, that controlled authorisation of dispensers is operating • where available, CCTV or similar security system.
Dip stick	Loss or gain	Check the following: <ul style="list-style-type: none"> • dip stick for wear/damage and replace if necessary • each tank has the correct dip stick • if using automatic tank gauging, that the system is operating to the manufacturer's specifications.
Water	Gain	Check each tank for the presence of water by: <ul style="list-style-type: none"> • use of an interface probe, or • water-finding paste on a dipstick. <p>Identify entry point(s) (e.g. if tank has a hole or water is entering via open valve, fill point, etc.).</p>
Pumps and piping manifolds	Loss	For a dispenser with a pump located inside the dispenser unit, remove covers and check valves and pipework for leaks, both during operation and when switched off. For submersible pumps, lift the pump cover and check wells for leaks. For piping manifolds, lift the pit cover and check for any leak.
Tank pit observation wells and groundwater monitoring wells	Loss	Check: <ul style="list-style-type: none"> • for any evidence of petroleum in the tank pit observation well and/or groundwater monitoring well using a measuring instrument such as an interface probe or a clean see-through bailer lowered slowly into the well to observe water interface • for vapours by using a portable gas analyser. <p>Undertake further investigation of the system to identify the source of leak.</p>

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Suspected issue to investigate	Loss/Gain?	System check
Vents	Loss	Check: <ul style="list-style-type: none"> • vent caps for any visible blockages • vents for evidence of petroleum blow-out at either vent outlet or below vents on ground or buildings.
Dispenser pumps are over or under dispensing	Loss or gain	Check: <ul style="list-style-type: none"> • that dispenser totals and console totals are recorded and operating within their accepted tolerances and that the records produced by each, for the same period, correlate within acceptable limits • the maintenance schedule and calibration of dispensers.
Sales test	Loss or gain	Determine tank and dispenser relationships by identifying single stock systems. Establish opening stock datum and do not alter the single stock systems for the duration of the sales test. During the sales test the operator should satisfy the requirements of the delivery procedures and run the test for five days unless significant loss or gain variations can be determined in a shorter period. The final stock reconciliation should be performed by the person responsible.
Interstitial monitoring (for appropriately designed UPSS only)	Loss	Check: <ul style="list-style-type: none"> • the system is active • leak detection measurements (e.g. liquid levels or pressure levels) are within the manufacturer's tolerances • leak detection measurements have been recorded for the system. Where any previous losses outside the manufacturer's leak detection tolerances have been reported in the last six months, undertake further investigation of the system to identify the source of leak.
Human error	Loss or gain	Check: <ul style="list-style-type: none"> • UPSS installation records – Was the installer accredited/certified? • for inaccurate measuring/recording • delivery losses/tank filling activities • for inadequate system management • failure to complete physical system checks.
Recent repairs undertaken on UPSS	Loss or gain	Check: <ul style="list-style-type: none"> • maintenance of records • if repair and reuse was performed, whether compatible materials were used.

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Suspected issue to investigate	Loss/Gain?	System check
Temperature	Loss or gain	Check: <ul style="list-style-type: none">• delivery temperature correction• calculations have been temperature-corrected to 15°C (or recommended ambient temperature).
Equipment integrity test	Loss or gain	If none of the above investigations reveals a reason for the discrepancy in the reconciliation records, an EIT may be considered and performed in accordance with Section 3.2 of the UPSS Guidelines.

Appendix F: UPSS Regulation leak notification form

Note: This form may be downloaded from www.environment.nsw.gov.au/upss.htm

UPSS Regulation Leak Notification Notification under Part 5.7 of the <i>Protection of the Environment Operations Act 1997</i>	
<p><i>This form provides specific guidance for reporting pollution incidents where a leak from an underground petroleum storage system (UPSS) is identified. This form should be completed where one or more of the following scenarios applies to the UPSS site (tick where appropriate):</i></p> <p><input type="checkbox"/> A leak from the UPSS is verified in accordance with Section 4.3 Loss Detection and Investigation or Section 4.4 Incident Management Procedures outlined in the UPSS Guidelines</p> <p><input type="checkbox"/> There is evidence on the site of free-phase hydrocarbons in surface water and/or groundwater</p> <p><input type="checkbox"/> There is evidence that offsite migration of hydrocarbons could occur, is occurring, or has occurred.</p> <p><i>Note: This form should be sent to the appropriate regulatory authority within 30 days of a pollution incident being detected by the person responsible for the UPSS.</i></p>	
Section A: UPSS site details	
Site name (or name of business):	Local Government Area (Council):
Nature of activity at the site:	Lot and DP number:
Street address:	
Environment Protection Licence number (if applicable):	
Dangerous Goods Licence/Notification Number (and date of expiry) (if applicable):	
Site characteristics (if known)	
Site substrate type: <input type="checkbox"/> Sand <input type="checkbox"/> Other (please specify) <input type="checkbox"/> Silt <input type="checkbox"/> Clay <input type="checkbox"/> Rock <input type="checkbox"/> Unknown	Direction of groundwater flow: Depth to groundwater:

Section B: Details of the incident <i>(Attach additional papers if necessary)</i>	
Date incident occurred or leak identified:	Duration of incident (or date leak stopped):
Nature of incident:	
Circumstances in which the incident occurred (including the cause of the incident, if known):	
<input type="checkbox"/> Leaking tank <input type="checkbox"/> Overfilling <input type="checkbox"/> Other (please specify) <input type="checkbox"/> Leaking piping <input type="checkbox"/> Spill <input type="checkbox"/> Structural failure <input type="checkbox"/> Unknown	
Location of the incident (maps and/or diagrams may be included):	
Location of any place where pollution is occurring or is likely to occur (maps and/or diagrams may be included):	
What aspects of the environment are affected? (tick all that apply):	
<input type="checkbox"/> Air <input type="checkbox"/> Surface water <input type="checkbox"/> Soil <input type="checkbox"/> Other (please specify) <input type="checkbox"/> Groundwater <input type="checkbox"/> Stormwater <input type="checkbox"/> Sediments	
Nature of any pollutants involved:	
<input type="checkbox"/> Unleaded petrol <input type="checkbox"/> Other, e.g. additives (please specify) <input type="checkbox"/> Lead replacement <input type="checkbox"/> Diesel <input type="checkbox"/> Kerosene <input type="checkbox"/> Waste oil	
Estimated quantity or volume of pollutants involved:	Concentration of any pollutants involved:

Action taken or proposed to be taken to deal with the incident and any resulting pollution or threatened pollution:

Any other relevant information (e.g. adjoining land uses, other possible source(s) of pollution):

Section C: Person responsible* for the UPSS site (refer to UPSS Regulation or see Section 1.6 of the UPSS Guidelines)

** The person responsible is the person who has management and control of the system. If the 'person' responsible is a corporation, an individual who is authorised to act on the organisation's behalf must be nominated.*

Name:	Phone no(s):
Contact person (if person responsible is not a natural person):	Address:

Section D: Details of person who submitted notification

Name:	Position:
Address:	Phone no(s):
Signature:	Date:

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<p><i>If you fail to report a pollution incident which poses material harm to the environment as required under Part 5.7 of the Protection of the Environment Operations Act 1997, you commit an offence. The maximum penalty is \$1,000,000 for corporations or \$250,000 for individuals.</i></p>	
<p><i>A person is required to notify a pollution incident under Part 5.7 of the Act even though to do so might incriminate them or make them liable to a penalty.</i></p> <p><i>Any notification given by a person under Part 5.7 of the Act is not admissible in evidence against the person for an offence or for the imposition of a penalty.</i></p>	
<p>Please send completed form to:</p>	<p>Email: upssreg@environment.nsw.gov.au</p> <p>Post (if before 31 May 2012): Contaminated Sites – UPSS Department of Environment and Climate Change NSW PO Box A290 Sydney South NSW 1232</p> <p>Local Council (if after 1 June 2012).</p>

Acronyms

ARA	Appropriate regulatory authority
AS	Australian Standard
ATG	Automatic tank gauging
CLM Act	<i>Contaminated Land Management Act 1997</i>
DECC	Department of Environment and Climate Change NSW, incorporating the Environment Protection Authority
DWE	Department of Water and Energy
EIT	Equipment integrity test
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPP	Environment Protection Plan
LPG	Liquid petroleum gas
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
QA/QC	Quality assurance/quality control
SIRA	Statistical inventory reconciliation analysis
UPSS	Underground petroleum storage systems
USEPA	United States Environmental Protection Agency

Glossary

Appropriate regulatory authority (ARA)	See definition in POEO Act, although in the context of the UPSS Regulation, DECC is the ARA for the first four years from commencement of the Regulation after which the ARA will be the relevant local council. Councils remain the ARA for all other matters at a UPSS site not directly associated with the operation of the storage system, such as noise and stormwater.
As-built drawings	Detailed site plans (to a recognisable scale) which depict the final installed configuration of any part of a UPSS and any construction deviations showing all features of the storage site as <i>currently</i> built. They do not include the pre-constructed drawings.
Catchment basin	In relation to a UPSS, a sealed bucket which fits around the fill pipe below ground which is designed to be large enough to collect any spills when the fill hose is uncoupled from the fill pipe
Cathodic protection system	Method of preventing or reducing corrosion of a metal surface by making the metal a cathode (i.e. the positive charge) by using either an impressed direct current or attached sacrificial anodes
Collection system	In relation to stormwater or wastewater, piping, pumps, conduits and any other equipment necessary to collect and transport the flow of surface water runoff from precipitation, or domestic, commercial or industrial wastewater to and from retention areas or any areas where treatment is designated to occur
Decommission	In relation to a UPSS, to permanently abandon the use of a system or render it permanently unusable
Discrepancy or loss investigation	Procedure to verify variation in petroleum volume and identify how and/or where the loss (or gain) of petroleum has occurred
Dispenser	Measuring or metering unit designed specifically to dispense petroleum from a storage system to a vehicle or other receptacle, including all components, external and internal, mechanical, electrical and hydraulic
Duly qualified person	A person who has competencies and experience (in relation to a specific activity) that are recognised as appropriate for that activity by the relevant industry
Environmentally sensitive zone	The buffer around a sensitive feature, such as a groundwater bore or surface water body, which DECC estimates is necessary to provide an acceptable level of protection in the event of a leak or spill from a nearby UPSS.

Environmentally unsatisfactory manner	<p>For the purpose of Part 4.3 of the POEO Act, an activity is carried out in an 'environmentally unsatisfactory manner' if:</p> <ul style="list-style-type: none">• it is carried on in contravention, or in a manner that is likely to lead to a contravention, of this Act, the Regulations or a condition attached to an environment protection licence (including a condition of a surrender of a licence) or an exemption given under this Act or the Regulations, or• it causes, or is likely to cause, a pollution incident, or• it is not carried on by such practicable means as may be necessary to prevent, control or minimise pollution, the emission of any noise or the generation of waste, or• it is not carried on in accordance with good environmental practice.
Environment Protection Plan	Environment Protection Plan referred to in clause 19 of the UPSS Regulation
Equipment integrity test (EIT)	A test conducted to evaluate whether a storage system is providing containment as originally designed, in accordance with the manufacturer's specification. The EIT must be able to detect a leak of 0.38 litres per hour from tank or pipe work, with a probability of detection at least 95% of the time and a false detection of 5% or less.
Fuel	Class 3 dangerous good or Class C1 combustible liquid intended to be combusted for the production of energy. It may include petrol, diesel, kerosene, aviation fuel, marine fuel, heating oil, bio-fuel and/or white spirits, but does not include used (waste) oil or LPG.
Groundwater monitoring	The collection and assessment (visual and/or analytical) of one or more water samples from a groundwater monitoring well for any evidence of contamination, allowing the potential detection of a leak from a UPSS beyond the tank pit excavation for the system
Groundwater monitoring well	A well that has been purposely installed as part of a groundwater monitoring system around a UPSS site. Must be located in an appropriate place to detect any leaked petroleum that may have migrated into the groundwater (or to characterise the quality of groundwater flowing onto a UPSS site).
Incident management procedure	In the context of these guidelines, a documented response procedure to manage a leak or spill of petroleum from a system; also known as leak or spill response procedure.

Installation (of a UPSS or any part of one)	The original installation of a system on the premises on which it is situated, including any work in the vicinity of the premises necessary for the installation and any alteration made before the system was first used
Inventory control (reconciliation)	A process for reconciling petroleum volume(s) (from accountable methods) of adding to and removing from a storage system
Leak	Any loss of petroleum from a storage system because the storage system is not providing full and continuous containment
Leak and spill response	An incident management procedure to contain and remediate a leak or spill, including the requirement to notify the appropriate regulatory authority of the leak or spill.
Loss detection	Procedures and processes able to identify the cause of a discrepancy (loss) from any part of a UPSS (i.e. a leak from tanks and/or pipework)
Loss monitoring procedure	<p>One or more procedures for undertaking inventory control (reconciliation) of the petroleum in a system to identify a discrepancy in the volume of petrol (either loss or gain) and the means to record the results and trigger the need for any further action.</p> <p>The UPSS Regulation prescribes that the method of loss monitoring must be able to detect a leak of at least 0.76 litres per hour, with a probability of detection at least 95% of the time and a false detection of 5% or less.</p>
Mandatory pollution protection equipment	<p>The minimum equipment and infrastructure requirements for a storage system, necessary to ensure effective containment of any petroleum in the storage system (should a leak or spill occur). The UPSS Regulation prescribes:</p> <ul style="list-style-type: none">• non-corrodible secondary containment tanks and associated pipework, and• overfill protection devices.
Modification (of a UPSS or any part of one)	The upgrade, replacement, extension, removal or other alteration of a system, not including any alteration made before the system is first used
New UPSS	Any storage system that is not an old system (see definition for old UPSS).
Observation well	A well drilled either outside or within a tank pit (the latter known as a tank pit observation well) to monitor for the presence of petroleum or petroleum vapour in the surrounding soil (or backfill if it is installed in the tank pit) or groundwater if it is present

Old UPSS	<p>Any storage system:</p> <ul style="list-style-type: none">• that was in use before 1 June 2008, or• that was being lawfully installed before 1 June 2008, or• that received development approval under the <i>Environmental Planning and Assessment Act 1979</i> before 1 June 2008, <p>but does not include a storage system that replaces any such system.</p>
Person responsible (for a UPSS)	<p>The person who has the management and control of a system or, if a system has been decommissioned, the person who had the management and control immediately prior to the system being decommissioned.</p>
Petroleum	<p>Any fuel that consists predominantly of a mixture of hydrocarbons derived from crude oil, with or without additives (such as ethanol), that is used, or could be used, as a fuel, and includes liquids such as petrol, diesel, gasoline, motor spirit, two-stroke, aviation fuel, heating oil, kerosene, and used (waste) oil.</p>
Piping	<p>Pipework within a UPSS that is integral to the transfer and routine containment of petroleum. Vent piping and vapour recovery piping are not classified as piping.</p>
Pollution incident	<p>An incident or set of circumstances during which, or as a consequence of which, there is or is likely to be a leak, spill or other escape or deposit of a substance, as a result of which pollution has occurred, is occurring, or is likely to occur. It includes an incident or set of circumstances in which a substance has been placed or disposed of on premises, but does not include an incident or set of circumstances involving only the emission of noise.</p>
Remediate	<p>In the context of these guidelines:</p> <ul style="list-style-type: none">• removing, dispensing, destroying, mitigating or containing the contamination of any land, or• eliminating or reducing any hazard arising from the contamination of the land, including by preventing the entry of persons or animals on the land.

Sampling and analysis	In relation to groundwater, the collection of a representative groundwater sample which is then analysed in the laboratory for the presence and concentration of specific chemicals. The processes are to be undertaken in accordance with NEPC 1999a, NEPC 1999b, APHA 2005 and USEPA 1996. Sample and analysis can also apply to the collection of soil samples and subsequent laboratory analysis.
Secondary (leak) containment	For the purposes of the UPSS Regulation, equipment and infrastructure, such as double-walled tanks and double-walled piping (an interstitial space), which are designed to contain a leak and/or prevent it from escaping beyond the containment area of a UPSS.
Separator	A system which can be above or below ground and commonly used to separate the constituents of oily water into chambers or vessels so that each constituent may be managed and/or disposed of in an appropriate manner.
Significant modification	Any modification to an old or new UPSS that involves: <ul style="list-style-type: none">• replacement of half or more of the tanks (at any one time), or• work which requires development consent, and triggers the need for the system to comply fully with the new Regulation.
Spill	Any loss of containment of petroleum from a storage system during physical management, such as: <ul style="list-style-type: none">• transfer, delivery or removal• any UPSS operation• maintenance or testing• repair or closure.
Statistical inventory reconciliation analysis (SIRA)	A statistical assessment of inventory (volumetric data (i.e. delivery, dispensing and retention volumes), which may be compensated (adjusted), as appropriate, to determine if a discrepancy in inventory control can be identified.
Storage system	In relation to a UPSS, one or more tanks completely or partially buried in the ground that contain, or are intended to contain, petroleum (including used oil), and includes any structure through which petroleum routinely passes from one part of the storage system to another part of the system (i.e. from the tanks to the dispensers), but does not include dispensers

Suitably qualified and experienced person	A person who has the relevant academic/technical qualification and practical experience to undertake work in a safe and effective manner, such as a contaminated land consultant (who will need appropriate tertiary qualifications and field experience)
Sump	In relation to a storage system, a structure used to collect spilled or excess oil, water, and other liquids in the system
Tank	A container or vessel intended for the storage of petroleum within a storage system that, for the purpose of the UPSS Regulation, is buried below the ground surface to such an extent that the base of the tank (in the ground) is not visible
Test	In relation to groundwater monitoring wells, includes visual assessment, use of interface probes and/or gauges, etc. to determine the presence of hydrocarbon contamination
Underground petroleum storage system (UPSS)	One or more tanks that are completely or partially buried in the ground which contain, or are intended to contain, petroleum, as well as any piping to, from or associated with the tanks to the inlet port of any dispensers, but not vent or vapour recovery piping
Used (waste) oil	Oil that has been used for lubricating or other purposes and has become unsuitable for its purpose due to the presence of impurities or loss of the original properties (and it is not intended for combustion)
Validation report	In relation to a storage system or a tank that forms part of a system, a validation report within the meaning of section 3.2 of the <i>Guidelines for consultants reporting on contaminated sites</i> (EPA 1997)

References and further reading

- AIP 2002, *CP4: Code of practice for the design, installation and operation of underground petroleum storage systems*, Australian Institute of Petroleum, Canberra (superseded by AS4897–2008)
- ANZECC and ARMCANZ 2004, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra
- APHA 2005, 'Section 1060' in *Standard methods for the examination of water and waste water*, 21st edition, American Public Health Association, Washington DC
- AS 2003, *AS2832.2–2003: Cathodic protection of metals – Part 2 Compact buried structures*, Standards Australia, Sydney
- AS 2004a, *AS2832.1–2004: Cathodic protection of metals – Part 1 Pipes and cables*, Standards Australia, Sydney
- AS 2004b, *AS1940–2004: Storage and handling of flammable and combustible liquids*, Standards Australia, Sydney
- AS 2006, *AS1692–2006: Tanks for flammable and combustible liquids*, Standards Australia, Sydney
- AS 2008a, *AS4897–2008: Design, installation and operation of underground petroleum storage systems*, Standards Australia, Sydney
- AS 2008b, *AS4976–2008: The removal and disposal of underground petroleum storage tanks*, Standards Australia, Sydney
- AS/NZS 1995, *AS/NZS1020–1995: Control of undesirable static electricity*, Joint Australian and New Zealand Standard, Sydney and Wellington
- AS/NZS 1998, *AS/NZS 5667.1–1998: Water quality sampling – Part 1 Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*, Joint Australian and New Zealand Standard, Sydney and Wellington
- AS/NZS 2007, *AS/NZS3000–2007: Electrical installations* (also known as *New Zealand wiring rules*), Joint Australian and New Zealand Standard, Sydney and Wellington
- DEC 2004, *Approved methods for the sampling and analysis of water pollutants in New South Wales*, Department of Environment and Conservation NSW, Sydney
- DEC 2006, *Guidelines for the assessment and management of groundwater contamination*, Department of Environment and Conservation NSW, Sydney
- DECC 2009a, *Incorporating requirements of the POEO (Underground Petroleum Storage Systems) Regulation 2008 in the planning and development process: UPSS guideline 1*, Department of Environment and Climate Change NSW, Sydney
- DECC 2009b, *Site sensitivity assessment: UPSS technical note*, Department of Environment and Climate Change NSW, Sydney
- DECC 2009c, *Site validation reporting: UPSS technical note*, Department of Environment and Climate Change NSW, Sydney
- DLWC 1998, *NSW Groundwater Quality Protection Policy*, Department of Land and Water Conservation NSW, Sydney
- DUAP 1998, *State Environmental Planning Policy No. 55: Remediation of land*, Department of Urban Affairs and Planning, Sydney
- EPA 1994, *Contaminated Sites: Guidelines for assessing service station sites*, NSW Environment Protection Authority, Sydney

- EPA 1995, *Contaminated Sites: Sampling design guidelines*, NSW Environment Protection Authority, Sydney
- EPA 1997, *Contaminated Sites: Guidelines for consultants reporting on contaminated sites*, NSW Environment Protection Authority, Sydney
- LWBC 2003, *Minimum construction requirements for water bores in Australia*, 2nd edition, Land and Water Biodiversity Committee, Canberra
- Murray–Darling Basin Commission 1997, *Murray–Darling Basin Groundwater Quality Sampling Guidelines: Technical report no. 3*, MDBC Groundwater Working Group, Canberra
- NEPC 1999a, ‘Schedule B(2): Guideline on data collection, sample design and reporting’ in *National Environment Protection (Assessment of Site Contamination) Measure 1999*, National Environment Protection Council, Canberra
- NEPC 1999b, ‘Schedule B(3): Guideline on laboratory analysis of potentially contaminated soils’ in *National Environment Protection (Assessment of Site Contamination) Measure 1999*, National Environment Protection Council, Canberra
- NSW WorkCover Authority 2005, *Code of Practice: Storage and handling of dangerous goods*, Gosford
- UL 2005, *UL971: Standard for non-metallic underground piping for flammable liquids*, Underwriters Laboratories Inc. USA
- USEPA 1989, *Methods for evaluating the attainment of cleanup standards: Volume 1 Soils and soils media (EPA 230/02-89-042)*, United States Environmental Protection Agency
- USEPA 1990, *Standard test procedures for evaluating leak detection methods: Volumetric tank tightness methods US EPA/530/UST-90/004*, United States Environmental Protection Agency
- USEPA 1992, *Test methods for evaluating solid waste: Physical/chemical methods SW-846*, 3rd edition, United States Environmental Protection Agency Office of Solid Waste and Emergency Response, Washington DC
- USEPA 1996, *Groundwater issue: Low-flow (minimal drawdown) groundwater sampling procedures*, United States Environmental Protection Agency National Risk Management Research Laboratory, Oklahoma
- USEPA 2000, *Standard test procedures for evaluating leak detection methods: Statistical inventory reconciliation methods (SIR) US EPA/530/UST-90/007*, United States Environmental Protection Agency
- USEPA 2008, *Meeting underground storage tank system requirements*, United States Environmental Protection Agency, available at www.epa.gov/oust/ustsystem/index.htm