

# ***Environmental Compliance Report***

## **Liquid Chemical Storage, Handling and Spill Management**

### **Part B**

#### **Review of Best Practice and Regulation**



**Department of  
Environment and  
Conservation (NSW)**

The Liquid Chemical Storage, Handling and Spill Management Environmental Compliance Program was undertaken by the Compliance and Assurance Section, Department of Environment and Conservation (DEC).

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## Executive summary

In 2003, the Department of Environment and Conservation NSW (DEC) developed a comprehensive approach to environmental compliance, to build on and integrate the compliance audit and licence review processes. The comprehensive approach combines assessing compliance with legislative requirements with reviewing industry best practice, to encourage improved environmental performance. Industry, licensees, state agencies, local government, the community and other stakeholders can provide input into various stages of the process by consulting with DEC.

The comprehensive approach to environmental compliance was piloted with the wood preservation industry. The pilot program showed that the comprehensive approach was successful in:

- achieving improved environmental performance through integrating environmental compliance activities
- enabling open and effective communication between DEC and industry
- providing greater opportunities for external stakeholder input
- better aligning how DEC regulates industry with reference to best environmental management practices.

Industries involved in liquid chemical storage, handling and spill management have been chosen for the first audit of industry sectors under the comprehensive approach to environmental compliance.

This report, *Environmental compliance report—liquid chemical storage, handling and spill management: Part B—review of best practice and regulation*, reviews the legislative regulations and best environmental management practices used in storing and handling liquid chemicals and managing spills in various industries, and issues facing industry and regulators.

*Part A—compliance audit* is a summary of the findings of the audit, looking at compliance with current DEC regulatory requirements. Parts A and B of this report are being issued concurrently.

From a literature review of liquid chemical storage, handling and spill management worldwide, DEC has found that the best environmental management practices regarding the activity of liquid chemical storage, handling and spill management are outlined in Australian Standards, codes of practices and guidelines addressing the environmental risks. In addition, DEC has identified best environmental practices from other jurisdictions and operations that could further reduce the environmental risks associated with this activity.

The current regulatory framework for the activity of liquid chemical storage, handling and spill management includes:

- DEC regulation under the *Protection of the Environment Operations Act 1997*
- DEC regulation under the *Road and Rail Transport (Dangerous Goods) Act 1997*, *Pesticides Act 1999*, *Environmentally Hazardous Chemicals Act 1985* and *Contaminated Land Management Act 1997*
- WorkCover Authority regulation under the *Occupational Health and Safety Act 2000*.

DEC considers Parts A and B of this report to be valuable management tools that will allow various industries to improve environmental performance in relation to liquid chemical storage, handling and spill management.

In addition to a systematic and rigorous process of follow-up actions to ensure that issues identified are being addressed at the audited sites, DEC will be reviewing the licenses at premises where compliance audits have been carried out. The public is encouraged to make submissions to DEC regarding those reviews—see [www.environment.nsw.gov.au/licensing/review.htm](http://www.environment.nsw.gov.au/licensing/review.htm).



# Introduction

## Comprehensive approach to environmental compliance

In 2003, the Department of Environment and Conservation NSW (DEC) developed a comprehensive approach to environmental compliance, to build on and integrate the compliance audit and licence review processes. The comprehensive approach combines assessing compliance with legislative requirements with reviewing industry best practice, to encourage improved environmental performance. Industry, licensees, state agencies, local government, the community and other stakeholders can provide input into various stages of the process by consulting with DEC.

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Industries involved in liquid chemical storage, handling and spill management have been chosen for the first audit of industry sectors under the comprehensive approach to environmental compliance.

DEC has conducted compliance audits of a sample of facilities across NSW that store and handle liquid chemicals and manage spills. The sample included 52 premises licensed under the *Protection of the Environment Operations Act 1997* (POEO Act) to handle chemicals and 10 non-licensed facilities regulated by DEC. Additionally, in partnership with relevant councils, compliance assessments were conducted at 9 premises regulated by local government. DEC has also reviewed the literature on the best environmental management practices for liquid chemical storage, handling and spill management.

DEC is reporting the results of the audits in this *Environmental compliance report—liquid chemical storage, handling and spill management*. The first part, *Part A—compliance audit*, summarises the findings of the audits. This second part, *Part B—review of best practice and regulation*, summarises the environmental regulations that affect the industry and best environmental management practices that can be used by industry. Parts A and B are being issued concurrently.

DEC will review licences for all premises where compliance audits have been carried out, pursuant to section 78 of the POEO Act. The review will involve reassessing the environmental protection issues previously found and the licensing decisions made at each site, and varying

licences where necessary. DEC expects that these reviews will be completed by January 2006. The licences to be reviewed will be advertised and listed on the DEC website and details of variations will be made available through the Public Register—see [www.environment.nsw.gov.au/prpoeo/index.htm](http://www.environment.nsw.gov.au/prpoeo/index.htm).

## **Purpose of this report**

*Part B—review of best practice and regulation* identifies and provides awareness of environmental issues and practices that offer scope for improved environmental performance at premises storing and handling liquid chemicals and managing spills. Stakeholders may find this contextual information useful when making submissions on the review of licences that deal with liquid chemical storage, handling and spill management.

DEC expects that Parts A and B will help industry to improve the environmental performance in storing and handling liquid chemicals and in spill management.

This report has been prepared for the purpose described, and no responsibility is accepted for its use in any other context or for any other purpose.

## **Selection of activity—liquid chemical storage, handling and spill management**

DEC frequently regulates all industrial activities licensed under the POEO Act, through, for example, conducting site inspections and reviewing annual returns. In addition, DEC has a rolling program of intensive compliance audits of industry sectors and activities. Sectors and activities targeted in DEC's environmental compliance program are chosen through assessment of major environmental and community concerns, and DEC corporate objectives and strategies.

Criteria considered in the audits include the likelihood of harm to human health and the environment from an activity, the nature of and hazards associated with the chemicals used, emissions and wastes from the activity, gaps in understanding of the activity, environmental performance, community concern, and the opportunity to make significant environmental gains in relation to the activity.

The activity of liquid chemical storage, handling and spill management was selected for this program, and also selected for the new comprehensive approach to environmental compliance, because:

- several major environmental incidents have been attributed to poor liquid chemical management practices
- previous audit experience indicates poor compliance with liquid chemical storage requirements
- the audits could be structured around licensed premises but would also apply to non-licensed sites
- existing guidance (such as Australian Standards and industry codes of practice) would assist in both the audits and the formulation of industry best practice

- strong links exist between DEC and council programs (for example, the Prospect Creek stormwater campaign, council works depot compliance inspection program and waste compliance campaigns).

## **Description of the activity**

Chemical storage, handling and spill management occur on a large number of premises covering a wide range of industry types, both scheduled and non-scheduled under the POEO Act. Liquid chemicals are used in many different ways, including as raw materials for the manufacture of products, for product modification, for cleaning purposes, for maintenance of plant and equipment, and as a source of energy.

Wherever liquid chemicals are stored and handled there is potential for air, soil, groundwater and surface water pollution to occur through spills or other releases. Other potential releases include fugitive losses or leaks from the valves, pumps, flanges and seals connected to liquid chemical storage and handling equipment. The potential for loss varies between and within premises according to the chemicals involved, the management practices used and the physical setting.

To prevent the discharge of pollutants from liquid chemical storage and handling activities, industry should minimise the quantities stored on-site, store materials in designated areas, install secondary containment facilities, conduct regular inspections, develop and implement emergency spill management procedures, and train employees and subcontractors.

### **Bulk storage**

Generally, very large volumes of liquid chemicals used as raw materials or manufactured as products are transported to and from sites by bulk tankers and are stored in bulk tanks made of corrosion-resistant materials. These bulk liquid chemical storage tanks can be located either above-ground or below-ground.

Storage tanks containing liquids with a high vapour pressure should be designed and built in accordance with best engineering practice and relevant Australian Standards and have a floating roof, an internal floating raft or an inert gas blanket to minimise the escape of vapours to the atmosphere. Bulk tanks should be protected by a secondary containment facility, such as a bund (a low impervious wall) around an individual tank or cluster of tanks (tank farm) with a sump, to contain spills and leaks which may otherwise be discharged off-site.

Secondary containment facilities should have low permeability, the capacity to contain at least the volume of liquid in the largest tank within the facility, and adequate additional capacity to contain any rain water or firewater as necessary. Pipework should not pass through the walls, but if this is unavoidable, the pipe should be sealed into the wall with a material that is resistant to attack by the chemical stored to ensure that the store remains leakproof.

### **Package storage**

A wide variety of liquid chemicals are routinely delivered, distributed, stored or dispatched in packages ranging from containers with a few litres capacity up to 200 litre drums, and intermediate bulk containers holding approximately 1000 litres. Packages may be delivered by trucks in, for example, shipping containers to a central receiving area (transfer station) and then distributed to various satellite stores around the site, or be delivered directly to the satellite stores. Packaged materials also should be stored within impervious secondary containment facilities.

Dangerous goods (substances listed in the Australian Dangerous Goods Code) must be stored in designated areas with appropriate placarding and isolated from incompatible materials. Liquid chemical products from industrial processes vary widely in nature, and are generally stored in a similar manner to raw materials. In general, for multiple container storage, containment stores should have sufficient capacity to contain at least 25% of the total volume of the containers being stored and have adequate additional capacity to contain any rain water or firewater as necessary.

### **Waste storage**

Liquid chemical wastes from industrial processes are generally stored in tanks or drums, and need to be assessed and classified in accordance with the POEO Act and *Environmental guidelines: assessment, classification & management of liquid & non-liquid wastes* before disposal. Such wastes can contain a number of contaminants, such as corrosive materials, oil and grease, nutrients and heavy metals. Waste lubrication oil is often stored in tanks or 200-litre drums within workshop areas. Many sites have trade waste agreements with the local wastewater authority, and pre-treat contaminated water before discharging it to the sewerage system. Generally, all tanks and drums containing liquid wastes should be located within an impervious secondary containment facility.

### **Other liquid chemicals**

Liquid chemicals used in the maintenance, repair and operation of plant and equipment, such as fuels, lubricating oils, hydraulic oils and liquid cleaning agents, are likely to be delivered to the site by bulk tanker or packages on trucks. Often fuels are stored in above-ground or below-ground storage tanks. Oils are usually delivered in 200-litre or smaller drums and are stored in workshop areas. Cleaning products are usually supplied in smaller plastic packages and stored in storerooms or cupboards. As with raw materials and wastes, any significant quantities of these materials should be transferred and stored within impervious secondary containment facilities.

### **Used packages**

Used packages (drums and containers) should be stored with their caps on to prevent any residues from being spilt or otherwise escaping. Sometimes, used drums and containers are rinsed out on-site and the wash waters are directed to the sewer or a treatment facility on-site before disposal.

### **Handling**

Generally, liquid chemicals are dispatched and delivered in designated loading/unloading docks or terminals or adjacent to tank farms or storehouse buildings. To prevent or minimise any leaks or spills that may occur during loading and unloading and that may result in air pollution, soil contamination or stormwater pollution, industry should provide air pollution controls where necessary and containment structures to contain any spills and leaks.

Bulk liquid chemicals are usually transported on-site via pipelines, and packaged liquid chemicals are usually transported by forklift, hand-barrow or hand. Forklift drivers and other operators should be appropriately trained. Any damaged containers or spillage should be reported immediately for appropriate action to be taken. External areas within the site where packaged liquid chemicals are transported should drain to a collection system such as a first flush detention basin designed to capture any spills or leaks.

## **Maintenance**

Bulk storage tanks, secondary containment facilities, pipework, stormwater treatment devices and so on should be regularly inspected and subject to preventive maintenance programs.

## **Incident management**

The storage, handling and transport of liquid chemicals have the potential to cause environmental pollution through spillage or other release to the air, ground and water. The level of sophistication of the spill containment, clean-up and recovery measures required will be determined by the quantity of chemicals being stored and their individual qualities such as compatibility with other chemicals and potential impact on the environment. Generally, industries storing large quantities of liquid chemicals or higher-risk liquid chemicals have emergency management plans that include spill clean-up procedures, firewater management and specialist training for people responsible for implementing the plan. Live emergency drills using the emergency management plan should be conducted at least annually. Even industries that store small quantities of lower-risk chemicals should train their personnel in spill containment procedures and have spill kits in place where required, containing adequate spill response equipment such as absorbent material. All industries should maintain up-to-date Material Safety Data Sheets for the chemicals stored or used on-site and ensure that staff understand the hazardous properties of these chemicals.

## **Risk of harm to the environment**

The storage and handling of liquid chemicals and the management of spills pose a potential risk of harm to the environment and can be major sources of pollution at industrial premises. Risks can arise from the following sources:

### **Air pollution**

- point-source air pollutant emissions from tank vents and tank roofs storing volatile liquid chemicals
- fugitive air pollutant emissions, and possibly odours, from the transfer of chemicals from delivery vehicles to chemical storage areas
- fugitive air pollutant emissions from losses or leaks from the valves, pumps, flanges and seals from the storage and handling of raw materials and products

### **Water pollution and soil contamination**

- spills or leaks of liquid chemicals during delivery
- spills or leaks from the transfer of liquid chemicals to permanent storage areas
- spills or leaks from liquid chemical storage areas and waste liquid chemical storage areas
- spills or leaks from disused containers and damaged drums, containers and packages
- discharges of inadequately treated contaminated stormwater to waters
- deliberate spillages caused by unauthorised personnel
- past inappropriate management practices

## **Incident management**

- toxic air emissions, smoke or odours from a fire or explosion
- contaminated firewater discharges to soil, surface waters or groundwater
- leaks from the storage of contaminated spill residues, personal protective equipment and clean-up equipment.

Liquid chemical storage and handling systems should be designed and managed using best environmental management practices to ensure that liquid chemicals are not lost from storage tanks and containers or piping systems through spills and leaks, and to minimise losses during transfer operations.

# Best environmental management practices used in liquid chemical storage, handling and spill management

As highlighted in the previous section, activities related to liquid chemical storage, handling and spill management can pose a risk of harm to the environment. DEC has identified a number of best environmental management practices to prevent or mitigate these risks.

## Best environmental management practices

Guidance material, including standards, codes of practice and guidelines for the proper storage and handling of liquid chemicals and the management of spills, has been developed by both industry and regulators in Australia. A number of Australian Standards deal with various aspects of chemical storage, handling and spill management (see Bibliography).

These standards were prepared following a request from the chemical industry for generic standards for the handling of each class of dangerous goods. The first Australian Standard in that series was issued in 1976, *AS 1940 Australian standard for the storage and handling of flammable and combustible liquids*.

This was revised as AS 1940:1993 to provide industry with best practice requirements and recommendations for storing and handling flammable and combustible liquids. This standard was updated in 2004 as AS 1940:2004 to incorporate new information on control philosophies and innovative designs that had been developed since the last edition.

The chemical industry has prepared a number of codes of practice for its members defining the performance practices required for the storage and handling of liquid chemicals and the management of spills (see Bibliography). The Australian Institute of Petroleum codes of practice (AIP 1993, 1994, 2003a, 2003b), the Plastics and Chemicals Industries Association responsible care codes of practice (PACIA 2000, 2002a, 2002b) and *The industry code of practice for the safe transport, handling and storage of packaged agricultural chemicals and veterinary chemicals* are all useful codes (Agsafe 2002).

DEC, WorkCover, other government organisations and industry have also produced numerous guidelines to help organisations deal with liquid chemicals in a safe and environmentally sound manner (see Bibliography). DEC (formerly the Environment Protection Authority) has produced various environmental guidelines (EPA 1997a, 1997b, 1999). WorkCover has developed a series of guidelines covering the storage and handling of dangerous goods and the management of spills.

DEC also reviewed environmental management practices and codes from overseas. Most best environmental management practices referred to were similar to those in NSW. DEC found other environmental management practices for the prevention or mitigation of environmental pollution from the storage and handling of liquid chemicals and the management of spills that could be adopted in NSW.

## Practices reducing risk of air pollution

The storage and handling of liquid chemicals and the management of spills may produce air pollutants such as volatile organic compounds, sulfur oxides, hydrogen sulfide, particulate matter and a number of toxic pollutants. Such emissions occur from the leakage, venting and evaporation of liquid chemicals being stored, handled or spilled.

A summary of best environmental management practices that prevent or mitigate the risks from the loss of liquid chemicals to the atmosphere include the following.

### Storage

#### Bulk storage

- Tanks should be provided with suitable vents to enable the safe discharge of displaced volatile air emissions during loading and unloading, and should have a vapour disposal or recovery system installed where necessary.
- Large storage tanks containing volatile liquids should be provided with floating metal covers, an internal floating roof or an inert gas blanket to minimise air releases.
- Small storage tanks containing volatile liquids should be provided with vapour-tight connections. These connections should be placed on all liquid and vapour lines and fittings, and close automatically when disconnected to minimise air releases.
- Large storage tanks should be provided with overfill protection and alarms.
- Leak detection tests on tanks, distribution lines and seals should be conducted regularly.

#### Packaged material and used package storage

- Package stores containing chemicals that emit volatile gases should be provided with adequate natural or mechanical ventilation.
- All containers storing liquids should be sealed (i.e. lids sealed and bungs secured).

### Handling

#### Transfer area management

- Areas for loading and off-loading liquid chemicals should be covered.
- Vapour recovery systems for loading/unloading operations should be installed and maintained where appropriate.
- Adequate natural or mechanical ventilation for package-filling operations should be provided, and if necessary the vents should be fitted with filters to minimise air emissions.
- Tankers should be provided with automatic shut-off mechanisms and fuel dispensing equipment.
- Valves should be kept closed unless manually opened during transfer.
- Shut-off valves used in the transfer of liquids should be of the quick-closing type.
- Hatches, manholes or covers on all tankers should be kept closed, except during loading and unloading operations.
- Regular inspections should be undertaken for losses or leaks, and valves, pumps, couplings and seals should be maintained regularly.

## Spill management

- Spills must be cleaned up immediately, and waste must be disposed of in accordance with DEC requirements to mitigate emissions to air.

## Practices reducing risks of water pollution and soil contamination

### Storage

Accidental releases of materials from the storage and handling of liquid chemicals and the management of spills have the potential for polluting surface water, stormwater and groundwater and for contaminating soil. The following best environmental management practices are designed to prevent, reduce or eliminate the discharge of pollutants from liquid chemical activities to soil, surface water, stormwater and groundwater.

### Bulk storage

- Tanks should be located with adequate separation distances from boundaries, ignition sources and protected places.
- Material that tanks are made of should be compatible with chemicals to be stored.
- Bulk tanks should be located in a compound that has a containment system that provides sufficient containment for 100% of net capacity of the largest tank in the compound and holds the input from a 1-in-20-year 24-hour storm or the output of any firewater for 20 minutes, whichever is greater.
- The floors of bulk storage facilities should be designed to withstand the hydrostatic pressure exerted when tanks are full.
- The containment system should be compatible with the liquid being stored and provide an impervious barrier to prevent spills from discharging outside the containment system.
- Any pipes connected to the storage tanks should be located over the containment system. If a pipe passes through a wall, the joint should be sealed to prevent leakage.
- All fixed tanks should be provided with a suitable overflow system that discharges to an area within the bund wall or to a collection or holding point.
- Any valve used for draining a storage compound should be located outside the bund wall. The valve should have clear open and closed positions and be compatible with the liquid contained. The valve should normally be closed except during drainage.
- All chemical storage tanks that contain dangerous goods must be located away from the containment walls, so any lateral spill from the tank would be contained inside the containment walls or hit a suitable splatter shield.
- All storage tanks should be fitted with level indicators. Where the level inside the tank is not continuously visible to the person filling the tank, a high-level alarm should be fitted to prevent overflow.
- Where possible, all chemical storage areas should be roofed. If this is not possible, any water collected in the storage area should be monitored for quality before appropriate discharge.
- All uncontaminated surface stormwater should be diverted from chemical storage areas.
- All tanks and storage compounds should be inspected and maintained regularly, and the tanks' integrity should be tested at least every 5 years.

- Chemicals in bulk storage should be properly labelled and have Material Safety Data Sheets available in the work area.
- Vehicles should move between storage areas in a manner that prevents the tracking of contamination from one area to another.
- All storage areas should be secured against unauthorised entry.
- All new storage areas located near environmentally sensitive areas should have groundwater monitoring wells.
- Management at all sites where inappropriate practices were followed in the past should conduct a site investigation and undertake remediation where necessary.

### **Packaged material storage**

- Package stores should be located with adequate separation from boundaries, ignition sources and protected places.
- Stored chemicals and waste materials should be confined to designated areas.
- All stores that contain liquid chemicals should be provided with suitable containment.
- The capacity of the spillage containment compound should be adequate to retain spillage.
- Spill containment areas should be designed so incompatible material does not drain to the same area.
- Drums and other containers should be stored (stacked) in such a manner and location that if the drums and other containers are ruptured or toppled, the contents will not spill outside the containment structure.
- Where possible, all storage areas should be roofed. If this is not possible, any stormwater entering such areas should be monitored for quality before appropriate discharge.
- All uncontaminated surface stormwater should be diverted away from package storage areas.
- All products should be sorted and labelled, and Material Safety Data Sheets should be made available in the work area.
- All storage areas should be secured against unauthorised entry.

### **Used package storage**

- Areas for storing scheduled liquid chemical wastes should be secured, roofed and walled, have impermeable floors and be adequately ventilated.
- All uncontaminated surface stormwater should be diverted away from the chemical waste storage areas.
- All containers storing waste liquids should be sealed (i.e. lids sealed and bungs secured).
- Empty containers should be washed, rinsed or chemically treated and sealed before storage or disposal.
- Labels of containers should be retained until the containers are washed and rinsed.
- Containers not for reuse should be rendered safe and be punctured or crushed.
- Accurate records of all wastes stored should be kept to ensure early disposal.
- Employees should be trained in appropriate waste control and disposal procedures.

## Handling

- Personnel trained in preventing the risk of spills or leaks should be present during loading and unloading operations.
- Transfer points should be well separated from boundaries and protected places such as dwellings, public buildings, hospitals, schools and factories.
- All uncontaminated surface stormwater should be diverted away from the chemical handling areas.
- Where possible, loading and unloading areas should be roofed and provided with rollover bunds and collection sumps.
- All vehicles should be inspected for leaks before and after loading and unloading operations.
- Hoses, couplings and other equipment should be regularly inspected for failures or leaks.
- All vehicle loading and unloading operations should be undertaken in a containment area with adequate spill containment capacity.
- Transfer points outside a bund should be provided with suitable spill containment.
- All connections used during the transfer of liquid between vehicles and storage tanks should have tight fittings.
- All transfer points should be suitably anchored and protected from impact by vehicles or swinging loads.
- All transfer hoses should be protected from vehicles driving over the hose or striking its connection.
- All nozzles and valves used during the transfer of liquid between tankers and storage tanks should be fitted with shut-off valves to prevent overflow.
- Transfer pumps should be provided with emergency shut-down devices.
- Hoses should be purged before uncoupling.
- Overfill protection devices should be regularly inspected.
- Stormwater from containment areas should be tested before discharge to minimise discharge of pollutants.

## Spill management

- Spills should be cleaned up immediately, and waste must be disposed of in accordance with DEC requirements to mitigate any discharge to soil or waters.
- Contaminated water and other waste (spill materials) from the clean up of spills must be collected and disposed of in accordance with DEC requirements.

The effective management of incidents can prevent or reduce the discharge of pollutants to soil, water and air. This can be achieved by preventing incidents, promptly containing and cleaning up spills, properly disposing of spilled materials, and training employees in incident management.

Incidents resulting from the storage and handling of liquid chemicals may include leaks, spills, fires, explosions and the release of vapours. Their scale ranges from limited events (e.g. small-scale spills and leaks which can be dealt with by on-site personnel using spill management procedures and spill kits) to significant events (e.g. emergencies which are generally large-scale,

require an urgent response, and may involve the emergency services). It is therefore important to understand the size of a limited spill and a significant spill for each material being stored and handled and the appropriate response for the size and type of spill.

Incidents with significant spills that cannot be controlled by personnel on-site should be dealt with by using emergency management procedures and implementing an emergency management plan.

The following best environmental management practices are designed to prevent or reduce the discharge of pollutants to surface water, groundwater, soil and air.

### **Limited incidents**

- A spill response plan should be developed, implemented, reviewed and updated as required.
- Spill response training and drills should be conducted regularly or as appropriate.
- Adequate supplies of spill response equipment should be maintained in accessible locations.
- The spread of the spill should be contained, and all spilled liquids should be recovered immediately. The spilled liquid and other clean-up waste should be properly disposed of.
- Water used for cleaning up and decontaminating spills should not be allowed to enter stormwater drains or watercourses.
- Spills should be covered and protected from stormwater runoff during rainfall to the extent that it does not compromise clean-up activities.

### **Significant incidents**

- An emergency management plan to deal with significant incidents should be developed, implemented, reviewed and updated as required.
- In designing the premises, sufficient space between bund walls, storage areas and other structures should be provided to allow access during emergencies.
- Employees should be trained in emergency response procedures, including spill clean-up procedures.
- Response equipment should be provided to allow emergencies to be dealt with immediately.
- Emergency drills using the emergency response plan should be undertaken at least annually.
- Spilled liquids and other wastes from the clean-up should be collected and properly disposed of.
- Responsible individuals should be designated to oversee and enforce control.
- All premises should have adequate measures to contain contaminated firewater on-site.
- Facilities that have bulk oil storage on-site should have a spill prevention control and countermeasures plan. The plan should contain: operating procedures that prevent oil spills; control measures to prevent a spill from reaching waters; and countermeasures to contain, clean up and mitigate the effects of an oil spill that reaches waters.
- Material such as sandbags or tarpaulins should be available to block any stormwater drain outlets from the site.

# Legislation regulating industries that store and handle liquid chemicals and manage spills

DEC administers four Acts that regulate industries that store and handle liquid chemicals and manage spills. Two other Acts also apply.

## Protection of the Environment (Operations) Act 1997

Premises that undertake scheduled activities listed in Schedule 1 of the POEO Act are licensed by DEC, subject to meeting activity threshold criteria. The following scheduled activity sectors were considered most likely to be storing and handling liquid chemicals and managing spills. For a full list of all the scheduled activities and the classifications under them, refer to Schedule 1 of the POEO Act:

- chemical industries or works
- chemical storage facilities
- livestock processing industries
- marinas and boat repair facilities
- mineral processing or metallurgical works
- shipping facilities (bulk)
- waste facilities.

The POEO Act also prohibits certain actions that may pose a risk to the environment, including the pollution of waters (section 120) and leaks and spills of substances (section 116). These restrictions apply to industries that store and handle liquid chemicals and manage spills, regardless of whether a licence is required.

Regulations issued under the POEO Act are also applicable to scheduled activity industry sectors dealing with liquid chemicals. Part 5 of the POEO (Clean Air) Regulation 2002 prescribes vapour control equipment for small and large storage tanks and a large loading plant, and vapour control equipment and loading and unloading requirements for large tankers that store, load or unload ‘volatile organic liquids’ in the Sydney, Newcastle and Wollongong metropolitan area. The Clean Waters Regulation 1972 limits the pollutants in discharges to ‘classified waters’, such as from scheduled premises dealing with liquid chemicals.

The POEO Act also establishes that DEC is the ‘appropriate regulatory authority’ for non-scheduled premises that are occupied by state and local government agencies, which include those that deal with liquid chemicals.

Premises not regulated by DEC are regulated by local government, including those that deal with liquid chemicals at a level below the licensing threshold for ‘scheduled activities’ in the scheduled activity sectors listed above.

## **Road and Rail Transport (Dangerous Goods) Act 1997**

The transport of dangerous goods in NSW is regulated under the *Road and Rail Transport (Dangerous Goods) Act 1997*, relevant regulations, and the Australian Dangerous Goods Code. Driver and vehicle licensing is required under the NSW Road and Rail Transport (Dangerous Goods) (Road) Regulation 1998, when dangerous goods are transported in bulk. DEC licenses the bulk transport of dangerous goods, including the transport of liquid chemicals. The criteria for classifying goods as ‘dangerous’ are outlined in the Australian Dangerous Goods Code (1998).

## **Environmentally Hazardous Chemicals Act 1985**

The *Environmentally Hazardous Chemicals Act 1985* (EHC Act) is the State’s key chemicals management law. The EHC Act parallels DEC’s goal for hazardous substances: to minimise the adverse impacts of chemicals and hazardous substances on the environment and public health. The EHC Act provides a flexible legal framework capable of regulating priority or high-risk chemicals throughout their entire lifecycles.

The main provisions of the EHC Act relate to:

- statutory chemical assessment
- the regulation and control of chemicals via chemical control orders, licences and regulations
- establishment of a statutory advisory group, the Hazardous Chemicals Advisory Committee.

Chemical Control Orders (CCOs) are the primary regulatory tools of the EHC Act for responding rapidly and flexibly to chemical problems. They are the key tools available to NSW if there is a need to impose management restrictions on a specific chemical or class of chemicals. CCOs allow for the control of a chemical throughout its lifecycle, and can set requirements for a broad range of activities, including the manufacture, processing, distribution, use, sale, transportation, storage and disposal of chemicals and chemical wastes for industrial, commercial and household purposes. CCOs can also be used to require the phasing-out of a particular chemical. There are currently five CCOs in force in NSW, covering aluminium smelter wastes containing fluoride or cyanide; dioxin-contaminated waste materials; scheduled chemical wastes; organotin waste materials; and polychlorinated biphenyl wastes and materials.

## **Contaminated Land Management Act 1997**

The *Contaminated Land Management Act 1997* establishes a process for investigating and (where appropriate) remediating land areas where contamination presents a ‘significant risk of harm’ to human health or other aspects of the environment. Poor handling, storage and spill management practices used with high-risk liquid chemicals may result in soil contamination. DEC regulates sites that are judged to pose a ‘significant risk of harm’ under the Act. Local government manages other contaminated sites under planning legislation.

## **Occupational Health and Safety Act 2000**

WorkCover NSW primarily administers the *Occupational Health and Safety Act 2000*, including the Occupational Health and Safety (General) Regulation 2001, in relation to the keeping and handling of dangerous goods at premises dealing with liquid chemicals.

## **Environmental Planning and Assessment Act 1979**

All development proposals in NSW must be assessed to ensure that they comply with relevant planning controls and, according to nature and scale, that they are environmentally and socially sustainable. State, regional and local plans and policies indicate what level of assessment is required, and who is responsible for assessment, being either the local council or the Minister for Planning (the Department of Planning assesses proposals for the Minister).

The development assessment system in NSW is set out in the *Environmental Planning and Assessment Act 1979*. The Act ensures that members of the public can participate in decisions that will shape their community's future. The Department of Planning primarily administers the Act, including associated regulations regarding planning and development.

The activities of some industries that deal with liquid chemicals would be classified as 'potentially hazardous' or 'potentially offensive' under State Environmental Planning Policy No. 33: Hazardous and Offensive Development.

'Potentially hazardous industries' are subject to a preliminary hazard analysis during the assessment process to determine their risk to people, property and the environment. Should such risk be within the criteria of acceptability and the proposal is approved, the approval may be subject to conditions that control the ongoing safety of the development and require potential hazards to be specifically addressed.

'Potentially offensive industries', would also need to meet the requirements for licensing by DEC.

# Statutory instruments regulating premises that store and handle liquid chemicals and manage spills

## Premises for which DEC is the appropriate regulatory authority—licensed premises

Premises that meet the criteria under Schedule 1 of the POEO Act must be licensed by DEC. DEC currently regulates 2544 licensed premises under the POEO Act. DEC audited 52 licensed premises in the industry sectors considered most likely to be dealing with liquid chemicals. *Part A—compliance audit* provides more information on those licensed premises and summarises their environmental performance.

Conditions are attached to Environment Protection Licences specifying the manner in which the licensed activity must be undertaken. The following two mandatory standard operating conditions appear on all licences:

*01.1 Licensed activities must be carried out in a competent manner. This includes:*

- *the processing, handling, movement and storage of materials and substances used to carry out the activity; and*
- *the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.*

*02.1 All plant and equipment installed at the premises or used in connection with the licensed activity:*

- *must be maintained in a proper and efficient condition; and*
- *must be operated in a proper and efficient manner.*

Licences also have specific operating conditions relevant to liquid chemical storage and handling, and spill management. The following standard condition appears on a number of the licences:

*Within 3 months of the date of the issue of this licence, the licensee must develop, or update, an emergency response plan which documents the procedures to deal with all types of incidents (e.g. spill, explosions or fire) that may occur at the premises or outside of the premises (e.g. during transfer) which are likely to cause harm to the environment.*

## Premises for which DEC is the appropriate regulatory authority—non-licensed premises

DEC is the ‘appropriate regulatory authority’ for premises that are operated by public authorities and that are not covered by Schedule 1 of the POEO Act. These non-licensed premises are required to comply with provisions in the POEO Act. Specific provisions that are relevant to liquid chemical storage, handling and spill management are:

- **Section 116**—makes it an offence to allow a substance to leak, spill or otherwise escape (whether or not from a container) in a manner that harms or is likely to harm the environment
- **Section 120**—prohibits the pollution of waters
- **Section 167**—requires the occupier of any premises to maintain and operate any pollution control equipment installed at the premises in a proper and efficient condition or manner.

DEC audited seven non-licensed premises owned and operated by State Government agencies and three non-licensed premises owned and operated by local councils. *Part A—compliance audit* provides more information on these audits.

## **Premises for which local government is the appropriate regulatory authority**

Local government, through the requirements of the POEO Act, regulates premises not regulated by DEC. DEC conducted joint compliance inspections with a selection of councils at non-licensed premises dealing with liquid chemicals. *Part A—compliance audit* provides more information on these compliance inspections.

## **Licence reviews**

Section 78 of the POEO Act requires DEC to review all environment protection licences every 3 years. Licences audited as part of the compliance audit program will be reviewed shortly. All operating conditions attached to licences that are relevant to chemical storage, handling and spill management will be reviewed for appropriateness, consistency and enforceability.

## Where to from here?

Parts A and B both identify matters for consideration by NSW industry and other interested stakeholders.

The best environmental management practices identified in this Part B are applicable to all premises that handle or store liquid chemicals. The operators of these premises must ensure that there are adequate and appropriate spill management preparations and practices on-site.

The issues identified in Part A are likely to be typical of any industry sector that deals with liquid chemical storage, handling and spill management in NSW. In addition to audit follow-up procedures outlined in Part A, DEC will be reviewing licences at premises where compliance audits have been carried out, as required by section 78 of the POEO Act. DEC will ensure that the matters identified in Part A are being considered at all relevant premises.

DEC will circulate information in Parts A and B of this report widely to stakeholders and seek cooperative opportunities to work with industry to improve its environmental performance.

Following the licence review phase, DEC will issue a final report which will identify the changes made and provide further guidance for industries that deal with liquid chemical storage, handling and spill management based on best environmental management practices.

## Bibliography

- Agsafe 2002, *The industry code of practice for the safe transport, handling and storage of packaged agricultural chemicals and veterinary chemicals*, Agsafe Australia, Canberra
- AIP 1993, *Codes of practice CP16: inspection and integrity monitoring of large steel vertical petroleum storage tanks*, Australian Institute of Petroleum, Canberra
- AIP 1994, *Codes of practice CP25: wastewater management at bulk petroleum storage sites*, Australian Institute of Petroleum, Canberra
- AIP 2003a, *Codes of practice CP30: the management of used lubricating oil and lubricating oil containers*, Australian Institute of Petroleum, Canberra
- AIP 2003b, *Guidelines GL14: safe above ground fuel storage on farms and industrial sites (for tanks < 10,000 L)*, Australian Institute of Petroleum, Canberra
- DEH Queensland 1994, *Environmental management guidelines: chemical storage*, Department of Environment and Heritage, Brisbane
- Environment Agency 2004, *Pollution prevention guidelines PPG2: above ground oil storage tanks*, Environment Agency, London, and Scottish Environmental Protection Agency, Stirling
- EPA 1997a, *Draft managing urban stormwater: treatment techniques*, NSW Environment Protection Authority, Sydney
- EPA 1997b, *Environment protection manual for authorised officers: bunding and spill management—technical bulletin*, NSW Environment Protection Authority, Sydney
- EPA 1998, *Draft managing urban stormwater: source control*, NSW Environment Protection Authority, Sydney
- EPA 1999, *Environmental guidelines: best management practice for marinas and boat repair facilities*, NSW Environment Protection Authority, Sydney
- EPA South Australia 2003, *Guideline: bunding and spill management*, Environment Protection Authority South Australia, Adelaide
- EPA Victoria 1992, *Bunding guidelines*, Environment Protection Authority, Victoria, Melbourne
- FORS 1998, *Australian dangerous goods code* (6th ed), Federal Office of Road Safety and National Road Transport Commission, Canberra
- PACIA 2000, *Safe handling and storage of adhesives and sealants*, Plastics and Chemicals Industries Association, Melbourne
- PACIA 2002a, *Code of practice—environment protection*, Plastics and Chemicals Industries Association, Melbourne
- PACIA 2002b, *Responsible care examples of best practice dangerous goods storage and handling*, Plastics and Chemicals Industries Association, Melbourne
- Standards Australia, *AS 1692:1989 Australian standard for tanks for flammable and combustible liquids*, Standards Australia, Sydney

Standards Australia, *AS 3780:1994 Australian standard for the storage and handling of corrosive substances*, Standards Australia, Sydney

Standards Australia, *AS 4326:1995 Australian standard for the storage and handling of oxidizing agents*, Standards Australia, Sydney

Standards Australia, *AS 4326:1995/Amdt 1:1999 Australian standard for the storage and handling of oxidizing agents*, Standards Australia, Sydney

Standards Australia, *AS 3846:1998 Australian standard for the handling and transport of dangerous cargoes in port areas*, Standards Australia, Sydney

Standards Australia, *AS 1940:2004 Australian standard for the storage and handling of flammable and combustible liquids*, Standards Australia, Sydney

Standards Australia and Standards New Zealand, *AS/NZS 4452:1997 Australian/New Zealand standard for the storage and handling of toxic substances*, Standards Australia, Sydney, and Standards New Zealand, Wellington

Standards Australia and Standards New Zealand, *AS/NZS 3833:1998 Australian/New Zealand standard for the storage and handling of mixed classes of dangerous goods in packages and intermediate bulk containers*, Standards Australia, Sydney, and Standards New Zealand, Wellington

Standards Australia and Standards New Zealand, *AS/NZS 4681:2000 Australian/New Zealand standard for the storage and handling of class 9 (miscellaneous) dangerous goods and articles*, Standards Australia, Sydney, and Standards New Zealand, Wellington

Standards Australia and Standards New Zealand, *AS/NZS 4681:2000/Amdt 1:2001 Australian/New Zealand standard for the storage and handling of class 9 (miscellaneous) dangerous goods and articles*, Standards Australia, Sydney, and Standards New Zealand, Wellington

USEPA 2001, *Source water protection bulletin: managing above ground storage tanks to prevent contamination of drinking water*, Office of Water USA, Washington DC

WorkCover 1998a, *Dangerous goods guidelines: DG 063—spillage containment and bunding for package stores*, WorkCover Authority NSW, Sydney

WorkCover 1998b, *Dangerous goods guidelines: DG 072—spillage containment and bunding for tanks*, WorkCover Authority NSW, Sydney