Environmental Compliance Report

Liquid Chemical Storage, Handling and Spill Management

Part A

Compliance Audit

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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CONTENTS

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 A—compliance audit*, is a summary of the findings of the audit, looking at compliance with current DEC regulatory requirements. The second part, *Part B—review of best practice and regulation*, reviews the legislative regulations and best environmental management practices for industry and issues facing industry and regulators. Parts A and B of this report are being issued concurrently.

DEC conducted compliance audits on 52 licensed management facilities and 10 non-licensed premises regulated by DEC across NSW, that store and handle liquid chemicals and manage spills. Compliance assessments were also conducted on 9 premises regulated by local government, in partnership with the responsible council. It is therefore likely that issues identified in this report are typical of the management of liquid chemical handling across the industry generally.

The objective of the audits was to assess each enterprise's compliance with the operating conditions attached to the licence issued under the *Protection of the Environment Operations Act 1997* (POEO Act), or with the requirements of the POEO Act at non-licensed premises, in relation to liquid chemical storage, handling and spill management. A program of follow-up actions needed to address any non-compliances and improve environmental performance was outlined in the audits. This report is based on a collation of the audits' findings. It provides an insight into industry's overall compliance performance and a summary of other issues of environmental concern identified through 'further observations' during audits.

The procedures and protocols for conducting the audits are described in the DEC's *EPA compliance audit handbook*. The audits entailed a detailed site inspection and a review of records and documentation relating to the premises. DEC officers carried out the audits between June 2004 and February 2005.

The results show that industry could improve its compliance and environmental performance by:

- locating all bulk tanks and storing all packaged materials within large enough impervious secondary containment facilities that are roofed, wherever practicable, to prevent the potential contamination of rain water
- constructing all bulk tank secondary containment facilities to capture trajectory leaks
- placing all packaged materials within secondary containment facilities so that they cannot topple out of the facility
- regularly inspecting and maintaining all tanks and secondary containment facilities and removing any liquids that accumulate as soon as is practicable
- storing used containers and drums within secondary containment facilities
- undertaking delivery and dispatch operations in isolated areas that, where practicable, are roofed to prevent the potential contamination of rain water; having rollover bunds; and having drainage to a sump capable of containing the largest spill or leak likely to occur
- installing control equipment that automatically shuts off bulk liquid transfers to prevent overfilling during delivery or dispatch operations
- transporting packaged materials within areas that drain to well-maintained containment systems, such as stormwater pits fitted with gate valves or first flush systems, rather than directly to stormwater
- training all staff in standard operating procedures relating to deliveries, transfers, dispatches and transport within the premises
- identifying any potential risks that may result from liquid chemical storage and handling operations on-site, and developing appropriate incident management plans to manage them
- providing training to ensure that spills and leaks are dealt with effectively, and that incident management plans are properly implemented
- maintaining adequate spill clean-up equipment at appropriate locations throughout the site
- providing an adequate firewater containment system at the site to prevent contaminated firewater from entering the stormwater system.

DEC considers Parts A and B of this report to be valuable management tools that will allow industry 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 problems identified are being resolved at the audited sites, DEC will review all licences 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.

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.

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.

The activity of liquid chemical storage, handling and spill management has been chosen for the first audits of industry sectors for the comprehensive approach to environmental compliance.

DEC conducted compliance audits of 52 facilities across NSW that are licensed under the *Protection of the Environment Operations Act 1997* (POEO Act) to store and handle liquid chemicals and manage spills, 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 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. The 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.

Purpose of this report

Part A—compliance audit has been prepared to present the key findings of the compliance audits carried out on a representative sample of premises across NSW that store and handle liquid chemicals and manage spills.

DEC expects that Parts A and B will help industry to improve environmental performance when storing and handling liquid chemicals and when managing spills.

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).

Scope and criteria of audits and compliance assessments

The scope of the audits and compliance assessments was limited to activities related to liquid chemical storage, handling and spill management conducted at premises other than those relating to:

- liquefied gases (as the WorkCover Authority has stringent requirements for the storage and handling of these substances)
- storage within underground storage tanks (as DEC has a number of relevant programs dealing with the issues associated with these storage tanks)
- the activity of processing liquids (as the management of chemical processing activities was not the focus of the program).

The activities within the scope were assessed against the audit or compliance assessment criteria (i.e. the required performance standards) for the 24-hour period before the end of the inspection.

The audit or compliance assessment criteria for the three categories of regulated premises are provided on the next page under 'Regulation of the activity'. The type of information collected and the way that information was processed were essentially the same for each category.

Site selection

Three categories of regulated premises were audited or assessed. DEC-regulated licensed premises and DEC-regulated non-licensed premises were audited, and local-government-regulated premises were assessed in partnership with the responsible council.

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

The primary focus of the program was premises classified within the activity sectors listed in Schedule 1 of the POEO Act and therefore licensed by DEC. Sites within the classifications listed under the following scheduled activity sectors were considered most likely to be storing and handling liquid chemicals and managing spills. Scheduled activities previously or currently being audited were not included in this program. (For a full list of all the scheduled activities and the classifications under them, refer to Schedule 1 of the POEO Act.)

Scheduled activity sectors were:

- 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.

A further analysis was undertaken to identify particular premises within the above scheduled activity sectors to be audited. After consultation with the relevant DEC regional offices, 51

licensed premises were selected as a representative sample. Forty-eight of them are privately owned and operated, and three are State Government owned and operated. An additional licensed premises operated by DEC was also audited, giving a total of 52. (Refer to Appendix A for a list of licensed premises audited.)

As other sectors also deal with liquid chemicals, licensees in those sectors will be informed of the findings of the program.

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

DEC also regulates activities not listed in Schedule 1 of the POEO Act which are conducted by public authorities (State Government and local government agencies). Ten non-licensed premises regulated by DEC were selected as a representative sample of premises likely to be storing and handling liquid chemicals and managing spills. Four of these premises are owned and operated by DEC, three by other State Government agencies, and three by local councils. (Refer to Appendix B for a list of non-licensed premises audited.)

Premises for which local government is the appropriate regulatory authority

Premises not regulated by DEC are generally regulated by local government. Nine such premises were identified by the responsible councils and selected for compliance assessments. DEC officers accompanied local government officers during the compliance inspections, which provided an opportunity for information sharing between DEC and council regulators.

Regulation of the activity

See *Part B—review of best practice and regulation* for further information on the regulatory framework within which industry operates.

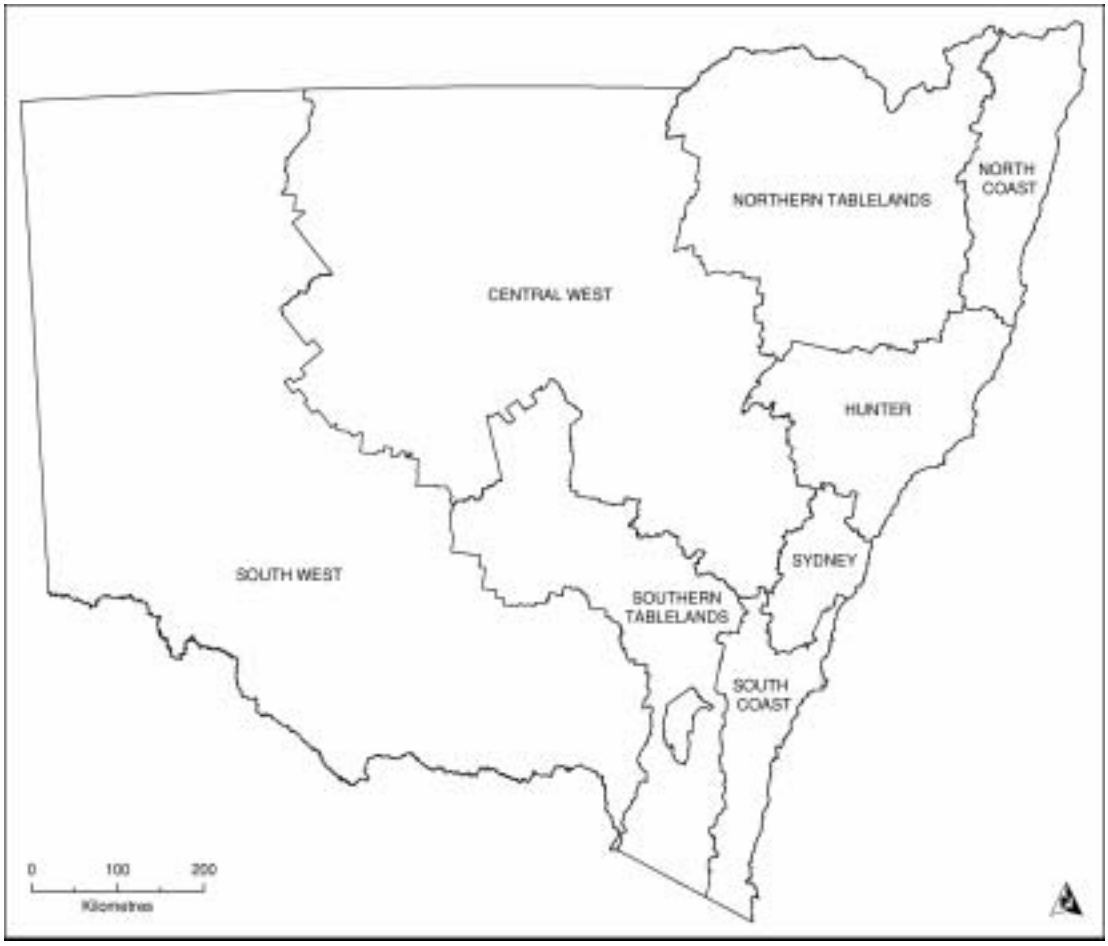
Premises for which DEC is the appropriate regulatory authority—licensed premises

Premises that meet certain criteria under Schedule 1 of the POEO Act must be licensed by DEC. DEC currently regulates 2544 licensed premises under the POEO Act, many of which store and handle liquid chemicals. The program identified those industry sectors most likely to be handling liquid chemicals, and Table 1 shows the number of premises within those industry sectors that were audited within each former Environment Protection Authority (EPA) region (shown in Figure 1). (Refer to Appendix A for a list of licensed premises audited.)

Table 1. Number of licensed premises audited in each former EPA region

Former EPA region	No of premises audited
Central West	1
Hunter	9
North Coast	1
Northern Tablelands	1
South Coast	6
Southern Tablelands	1
South West	3
Sydney	30
Total	**52**

Figure 1—Former EPA regions



This figure shows the former EPA boundaries as at the start of the program.

Conditions are attached to environment protection licences specifying the manner in which the licensed activity must be undertaken. The audit criteria for the licensed premises were limited to compliance with the following two mandatory standard operating conditions, which appear on all environment protection licences:

O1.1 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.*

O2.1 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.*

Compliance with any other operating conditions specifically relevant to liquid chemical storage, handling and spill management on a particular licence was also assessed.

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

These premises are not licensed but are regulated by DEC through the requirements of the POEO Act. The audit criteria for the non-licensed premises regulated by DEC were limited to compliance with the following three sections of the POEO Act, for the 24-hour period before the end of the audit inspection:

- **Section 116**—makes it an offence to allow any 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.

These sections of the POEO Act are provided in full in Appendix C. Four non-licensed premises owned and operated by DEC, three by other State Government agencies and three by local councils were audited. (Refer to Appendix B for a list of the non-licensed premises audited.)

Premises for which local government is the appropriate regulatory authority

Premises not regulated by DEC are generally regulated by local government through the requirements of the POEO Act. Local government areas where compliance assessments were conducted and the number of premises assessed are shown in Table 2.

Table 2. Local government areas and number of premises assessed

Local government area	Number of premises assessed
Blacktown	1
Botany	1
Kyogle	1
Orange	3
Shoalhaven	1
Wyong	2
Total	**9**

These premises were assessed to identify whether activities were being carried out in a competent manner and whether plant and equipment was being maintained and operated in a proper and efficient condition or manner. The compliance assessments also covered the 24-hour period before the end of the compliance inspection.

Audit methodology

The compliance audits were performed in accordance with the procedures and protocols in the *EPA compliance audit handbook* (copies are available from DEC's Pollution Line: 131 555). When an audit is completed, the findings are presented to the enterprise as an individual compliance audit report. Individual compliance audit reports are publicly available in the DEC Library on Level 15, 59–61 Goulburn Street, Sydney; phone (02) 9995 5302.

The audits were limited to a review of each enterprise's compliance with legislation administered by, or statutory instruments issued by, DEC. They are based on information from DEC files, information supplied by representatives of the enterprise and observations made during site inspections.

The audit reports contain an action program which outlines any non-compliances, recommended actions and agreed timeframes in which the enterprise must comply. DEC staff follow up on compliance audits to ensure that the enterprise is implementing the actions required of it in the report. DEC has a systematic and rigorous monitoring program that tracks these follow-ups to ensure that the enterprise completes all actions.

The findings presented in this report, *Part A—compliance audit*, are a collation of the findings presented in the individual compliance audit reports.

Compliance assessment methodology

Compliance assessments were conducted on the non-licensed council-regulated premises in accordance with a similar methodology to that of the audits. The compliance assessments were based on a review of any information on council files, information supplied by representatives of the enterprise and observations made during site inspections. The assessments were limited to determining whether the activities being undertaken on the premises related to chemical storage, handling and spill management were being carried out in a competent manner, and whether plant and equipment were being maintained and operated in a proper and efficient condition or manner.

The findings of the individual compliance assessments were provided to the relevant council, and DEC provided guidance to the councils on regulatory action when requested. Where relevant, the findings of the compliance assessments conducted on the non-licensed council-regulated premises are provided in the section of this report entitled ‘Summary of findings of compliance audits’.

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 facilities, 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 store, 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 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 also train their personnel in spill containment procedures and have spill kits in place (containing adequate spill response equipment such as absorbent material) where required. 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.

Summary of findings of compliance audits

This section of the report summarises the various issues identified in the 'non-compliances' and 'further observations' reported in individual compliance audit reports. For the DEC-regulated premises, the compliance of each premises with the conditions attached to the licence or the requirements of the POEO Act is described in the individual compliance audit reports for the premises as listed in appendices A and B.

The issues identified in the 'non-compliances' and 'further observations' reported in the individual compliance assessments of the council-regulated premises are also summarised here.

'Non-compliances' are reported where there is clear evidence of non-compliance with licence conditions or POEO Act requirements. When an issue of environmental concern was observed that did not strictly relate to the scope of the audit or assessment, the issue is reported as a 'further observation'. 'Further observations' are indicators of potential non-compliances, or areas where environmental performance can be improved.

This section also highlights practices observed during the DEC audit and assessment inspections that contributed to the competent environmental management of various issues.

The risks associated with the non-compliances identified at the DEC-regulated premises were assessed and colour-coded according to their environmental significance (see table 3 below).

Non-compliances were assessed against two criteria: the likelihood of environmental harm occurring and the level of environmental impact. The likelihood of environmental harm was determined by assessing:

- the quality of any preventive maintenance
- the level of training provided to operators
- the quality of any spill clean-up procedures
- the previous history of incidents at the site.

The level of environmental impact was assessed by considering factors such as the quantity and toxicity of the material and the sensitivity of the receiving environment.

After these assessments were made, information was transferred into the risk analysis matrix shown in table 3.

Table 3. Risk analysis matrix

	Likelihood of environmental harm occurring			
Level of environmental impact		***Certain***	***Likely***	***Less likely***
	High	**Code red**	**Code red**	**Code orange**
	Moderate	**Code red**	**Code orange**	Code yellow
	Low	**Code orange**	Code yellow	Code yellow

A non-compliance assessed as a 'code red' suggests that the non-compliance is of considerable environmental significance and therefore must be dealt with as a matter of priority. A non-compliance assessed as a 'code yellow' suggests that the non-compliance could receive a lower priority but must still be addressed.

Table 4 details the number of non-compliances found in each category during the audit process.

Table 4. Number of non-compliances found in each category at the audited premises

Colour code of non-compliance	Code red (highest risk)	Code orange	Code yellow (lowest risk)	Total
No of non-compliances	1 (1%)	8 (6%)	118 (93%)	127 (100%)

DEC is carrying out a systematic and rigorous process of follow-up actions to ensure that the operators of audited sites address all non-compliances reported. Follow-up actions required for audited sites can be found in the individual audit reports, which are publicly available in the DEC Library on Level 15, 59–61 Goulburn Street, Sydney; phone (02) 9995 5302.

Issues identified

In this section of the report the following symbols delineate between findings that have been reported in the individual audit reports as 'non-compliances' or as 'further observations':

- non compliances
- further observations.

Where issues are described in detail, the number of premises where an issue was identified is shown, followed by the colour code of the non-compliance signifying the associated environmental risk. The same non-compliance found at different premises can be associated with different colour codes for each premises. This occurs when the environmental risk associated with the non-compliance differs between premises. For example, the environmental risk from the storage of liquid chemicals without secondary containment is higher at a premises where a river or creek runs through the site than at premises where there is a greater distance to the nearest water body or to groundwater.

'Further observations' are issues that have been identified as being of environmental concern and could lead to non-compliances, but are beyond the scope of the audit. They do not have a colour code assigned. A small number of further observations not related to liquid chemical storage, handling and spill management have not been recorded here, but are being followed up at individual premises as part of ongoing compliance activities.

In some cases, a single non-compliance or further observation reported in an individual report includes a number of elements relating to more than one issue listed in the findings. For example, a single non-compliance may have resulted from an auditor noting that a bulk tank was corroding and that the bund surrounding the tank was also cracked. However, both these elements of the non-compliance are listed as separate issues in the findings. Therefore, the number of non-compliances does not equal the number of issues listed in the findings.

The issues of concern identified during the audits and assessments are summarised in table 5 and explained in the following section.

Table 5. Findings identified in the audits and assessments, and the number of premises at which those issues were identified

Issue	Category contributing to non-compliances and further observations	Number of premises at which issue was identified		
		DEC-regulated premises (62)	Council-regulated premises (9)	Total number of premises (71)
Water pollution and soil contamination				
	Bulk tank storage	23	2	25
	Packaged materials storage	31	3	34
	Used packages storage	5	0	5
	Liquid chemical handling	24	3	27
	Miscellaneous	11	1	12
Air pollution				
	Vapour recovery	3	0	3
	Miscellaneous	2	0	2
Emergency management				
	Emergency response plans	9	2	11
	Training	5	0	5
	Response infrastructure and equipment	8	2	10
	Firewater management	2	1	3
	Miscellaneous	9	0	9

The following premises had no non-compliances or further observations.
DEC-regulated premises:

- licensed premises—14 out of 52 (27%)
- non-licensed premises—four out of ten (40%).

Council-regulated premises:

- non-licensed premises—two out of nine (22%).

Water pollution and soil contamination

Surface water and groundwater are fundamentally interconnected, and it is often difficult to separate the two because they 'feed' each other. Groundwater, in a broad sense, is all water below the land surface, mostly in aquifers permeable enough to allow water to enter, move through and leave. Filtered down from the surface, groundwater may seep slowly for numerous kilometres over many years, eventually emerging naturally into rivers, springs or marshes. Surface water and groundwater may mobilise pollutants from a wide variety of sources and therefore may contain a variety of contaminants. Water contaminated with pollutants from land can reach surface and coastal waters via runoff from rain. These waters can also be polluted by recharge from contaminated groundwater.

Contaminated water can also infiltrate land to an extent where the land itself becomes contaminated and requires some form of remediation. Soil may also be contaminated through direct discharges of pollutants, and this in turn may result in water pollution if the contamination is mobilised.

Under Section 120 of the POEO Act 1997 it is an offence to pollute waters. Pollution of waters means introducing (whether through an act or omission) into waters any matter whether solid, liquid or gaseous that changes the physical, chemical or biological condition of the waters.

Additionally, it is also an offence to place material in a position where it is likely to fall, descend, be washed, be blown or percolate into any waters or the dry bed of any waters or into any drain, channel or gutter used or designed to receive or pass rain water, floodwater or any water that is not polluted. Waters include the whole or any part of a stream, river, lake, wetland, natural or artificial watercourse, dam, tidal waters and underground water.

Bulk tank storage

Any leaks and spills of liquid chemicals from bulk storage tanks that are not contained in appropriate secondary containment facilities have the potential to contaminate soil and groundwater and either drain or be flushed to waters, causing surface water pollution.

DEC-regulated premises

Bulk liquid chemicals were not being stored in a manner that would contain spills and leaks at 23 of the 62 DEC-regulated premises as follows.

Inadequate maintenance

- The secondary containment facility contained bulk tanks that were not properly or efficiently maintained due to walls or liners being cracked, expansion joints being opened up and sealant peeling off (6 premises—code yellow).
- The secondary containment facility contained bulk tanks that were not properly or efficiently maintained due to the accumulation of rain water not being removed as soon as practicable, compromising the capacity of the store (4 premises—code yellow).
- The secondary containment facility contained a bulk tank that was not properly or efficiently maintained due to the storage of equipment in the facility, reducing its capacity (2 premises—code yellow).
- The exteriors of bulk tanks or supports for tanks were not properly or efficiently maintained due to significant areas of corrosion, which may compromise the structural integrity of the tanks (2 premises—code yellow).
- The secondary containment facility contained bulk tanks that were not properly or efficiently maintained due to a build-up of oil or sediment, which could be mobilised and discharged from the facility (2 premises—code yellow).
- The secondary containment facility contained a bulk tank that was not properly or efficiently maintained due to the valve in the wall to drain rain water being left open (1 premises—code yellow).

Inadequate construction of secondary containment

- Trajectory leaks of material from tanks within the secondary containment facility were unlikely to be contained within the facility due to the store walls being too close to the tanks (5 premises—code yellow and 1 premises—code orange).
- The bulk tank secondary containment facility was constructed of blocks which were not sealed and therefore the bund wall was not impermeable (2 premises—code yellow).
- There was potential for the earthen secondary containment store facility to be permeable and not prevent soil contamination and groundwater pollution (1 premises—code yellow).
- The tank was located on a stand above and overhanging the secondary containment facility wall (1 premises—code yellow).

Inadequate capacity of secondary containment

- The capacity of the secondary containment facility was insufficient to hold the volume of liquid in the largest tank in the store (4 premises—code yellow).

- The capacity of the secondary containment facility was insufficient to hold the volume of the largest tank in the store due to the channel being sawed in or holes being drilled through the facility wall, reducing its capacity (2 premises—code yellow).

Lack of secondary containment

- The waste oil tank with no secondary containment was severely corroded and there was evidence of seepage to waters (1 premises—code yellow).
- The partially below-ground waste oil tank with no secondary containment had evidence of spills around the delivery port and no integrity testing was conducted on the tank (1 premises—code yellow).

Other

- Boiler water discharging within the secondary containment store caused mobilisation of pollutants on the store floor, resulting in increased likelihood of discharge of polluted water off-site (1 premises—code yellow).
- Grease trap wastes stored in a large, unlined, earthen, above-ground dam had the potential to cause soil and groundwater contamination (1 premises—code yellow).

Further observations

- No integrity testing or groundwater monitoring had been conducted for underground storage tanks (5 premises).
- There was no planned preventive maintenance program which could help prevent structural corrosion of bulk tanks and minimise the risk of liquid chemical escapes (1 premises).
- The walls of secondary containment facilities containing two treatment tank farms were constructed of unsealed bricks and not impermeable (1 premises).
- The scrubber tank which could intermittently hold elevated levels of anhydrous ammonia was not contained in the secondary containment facility (1 premises).
- The overhead fibreglass tank of process water was not contained within the secondary containment facility, and although any leakage could have been prevented from entering an adjacent stormwater drain when staff were in attendance, systems to prevent the pollution of waters needed to be in place at all times (1 premises).
- The concrete sewage storage tank had inadequate spill containment facilities (1 premises).
- The neutralising process tanks were not appropriately contained to prevent any spillage or leakage from discharging into stormwater (1 premises).
- A gate valve at the base of a secondary containment facility wall used for draining the store was in an accessible area with no sign or locking mechanism and, although the valve was shut, it could be left open, resulting in an accidental release of liquid chemicals to stormwater (1 premises).
- Areas containing bulk tanks draining to the trade waste treatment system may not be able to cope with a major spillage, as the treatment system would be compromised (1 premises).

Council-regulated premises

Bulk liquid chemicals were not being stored in a manner that would contain spills and leaks at two of the nine council-regulated premises, as follows:

- The bulk tank of heavy oil was on a stand not within the secondary containment facility (1 premises).
- The diesel storage tank had no containment, and the unloading stopcock was not locked, increasing the likelihood of vandalism, which could lead to soil contamination and groundwater pollution (1 premises).

All operators should identify any bulk liquid storage activities, including the storage of wastes, that may impact on the quality of water flowing from the premises, and ensure that appropriate controls are in place, such as locating tanks within adequately sized, well-maintained, impervious secondary containment facilities. The effectiveness of any controls should be monitored continuously.

Good practice observed during DEC audit inspections

- Individual tanks within a tank farm had separate secondary containment facilities, each connected to a pump-out system, which directed any liquid within the facility to a dedicated tank within the tank farm.

Packaged materials storage

Any leaks and spills of solid or liquid materials from, for example, intermediate bulk containers (IBCs), 200-litre drums and plastic containers that are not properly handled or stored in appropriate secondary containment facilities have the potential to contaminate soil and groundwater and either drain or be flushed to waters, causing surface water pollution.

DEC-regulated premises

Materials and wastes were not being stored in a manner that would contain spills and leaks at 31 of the 62 DEC regulated premises as follows.

Lack of secondary containment

- 20-litre containers, 200-litre drums and 1000-litre IBCs of liquid chemicals were stored in external sealed areas that did not have secondary containment and drained to stormwater (11 premises—code yellow, 1 premises—code red).
- 200-litre drums and 1000-litre IBCs of liquid raw materials were stored in external unsealed areas that did not have any secondary containment and where any leaks or spills could cause soil contamination or drain to stormwater (2 premises—code yellow, 1 premises—code orange).
- A number of 1000-litre IBCs, 200-litre drums or 20-litre containers of liquid chemicals were stored undercover but with inadequate secondary containment measures such as a rollover bund across entranceways (4 premises—code yellow).
- Waste or spill clean-up storage drums without lids were stored in an uncovered area, with no secondary containment, which drained off-site via a first flush system or oil–water separator (2 premises—code yellow).
- Unidentified liquid wastes were stored in 200-litre drums without lids on an unsealed surface with no secondary containment (1 premises—code orange).
- Polluted discharges to the stormwater treatment system were not minimised, as the temporary storage area containing hazardous waste recovery drums and a damaged 200-litre drum containing liquid chemicals did not have a secondary containment facility (1 premises—code yellow).
- Several 4-litre tins of paint were being stored on an uncovered shelf outside the chemical storage shed directly above a stormwater drain (1 premises—code yellow).

Inadequate maintenance

- Secondary containment facilities were not properly and efficiently maintained due to walls or floors being cracked or damaged (3 premises—code yellow).

- Secondary containment facilities were not properly and efficiently maintained due to the accumulation of liquids or rain water in sumps reducing the capacity of the facility to contain spills or leaks (2 premises—code yellow).
- The secondary containment facility was not properly and efficiently maintained due to pollutants from outside the bund being tipped into the sump, which was almost full and had limited capacity to receive any spills or leaks occurring within the store (1 premises—code yellow).
- The flammable goods store with secondary containment was not properly and efficiently maintained due to considerable amounts of debris in the collection sump, which could result in blockage of the submersible pump within the sump (1 premises—code yellow).
- 200-litre drums used for the storage of liquid wastes in the flammable goods secondary containment store were not properly and efficiently maintained due to drums being damaged and heavily corroded (1 premises—code yellow).

Inadequate location of packaged goods within containment facilities

- 200-litre drums of liquids were stored within a secondary containment facility, positioned where they could be dislodged or topple from the facility and rupture where spillage could enter waters (3 premises—code yellow).
- Waste oil drums were stored on the wall of the waste oil secondary containment facility (1 premises—code yellow).
- 200-litre drums of liquid chemicals were not completely stored on a bunded pallet, resulting in the likelihood of leaks from the drums entering a stormwater pit located in the vicinity (1 premises—code yellow).

Further observations

- 20-litre containers, 200-litre drums or 1000-litre IBCs of liquid chemicals were stored without secondary containment (6 premises).
- 1000-litre IBCs of liquid chemicals were stored in a secondary containment facility with limited capacity, fitted with a valve which had the potential to fail (1 premises).
- Oils and grease were stored in areas with inadequate security, as the area was easily accessible to the public at any time (1 premises).
- Drums of fuel for rapid refuelling of helicopters were stored next to landing pads without secondary containment (2 premises).

Council-regulated premises

Packaged liquid chemicals were not being stored in a manner that would contain spills and leaks at three of the nine council-regulated premises, as follows.

- A significant number of 20-litre containers, 200-litre drums and 1000-litre IBCs of liquid chemicals, including flammable materials, were stored in roofed areas without secondary containment, from where any leaks or spills could flow out of the entrance and enter stormwater drains located nearby (1 premises).
- Numerous 20-litre containers of liquid chemicals were stored undercover but in areas without secondary containment, from where any leaks or spills could flow outside to stormwater or penetrate through joints in the floor of the building and contaminate soil and groundwater (1 premises).
- The secondary containment facility was not properly and efficiently maintained due to the deterioration of the mortar in the brick walls, which may allow the escape of any spill or leak (1 premises).

All operators should identify the storage of any packaged materials, including wastes, that may reduce the quality of water flowing from the premises, and ensure that appropriate controls are in place such as storing the packaged materials in adequately sized, well-maintained, impervious secondary containment facilities. The effectiveness of any controls should be monitored continuously.

Used packages storage

Poor storage and management of used packages can allow liquid chemicals to contaminate soil and groundwater or drain or be flushed to waters, causing surface water pollution.

DEC-regulated premises

Used packages were not being stored and managed in a manner that would prevent the pollution of waters at four of the 62 DEC-regulated premises as follows.

- Numerous 'empty' containers and several 'empty' 200-litre drums, some of which contained residues and were accumulating significant quantities of rain water, were being stored in an area that drains directly to stormwater, and any leaks or spills from these containers and drums had the potential to enter the stormwater inlet drain in the area (1 premises—code yellow).
- Used 200-litre drums were stored on a loading ramp which was discoloured as a result of previous chemical spills, and there was insufficient cover to prevent any rainfall from mobilising any spilt material to a stormwater inlet drain located in the vicinity (1 premises—code yellow).
- Some of the used empty drums in a large store of empty drums were corroding, and any residues could have polluted stormwater (1 premises—code yellow).
- Empty containers were increasing the pollutant load on the stormwater treatment system (1 premises).
- Disused liquid chemical drums and containers, many without lids or in a semi-crushed state, were stored in unroofed and unsealed areas without any secondary containment (1 premises).

All operators should identify the storage of any used packaging that may adversely affect soil and groundwater or the quality of surface water flowing from the premises, and ensure that appropriate controls are in place. For example, if any residues remain, the containers must be maintained in good condition with their lids on and be stored in areas where the containers will not be damaged, preferably within a secondary containment facility. The possibility of used drums containing sufficient residues to form explosive mixtures or becoming distorted and eventually rupturing in extreme heat also needs to be considered. The effectiveness of any controls should be monitored continuously.

Liquid chemical handling

Liquid chemical handling includes transfers (delivery and dispatch) and transport within the premises. Poorly designed, installed or maintained delivery and dispatch areas, pipework or areas where packaged materials are transported within the premises could allow liquid chemicals to contaminate soil and groundwater or to drain or be flushed to waters, causing surface water pollution.

DEC-regulated premises

Delivery and dispatch areas had not been installed or were not being operated, and transport within the premises was not being undertaken, in a manner that would prevent spills or leaks polluting waters at 24 of the 62 DEC-regulated premises as follows.

Inadequate containment of bulk transfer operations

- A flexible hose with signs of leakage used to transfer waste water, was located outside the waste water tank secondary containment facility, as the store was too small to accommodate the hose (1 premises—code yellow).
- The transfer of bilge water by flexible hose was not in accordance with procedures, as no operator was overseeing the transfer, and any leak or escape of liquid chemicals would enter the harbour and may continue undetected (1 premises—code yellow).
- There was no spill or leak containment for the coupling on the flexible hose transferring bilge water from a bulk tank located adjacent to the harbour (1 premises—code yellow).
- Valves for bulk tanks were located so spills and leaks could flow outside the contained delivery area to a first flush retention basin which was not designed to treat surface water contamination of this kind (1 premises—code yellow).
- The delivery bay was not covered; the sump located in the bay had insufficient capacity to hold the contents of a road tanker compartment, and was located near a stormwater drain inlet (1 premises—code orange).
- Uncovered tanker bays where the bulk product was dispatched had evidence of spills, and no containment devices were in place to prevent spills from entering the wastewater treatment plant, which regularly discharged partially-treated waste water (1 premises—code yellow).

Inadequate containment of packaged goods transfer operations

- Although a dedicated area with secondary containment was available for packaged products being transferred, products were temporarily stored in an area which flowed to stormwater (2 premises—code yellow).
- 205-litre drums and 1000-litre IBCs were unloaded and temporarily placed in an area immediately adjacent to a stormwater drain inlet (1 premises—code yellow).
- 205-litre drums and 20-litre containers of liquid chemicals were stored in a loading bay which did not have any liquid chemical containment facilities (1 premises —code yellow).
- The delivery area did not have secondary containment (1 premises—code yellow).

Inadequate maintenance

- The loading bay was not properly and efficiently maintained due to deterioration of its concrete surface, increasing the risk of any spills or leaks of liquid chemicals which could result in soil contamination and groundwater pollution (2 premises—code yellow).
- The bulk liquid chemical delivery/dispatch area was not being properly and efficiently maintained due to leaks from valves or piping adjacent to the tank not being cleaned up, and stains indicated that past spills and leaks had not been properly cleaned up in a timely fashion (1 premises—code yellow).
- The delivery area was not being properly and efficiently maintained, as the surface of the area was cracked (1 premises—code yellow).

Inadequate control equipment

- No appropriate control equipment such as level indicators or high-level alarms was installed on the tanks to prevent overflows during deliveries (1 premises—code yellow).

- There was no automatic control equipment to stop pumping of the product into tankers if a significant spill occurred (1 premises—code yellow).

Inadequate management of stormwater systems

- The stormwater pond (which supplied process water and stored contaminated stormwater) had an oily appearance on the surface and was full, and therefore had no capacity to retain any spilled material (1 premises—code orange).
- There were no regular checks on the stormwater pit system, and therefore it was likely that the capacity of the pit would be compromised (1 premises—code yellow).
- The first flush system was not being properly and efficiently maintained, as the pits were full of accumulated rain water and therefore would not be capable of containing any major spills which may occur (1 premises—code yellow).
- The stormwater drain inlet in the area where liquid chemical transfers occurred was clogged with sludge from spills and dust accumulations, and any blockage could have caused the pooling of rain water in the area, potentially compromising the effective containment and management of any spills or leaks (1 premises—code yellow).
- An oil interceptor, through which stormwater was discharged off-site, was not being properly and efficiently maintained due to the build-up of oily wastes and residues in the lower half of the interceptor (1 premises—code yellow).

Further observations

- Deliveries of bulk liquid chemicals occurred in areas without secondary containment, and the coupling points between the mobile tanker and the tank were not within a contained area (2 premises).
- Delivery and dispatch areas where packages of liquid chemicals were transferred to were not roofed or fitted with secondary containment, and stormwater drain inlets in the vicinity were not covered during delivery and dispatch operations (1 premises).
- Drains in the area where packages of liquid chemicals were unloaded and delivered into the dangerous goods stores were not covered during the unloading operation, and no spill kits were located in the immediate area (1 premises).
- The detention pit designed to capture and contain any spillage which could occur during the delivery and dispatch operations drained directly to stormwater and had insufficient capacity to contain the largest packages transferred in the area (1 premises).
- Although transfers occurred in an area that drained to stormwater pits that had gate valves that were normally closed and opened only in wet weather, deliveries and dispatches occurred during wet weather when the valves in the pits were open, resulting in the potential for any spills or leaks which occurred during these periods to be discharged off-site (1 premises).
- Although delivery hoses were tested annually and the delivery operations were attended during the entire discharge, deliveries of caustic soda occurred in an area without secondary containment, and the coupling points between the mobile tanker and the delivery hose and between the delivery hose and the pipe to the storage tank were outside the tank's secondary containment facility (1 premises).
- Drip collection systems from the bulk filling mechanism drained to a 1000-litre IBC which did not have secondary containment (1 premises).
- The sump installed to collect spills during dispatches had not been pumped out and had no capacity to contain any spillage which may occur (1 premises).

- The refuelling of forklifts by a mobile tanker occurred in an area without secondary containment, which drained to a wastewater treatment plant on an adjacent site over which the licensee had no control (1 premises).
- Any spillage that occurred in the area surrounding the refill point for underground storage tanks could flow to stormwater drains (1 premises).
- There was evidence of spillage around transfer points for the bulk diesel tank, and no containment provisions for any leak or spill that could occur (1 premises).
- The bowser for fuelling forklifts located in an unsealed area had stains around it indicating that spillage had occurred which could contaminate soil, surface water and groundwater (1 premises).
- There were no controls to prevent leaks or spills of liquid chemicals, delivered by bulk road tanker to an uncovered road tanker bay, draining to the waste water treatment plant and compromising the plant's ability to adequately treat waste liquid (1 premises).
- Uncontaminated roof water was directed to the contaminated stormwater catchment, increasing the quantity of water requiring treatment (2 premises).
- There was insufficient capacity in the first flush collection tanks (1 premises).
- The performance of the oil–water separator processing stormwater before discharge was not regularly checked (1 premises).

Council-regulated premises

Delivery and dispatch areas had not been installed or were not being operated, and transport within the premises was not being undertaken in a manner that would prevent spills or leaks polluting waters at three of the nine council-regulated premises as follows.

- Drain covers were not placed over the stormwater pits, and no spill kits were located in the immediate vicinity, when packages of liquid chemicals were unloaded and loaded by forklift in an unroofed area without secondary containment (2 premises).
- Transport of 20-litre containers of liquid chemicals within the premises occurred in areas that drained directly to stormwater (1 premises).

All operators should identify any delivery and dispatch operations and any on-site transport operations that may reduce the quality of water flowing from the premises and ensure that appropriate, well-maintained controls are in place. Such controls may include locating delivery and dispatch operations undercover in an area surrounded by rollover bunds with drainage to a sump, and ensuring that any external areas through which packaged materials are transported drain to a stormwater detention system such as a first flush collection system. Controls should be in place to segregate clean stormwater, such as roof water, from potentially contaminated stormwater to limit the quantity of contaminated water that may have to be treated before discharge. The effectiveness of any controls should be monitored continuously.

Good practices observed during DEC audit inspections

- Tankers that arrived on-site to deliver bulk loads of liquid chemicals were registered on an electronic system to ensure that each chemical was delivered to the correct tank. The driver of each tanker had a card that contained information about the contents of the tanker (chemical type and volume). The card was registered at the front gate, and the information on it was cross-checked with other delivery documentation. The acceptance of the information on the card automatically prepared the correct loading area for transfer, and all other areas remained closed. This minimised the risk of incompatible chemicals coming into contact and the available volume for deliveries being exceeded.

- Unauthorised access to the bulk road tanker loading bays was prevented by requiring tanker drivers to key a code into the controlling computer system to gain access. The pumping systems at the bays were fitted with overfill protection devices, and a vigilance control had be activated every three minutes by the tanker driver during loading.
- Even though the plastic pipe carrying trade waste adjacent to a stormwater drain had a 100-year guarantee, the licensee considered that the joints may be relatively vulnerable and therefore encased the pipework in a larger galvanised pipe, which drained to several large sumps that could be pumped out.
- A number of sites had valves installed in the stormwater pits located in unroofed areas where chemicals were transported. These valves were kept shut other than during a significant rain event, so any spills which could occur during normal operating conditions were captured.
- To prevent damage and potential leaks from 205-litre drums during transport by forklift within the premises, the drums were placed in plastic containers during transport.

Miscellaneous

A variety of other practices which may be undertaken at premises had the potential to result in liquid chemicals draining or being flushed to waters, causing water pollution.

DEC-regulated premises

Other practices with the potential to result in water pollution were noted at 11 of the 62 DEC-regulated premises as follows.

- A significant number of disused, large, lead acid batteries were stored in an unroofed area without secondary containment from where any leaks were likely to be flushed to waters (3 premises—code yellow).
- A disused electricity transformer likely to contain oil contaminated by polychlorinated biphenyls (PCBs) was stored in an area without secondary containment from where any leaks were likely to be flushed to waters (1 premises—code yellow).
- The valve in an area where full sample bottles were located was open, increasing the likelihood of soil or groundwater pollution (1 premises—code yellow).
- Pollutant and hydraulic loads on stormwater treatment devices were not kept to an absolute minimum to ensure that any off-site discharges did not pollute waters (1 premises).
- Secondary containment facilities containing incompatible materials in the process area drained to a common area, increasing the risk of mixing (1 premises).
- A small quantity of disused lead acid batteries was stored in an unroofed and unbunded area from where any leaks could be flushed to coastal waters (1 premises).
- An operating electricity transformer had defective bunding due to extensive cracking of the brickwork and pipework through the bund wall (1 premises).
- Cooling towers did not have any containment facilities to trap spillages or leaks of liquids (1 premises).
- Monitoring of the ongoing operation was lacking, and there were no records of maintenance of ageing sumps, and no groundwater monitoring to assess any impacts that may have occurred (1 premises).
- The inventory system used to track containers of chemicals dispatched from the depot for use within a large area did not include a ‘cradle to grave’ approach for all chemicals and containers dispatched (1 premises).

- The storage pond containing contaminated pesticide residue from the wash-down bay for farm machinery was too small, as the pond was close to overflowing and a significant rain event could cause the pesticide residue to overflow, resulting in harm to the environment (1 premises).

Council-regulated premises
Other practices with the potential to result in water pollution were noted at one of the nine council-regulated premises as follows.

- Process tanks containing liquid chemicals, with easily accessible valves at the bottom, were located in an area without secondary containment which drained to stormwater (1 premises).

All plant and equipment that incorporates, for example, tanks, reservoirs and pipe systems, which may contain liquid chemical pollutants, should be stored or housed in a manner which minimises the potential for the liquid chemicals to pollute waters. Wherever practicable, such plant and equipment should be located in an impervious bunded area or in an area which drains to an appropriate stormwater treatment system.

If equipment contains PCBs, the PCB Chemical Control Order 1997 (CCO) may apply. The CCO sets out controls for storing PCB materials and wastes. It requires people storing PCBs to survey potential PCB-containing equipment, develop emergency management procedures, and remove PCBs from equipment or process them to reduce levels within specified timeframes.

Good practice observed during DEC audit inspections

- Items such as used lead acid batteries and oil filters were stored in trays or drums with covers to prevent the ingress of stormwater.

Air pollution

Air pollution arising from industries which store and handle liquid chemicals can include vapours or odours that can be harmful to human health and the environment. The release of vapours may reduce local and regional air quality, and odours may affect local amenity. Sections 124–128 of the POEO Act cover the operation and maintenance of plant, materials and the standards of air impurities not to be exceeded. Section 129 of the POEO Act prohibits the emission of an 'offensive odour' from licensed premises. The POEO (Clean Air) Regulation 2002 contains a number of requirements regarding vapour recovery from bulk storage tanks and emissions from various other plant materials.

Vapour recovery

Vapour transfer systems direct vapours that are displaced as the tanks are filled back to the mobile tanker. The POEO (Clean Air) Regulation 2002 requires that tanks storing volatile organic liquids and with a capacity of between 8 and 150 kilolitres have vapour transfer systems, if they are located in the Sydney metropolitan area. However, tanks located in the Hawkesbury local government area are exempt, and any tanks with a throughput of less than 600 kilolitres a year may be exempt.

Tanks larger than 150 kilolitres anywhere in the Sydney, Wollongong or Newcastle metropolitan areas containing volatile organic liquids with a vapour pressure at or below 75 kPa are required to have a floating metal roof or cover, or a vapour recovery or disposal system. Such tanks

containing volatile organic liquids with a vapour pressure above 75 kPa are required to have a vapour recovery or disposal system.

DEC-regulated premises
Issues relating to vapour recovery were identified at three of the 62 DEC-regulated premises as follows.

- Underground storage tanks with a capacity of greater than 8 kilolitres were vented to the atmosphere and not fitted with a vapour transfer system to contain vapours displaced during filling (3 premises).

All operators should familiarise themselves with the POEO (Clean Air) Regulation 2002, assess their tanks and ensure that all control equipment required by the Regulation is installed and operated as necessary.

Miscellaneous

A variety of activities, such as decanting liquid chemicals, cleaning drums and leaving lids off drums, may contribute to local or regional air pollution. The collective effect of a number of limited odour sources may cause odours off-site, particularly during unfavourable weather.

DEC-regulated premises
Issues relating to potential air pollution were identified at two of the 62-DEC regulated premises as follows.

- Anaerobic processes occurring in a waste water storage and treatment dam could result in the generation of odour when the liquid is aerated or applied to the irrigation area (1 premises).
- A warehouse used to store solvents had open doors, and strong solvent odours were detected outside the building that had the potential to migrate off-site and affect neighbouring industrial premises (1 premises).

All operators should identify activities, plant and equipment that have the potential to cause air pollution, including odours. Appropriate maintenance and monitoring schedules should be implemented to ensure that emissions comply with the POEO Act. Control equipment such as ducting to afterburners, scrubbers, biofilters or activated carbon filters may be required to prevent uncontrolled releases. Operational procedures and process controls that minimise air emissions from the site should be developed and implemented. The effectiveness of these controls should be monitored continuously.

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). The scale and complexity of incident management planning required at a premises is proportional to a number of factors, including the size of the facility, its location, the nature of chemicals and operations on the site, and the number of staff. Inadequate and inappropriate incident management, such as untrained or poorly trained staff flushing spills or leaks down stormwater drains, can cause serious pollution incidents.

Emergency management plans

Inadequate emergency management plans can allow liquid chemicals to pollute the ground, water and air.

DEC-regulated premises

Inadequate emergency management plans were noted at nine of the 62 DEC-regulated premises as follows.

- No formal emergency management plan had been developed to deal with emergencies that may occur on the premises (3 premises—code yellow).
- No formal emergency management plan was in place to manage spills and leaks (1 premises—code yellow).
- The emergency management plan was unlikely to be able to deal with all types of environmental issues that would occur on-site; e.g. dealing with the overflow from the stormwater collection pit (1 premises—code yellow).
- The emergency management plan in place at the site had not been updated and did not contain a section on firewater containment (1 premises—code yellow).
- The emergency management plan did not address the management of spills of non-hazardous materials; provide details of the stormwater system on the site; indicate where spill equipment or Material Safety Data Sheets were located; provide information on how firewater may be contained; or indicate where an up-to-date inventory of pesticides in the store could be found (1 premises—code yellow).
- The emergency management plan did not include details that would be of assistance in dealing with emergencies; e.g. a plan of the premises, an inventory of chemicals and a plan of the stormwater system on the site (1 premises).
- Inadequate procedures for the management of spill material were in place at the site. A Hazmat recovery capsule containing toluene diisocyanate collected from another site was being stored on the site, and site management did not appear to be aware that the contents of the drum were highly toxic and that the drum had been on the site for 9 months (1 premises).

Council-regulated premises

Inadequate emergency response plans were noted at two of the nine council-regulated premises as follows.

- There was no plan in place to deal with emergency situations which could arise from the weekly transfer of waste liquids from a 10-kilolitre tank via a rubber hose to the sewer 80 metres away, in a sealed area that drained to a nearby creek and wetland (1 premises).
- Site management had limited capacity to deal with any emergencies which may arise, as potential hazards such as fires or spills had not been identified, and strategies to deal with the hazards, including training and installation of appropriate spill equipment, had not been developed or implemented (1 premises).

Emergency management plans should be prepared in consultation with relevant emergency services and regulatory authorities (e.g. WorkCover, fire brigades, DEC). They should be regularly reviewed and include procedures for dealing with fires, explosions, the reaction of incompatible substances, the management of significant spills and firewater management as appropriate. They should also include a plan of the site and note the location of all chemical storage areas, emergency response equipment (including spill kits) and stormwater infrastructure. A manifest of all chemicals and their locations on-site should also be available. A system should be in place to record any incidents and their causes and to prompt actions to prevent further similar incidents.

Training

Inadequate training can allow liquid chemicals to pollute the ground, water and air.

DEC-regulated premises

Inadequate training was noted at five of the 62 DEC-regulated premises as follows.

- Operational staff (other than the plant manager) had not received formal training in dealing with emergencies that may occur on the premises (2 premises—code yellow).
- Although documents indicated that drills would be conducted, no drills had been undertaken for approximately 2 years, and significant volumes of chemicals and wastes were stored on-site adjacent to a creek (1 premises—code orange).
- Training of staff in spill management was limited to reminding them that pollutants should not be placed in the stormwater drains; no training was provided in the use of the spill kits or drain covers located on the site (1 premises—code yellow).
- Limited training was provided to staff in spill procedures, including the maintenance and use of spill equipment at a site located adjacent to the harbour (1 premises—code yellow).

Induction training should be provided to all employees regarding procedures pertaining to, for example, liquid chemical delivery and dispatch, spill clean-up, fire management and explosions. The training material should be reviewed regularly and updated as necessary. Refresher training should be provided regularly, and records of any training should be kept.

Good practices observed during DEC audit inspections

- All staff employed on the site were trained in fire fighting and in the handling of chemicals, increasing the likelihood that spills and emergencies would be competently managed, and any detrimental impacts would be minimised.
- To complement training, signs were erected in each storage area providing contact telephone numbers and clear and comprehensive instructions on procedures to be followed in the event of emergencies, including those involving spills and leaks.

Response infrastructure and equipment

Inadequate response infrastructure and equipment can allow liquid chemicals to pollute water and air.

DEC-regulated premises

Inadequate response equipment was noted at eight of the 62 DEC-regulated premises as follows.

- The spill kit was not effectively maintained, as the spill response equipment (e.g. absorbent materials, absorbent booms) had not been replenished after use (1 premises—code yellow).
- The spill kit for the emergency management of spills was not being properly and efficiently maintained, as the kit did not contain the suite of spill response equipment and materials listed on its lid (1 premises—code yellow).
- The location of spill kits was not well understood by staff (one kit was being used as a rubbish bin), and a drain cover was missing from its holder in the dangerous goods store delivery area (1 premises—code yellow).
- Only one spill kit was located on-site, and this was positioned away from the major chemical stores (1 premises—code yellow).
- Class 6 (toxic) chemicals were stored on-site, and there were no empty Hazmat drums on-site to contain any spill clean-up material (1 premises—code yellow).

- The spill kit for the dangerous goods store was being used elsewhere, indicating that insufficient spill clean-up equipment was available on site to manage all incidents likely to occur (1 premises—code yellow).
- There was no documented system to ensure that spill kits were all properly stocked and maintained; drain covers were not available for use during liquid chemical transfers (1 premises—code yellow).
- Spill berms were not clearly marked or easily accessible in the event of an emergency (1 premises).
- The location of the existing spill kit was not well understood by staff, and other areas on site where spills and leaks could occur did not have spill kits located in the immediate area (1 premises).
- Fire extinguishers were not located in readily accessible areas, and extinguishers were not inspected and serviced regularly (1 premises).

Council-regulated premises

Inadequate response equipment was noted at two of the nine council-regulated premises as follows.

- The spill kit was not adequate to deal with the size of spills that could occur on-site (1 premises).
- There was no spill kit on premises where liquid chemicals were stored and transferred near stormwater drains (1 premises).

Infrastructure may include retention tanks, first flush systems and valves in stormwater pits. Incident response equipment should include a range of absorbent material, an appropriate number of recovery drums compatible with the substances which may be put in them, neutralisers, equipment to block drains, and portable pumps. Where appropriate, the equipment should be kept on, for example, a pallet for quick transport to an incident site.

Good practice observed during DEC audit inspections

- A number of 'spill trailers' which could be readily moved to different locations as necessary and were equipped with a wide range of clean-up equipment (e.g. booms, absorbent materials, shovels, brooms) were maintained on-site.

Firewater management

Inadequate firewater management can enable liquid chemicals to cause water pollution.

DEC-regulated premises

Inadequate firewater management was noted at two of the 62 DEC-regulated premises as follows.

- No systems were in place to contain contaminated firewater likely to be generated in the event of a significant fire at the site (1 premises—code orange).
- The stormwater pond (which supplies process water and retains firewater) had an oily appearance on the surface and was full, and therefore had no capacity to retain any firewater (1 premises—code orange).

Council-regulated premises

Inadequate firewater management was noted at one of the nine council-regulated premises as follows.

- There was no system to retain firewater, and firewater from outside the main building was likely to enter the stormwater system (1 premises).

All operators should identify any operations or areas from which contaminated firewater may be discharged in the event of a fire, and ensure that appropriate, well-maintained controls are in place. Such controls may include adequate containment, and pumping and storage systems. Appropriate procedures and training should be in place to ensure that any systems are operated correctly when required.

Miscellaneous

A variety of other practices could result in inappropriate incident management resulting in water or air pollution.

DEC-regulated premises

Other practices which may cause inappropriate incident management were noted at nine of the 62 DEC regulated premises audited as follows.

- A number of 1000-litre IBCs in storage had more than one dangerous goods label attached and had additional information written in permanent marker, resulting in incorrect and unclear signage, increasing the risk of ineffective management of leaks and spills and increased danger in an emergency (1 premises—code yellow).
- There were incompatible materials stored in the 'flammable goods store': i.e. 205-litre drums with a hazardous goods classification of 4.2 (spontaneously combustible) and material with UN Substance Identification Number 3190 (self-heating solid) (1 premises—code yellow).
- Tanks of flammable volatile organic liquids were not clearly marked as 'Class 3 Flammable' (1 premises—code yellow).
- One liquid waste tank available to hold any recovered spillage did not have secondary containment, and the other did not have secondary containment capable of containing the maximum storage capacity of the tank. No procedure appeared to be in place to deal with incompatible substances being placed in the tanks (1 premises—code yellow).
- Oil and grease residues indicative of previous spills had not been cleaned up as part of normal maintenance and increased the risk of water pollution, particularly during significant rain events (1 premises—code yellow).
- Material for which the Material Safety Data Sheet states 'do not mix with acids as chlorine gas may be emitted' was stored with an acid (1 premises).
- Poor housekeeping made a bulk storage tank inaccessible, which could hinder any emergency response (1 premises).
- The flammable liquid cupboard was located near the ammunition cupboard (1 premises).
- Maintenance was conducted on an as-needs basis only, and as no preventative maintenance program was in place, the risk of plant failure, which could result in liquid chemical leaks and spills, was potentially increased (1 premises)
- Labels on drums in the poisons store did not enable contents to be easily identified (1 premises).

All operators should identify any potential areas or practices which may result in incidents not being managed appropriately. For example, all packages should be clearly labelled, systems should be in place to ensure that incompatible materials are not mixed during any incidents, and spill recovery drums and tanks should have appropriate secondary containment. Up-to-date Material Safety Data Sheets should be readily available to ensure access to information about the harmfulness of the chemicals stored on the premises.

Good practice observed during DEC audit inspections

- A checklist, completed by the environmental manager three times a day, identified key chemical delivery and storage areas, key drains, sumps and bunds, key control valves and the various spill kits for status checks.

See *Part B—review of best practice and regulation* for additional information on preventing adverse environmental impacts.

Related DEC programs

Prospect Creek stormwater campaign

The 'Improving the Prospects of Our Creek' project involved the collaboration of DEC, Fairfield and Holroyd city councils and Sydney Water. Prospect Creek had been polluted a number of times, including by a major insecticide spill which occurred when an IBC split open during transfer and devastated aquatic life in the creek. The project aimed to reduce the number of water pollution incidents in the creek by improving the environmental performance of businesses in Wetherill Park and Smithfield, in Sydney's south-west.

Forty stormwater samples were collected from industrial subcatchments during dry weather. Once the high-risk stormwater subcatchments were identified, the former Environment Protection Authority, the councils and Sydney Water inspected 280 businesses. The inspections targeted activities such as liquid chemical storage that had the potential to cause stormwater pollution.

Of the 49 DEC-licensed premises inspected, 37 required follow-up action. The main issues identified included:

- inadequate storage of chemicals, drums and batteries in external areas
- absence of bunding across doorways and around chemical storage areas
- inadequate maintenance of existing bunding
- the need to install or upgrade first flush systems
- inadequate separation of clean and dirty areas, resulting in cross-contamination.

The DEC required any necessary corrective measures to be implemented.

Of the 231 premises inspected by the councils, 96 required follow-up action. The main issues identified included:

- inadequate bunding of chemical storage areas
- the need to install spill clean-up equipment.

The councils are following up any premises that required corrective measures to be implemented and may take further enforcement action as necessary.

Council works depot compliance inspection program

DEC's Sydney Region has produced a guide titled *Council depots: a guide to preventing and reducing environmental impacts*. The guide was sent to works directors in all 43 councils in the Sydney Region. DEC's Cleaner Industries Unit also produced a module titled *Stormwater management for council depots*. A compliance inspection program, designed to assist and build the capacity of councils and to regulate council operations, was also developed and is described in the next paragraph.

A DEC officer inspects a depot with the depot manager, and the council is invited to comment on the draft compliance inspection report to identify any factual errors or to notify DEC of works already carried out. The final report, including the council's comment, is sent to the council's general manager asking the council to develop an action plan to address identified issues (with an offer of assistance from DEC) and advising that DEC will re-inspect the depot in 6 months. All areas of the depot, including mechanics workshops, painting and signwriting areas, vehicle refuelling areas and chemical storage areas are inspected. The depot's compliance with the POEO Act is assessed, and feedback and advice on how to comply or to improve environmental performance are provided.

To date, 33 depots have been inspected, and all have required follow-up action. The main issues identified included:

- inadequate bunding and roofing of refuelling areas
- inadequate bunding and storage of liquid chemicals, including bunds constructed from porous materials
- lack of general stormwater protection, including drains not clearly marked
- absence of bunding across doorways leading into external areas
- spill kits being used as rubbish bins.

Most councils resolved urgent or easily fixed problems within a few weeks and signalled their intention to remedy all remaining problems in a matter of months. Several councils have indicated that the depot program has prompted internal audits of the depot, allocation of funds for improvement works that would otherwise not have taken place, and environmental training for depot staff.

Waste compliance campaigns

DEC's Sydney Waste Section has undertaken a compliance and enforcement program focusing on high-risk waste issues. The program uses a broad range of compliance tools such as targeted inspections, enforcement actions and education. Twenty-four campaigns have been conducted to date, and those associated with the storage, handling, transport and disposal of chemicals and wastes are summarised below.

A targeted inspection campaign has been undertaken on a wide range of licensed manufacturing and service industry premises that generate wastes. Compliance was checked against storage, handling and waste tracking requirements. Approximately half of the 78 premises inspected had issues, including:

- risk of stormwater pollution from incorrectly stored waste
- unsatisfactory waste storage arrangements
- discharge points which needed further investigation.

Where necessary, licensees were required to implement corrective measures to ensure compliance.

Inspections have also been undertaken on 25 licensed and 15 non-licensed premises that generate liquid waste, to assess compliance with waste storage, handling, tracking and disposal requirements. Sixty-five percent of the licensed sites and 33% of the non-licensed sites had issues, including:

- storage of waste or chemicals in unbunded areas
- drums of chemicals stored inappropriately in bunded areas
- storage of waste or chemicals in unsecured areas
- spill management plans not implemented
- spill equipment not available
- integrity of ageing tanks not tested
- adequacy of waste water treatment systems not verified.

Letters outlining the non-compliances detected were sent to licensees, requiring them to notify DEC of any corrective action taken. Non-compliances noted at non-licensed premises were followed up by the council officers that accompanied DEC officers during the joint inspections of those premises.

A subsequent campaign was conducted focussing on businesses that generate liquid wastes from the use and production of inks, dyes, paints, lacquers and varnishes, 'waste basic solutions' and 'waste acidic solutions'. Approximately half of the 20 premises inspected had issues, including:

- inadequate bunding of waste storage areas
- inadequate storage of wastes
- stormwater drains located within buildings where liquids were handled
- inadequate spill containment equipment
- lack of spill response procedures.

Follow-up action was undertaken with regard to those premises needing to implement corrective measures.

A re-inspection campaign has commenced, targeting approximately 20 waste activity premises inspected during previous campaigns which required follow-up action. To date, two licensees have been issued with penalty notices. Information on the knowledge, skills, attitudes, practices and behaviour of licensees is also being gathered to assist in evaluating the effectiveness of the previous campaigns and identifying whether campaigns are changing the behaviour of the licensees.

In June 2005, DEC and Parramatta City Council hosted a liquid waste forum. The forum, attended by over 40 businesses that generate liquid waste, demonstrated that cost savings can be made from cleaner production initiatives, and benefits can be gained from choosing alternative chemicals, avoiding the generation of liquid waste and implementing practices to recycle, reuse or treat liquid waste.

Where to from here?

The Part A and B reports both identify matters for consideration by NSW industry and other interested stakeholders.

The issues identified in this part are likely to be typical of industry sectors that deal with liquid chemical storage, handling and spill management in NSW.

The audits indicated that industry could improve its compliance and environmental performance by:

- locating all bulk tanks and storing all packaged materials within adequately sized, impervious secondary containment facilities which are roofed, wherever practicable, to prevent the potential contamination of rain water
- ensuring that all bulk tank secondary containment facilities are constructed so the trajectory of any leaks will not flow outside the facility
- ensuring that all packaged materials are located within secondary containment facilities so any packaged materials will not topple out of the facility
- implementing systems designed to ensure that all tanks and secondary containment facilities are regularly inspected and maintained, and any liquids that accumulate within facilities are removed as soon as is practicable
- storing used containers and drums within secondary containment facilities
- undertaking delivery and dispatch operations within areas that are isolated from other areas, have rollover bunds, and drain to a sump capable of containing the largest spill or leak likely to occur, and, where practicable, are roofed to prevent the potential contamination of rain water
- installing control equipment that automatically shuts off bulk liquid transfer operations, to prevent overfilling during delivery or dispatch operations
- transporting packaged materials on-site within areas which drain to well-maintained containment systems, such as stormwater pits fitted with gate valves or first flush systems, rather than directly to stormwater
- providing adequate training in any standard operating procedures related to deliveries, transfers, dispatches and transport within the premises
- identifying any potential risks which may result from liquid chemical storage and handling on-site and developing appropriate incident management plans to reduce these risks
- providing adequate training to ensure that spills and leaks are dealt with effectively, and any incident management plans are properly implemented
- maintaining adequate spill clean-up equipment at appropriate locations throughout the site
- ensuring that an adequate firewater containment system is provided on-site to prevent contaminated firewater from entering the stormwater system.

While DEC ensures that these issues are being resolved at the audited sites through follow-up, the issues are likely to be of concern at any premises where liquid chemicals are stored and handled and spills are managed, and warrant regular attention by site managers at all premises.

In addition to audit follow-up procedures, 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 also ensure that the matters identified in this Part A are being considered at all relevant premises. Part B of this report will identify best environmental management practices to help industry resolve these matters. DEC will therefore 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.

Appendices

Appendix A: List of DEC-regulated licensed premises audited

Individual compliance audit reports for all of these facilities are publicly available in the DEC Library on Level 15, 59–61 Goulburn Street, Sydney; phone (02) 9995 5302.

Scheduled activity	Lic. no	Accountable party	Location
Chemical industries or works—battery	2088	Exide Australia Pty Ltd	Seven Hills
Chemical industries or works—other	818	Pirelli Power Cables & Systems Australia Pty Ltd	Liverpool
Chemical industries or works—other	993	Nuplex Industries (Aust) Pty Ltd	Botany
Chemical industries or works—other	1255	Solvay Interox Pty Ltd	Banksmeadow
Chemical industries or works—other	2745	Procter & Gamble Australia Pty Ltd	Rydalmere
Chemical industries or works—other	2822	Castrol Australia Pty Ltd	Guildford
Chemical industries or works—other	3740	Unilever Australia Ltd	North Rocks
Chemical industries or works—other	1290	Nowra Chemical Manufacturers Pty Ltd	Nowra
Chemical industries or works—other	2002	Australchem Pty Ltd	Tomago
Chemical industries or works—paints	1270	Wattyl Australia Pty Ltd	Blacktown
Chemical industries or works—pharmaceuticals or veterinary products	1020	Roche Products Pty Ltd	Dee Why
Chemical industries or works—pharmaceuticals or veterinary products	2170	Merck Sharp & Dohme (Australia) Pty Ltd	Granville
Chemical industries or works—pharmaceuticals or veterinary products	4452	Vetlab Pty Ltd	St Marys
Chemical industries or works—pharmaceuticals or veterinary products	11473	Virbac (Australia) Pty Ltd	Crookwell
Chemical industries or works—soap	2096	Colgate-Palmolive Pty Ltd	Villawood
Chemical industries or works— pesticides	1035	Autopak Formulators Pty Ltd	St Marys
Chemical industries or works— pesticides	5686	Buckman Laboratories Pty Ltd	Wagga Wagga
Chemical storage facilities	1969	Sydney Metropolitan Pipeline Pty Ltd	Silverwater
Chemical storage facilities	6007	Vopak Terminals Sydney Pty Ltd	Port Botany
Chemical storage facilities	11690	Australian Petrochemical Storage Pty Ltd	Ingleburn
Chemical storage facilities	837	Caltex Australia Petroleum Pty Ltd	Kurnell
Chemical storage facilities	10095	BOC Ltd	Cringila
Chemical storage facilities	527	BP Australia Ltd	Carrington
Chemical storage facilities	3553	Ciba Specialty Chemicals Pty Ltd	Wyong
Chemical storage facilities	11793	Incitec Fertilizers Ltd	Moree
Livestock processing industries—other	1122	Effem Foods Pty Ltd	Raglan
Marinas and boat repair facilities—other vessel construction or maintenance	6868	State Transit Authority of NSW	Balmain
Marinas and boat repair facilities—other vessel construction or maintenance	10894	Hawkesbury River Holdings Pty Ltd	Brooklyn
Marinas and boat repair facilities—mooring & boat storage	11214	Macquarie Leisure Operations Ltd	Rushcutters Bay
Marinas and boat repair facilities—other vessel construction or maintenance	11758	Royal Sydney Yacht Squadron	Kirribilli
Marinas and boat repair facilities—other vessel construction or maintenance	11919	Waterways Authority	Rozelle
Marinas and boat repair facilities—other vessel construction or maintenance	6609	ADI Ltd	Carrington
Marinas and boat repair facilities—mooring & boat storage	11339	Lake Macquarie Yacht Club Ltd	Belmont
Mineral processing or metallurgical works— other metals processing	948	Unicast Diecastings Pty Ltd	Prestons
Mineral processing or metallurgical works—other metals processing	1098	Crane Enfield Metals Pty Ltd	Penrith
Mineral processing or metallurgical— other metals processing	6158	Metal Manufacturers Ltd	Port Kembla
Mineral processing or metallurgical—metal plating or coating works	1145	Industrial Galvanisers Corporation Pty Ltd	Kirrawee

Scheduled activity	Lic. no	Accountable party	Location
Mineral processing or metallurgical—metal plating or coating works	505	Industrial Galvanizers Corporation Pty Ltd	Hexham
Mineral processing or metallurgical—metal plating or coating works	6758	Galvanising Services (Coffs Harbour) Pty Ltd	Coffs Harbour
Shipping facilities (bulk)	4137	Bulk Maritime Terminals Pty Ltd	Rozelle
Shipping facilities (bulk)	3114	Port Kembla Gateway Pty Ltd	Port Kembla
Shipping facilities (bulk)	2367	Kooragang Bulk Facilities Pty Ltd	Kooragang
Shipping facilities (bulk)	4688	Newcastle Port Corporation	Carrington
Waste facilities—HIGAB processing[1]	4560	Waste Recycling and Processing Corporation	Homebush Bay
Waste facilities—HIGAB processing	5790	Solvents Australia Pty Ltd	Mona Vale
Waste facilities—HIGAB processing	11950	Riverside Metal Industries Pty Ltd	Revesby
Waste facilities—HIGAB processing	5874	Hydromet Operations (Southern) Ltd	Unanderra
Waste facilities—HIGAB processing	11155	South Coast Liquid Treatment Pty Ltd	Nowra
Waste facilities—HIGAB processing	11180	Enviroking Investments Pty Ltd	Black Hill
Waste facilities—HIGAB processing	11932	Albury Galvanizing Pty Ltd	Jindera
Waste facilities—HIGAB processing	11947	Pentarch Pty Ltd	Oaklands
Waste activities	6193	Royal Botanic Gardens and Domain Trust*	Sydney

[1]HIGAB is Hazardous, Industrial, Group A or Group B wastes as defined in the POEO Act 1997.

* The Royal Botanic Gardens and Domain Trust was audited as a part of the program under which premises operated by DEC were audited.

Appendix B: List of DEC-regulated non-licensed premises audited

Individual compliance audit reports for all of these facilities are publicly available in the DEC Library on Level 15, 59–61 Goulburn Street, Sydney; phone (02) 9995 5302.

Premises	Accountable party	Location
Council works depot	Shellharbour City Council	Oak Flats
Council works depot	Kempsey Shire Council	Kempsey
Council works depot	Wollongong City Council	Wollongong
Works depot	NSW Roads and Traffic Authority	Tamworth
Research institute	NSW Department of Primary Industries (Agriculture)	Tamworth
Works depot	Sydney Catchment Authority	Nepean
Works depot	DEC Parks and Wildlife Division	Ulladulla
Works depot	DEC Parks and Wildlife Division	Girrakool
Works depot	DEC Parks and Wildlife Division	Glenbrook
Works depot	DEC Parks and Wildlife Division	Jindabyne

Appendix C: Protection of the Environment Operations Act 1997—sections 116, 120, 167 and dictionary definitions

Section 116 Leaks, spillages and other escapes

(1) If a person wilfully or negligently causes any 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:

(a) the person, and

(b) if the person is not the owner of the substance, the owner,

are each guilty of an offence.

(2) If:

(a) the person in possession of the substance at the time of the leak, spill or other escape, or

(b) the owner of any container from which the substance leaked, spilled or escaped, or

(c) the owner of the land on which the substance or any such container was located at the time of the leak, spill or other escape, or

(d) the occupier of the land on which the substance or any such container was located at the time of the leak, spill or other escape,

wilfully or negligently, in a material respect, caused or contributed to the conditions that gave rise to the commission of the offence under subsection (1), that person, owner or occupier is guilty of an offence.

(3) A person may be proceeded against and convicted of an offence under subsection (2) whether or not a person has been proceeded against or convicted of an offence under subsection (1) in respect of the leak, spill or other escape.

(4) It is a defence in any proceedings against a person for an offence under this section if the person establishes that the leak, spill or other escape was caused with lawful authority.

(5) In this section:

container includes anything used for the purpose of storing, transporting or handling the substance concerned.

owner of a substance includes, in relation to a substance that has leaked, spilled or otherwise escaped, the person who was the owner of the substance immediately before it leaked, spilled or otherwise escaped.

Section 120 Prohibition of pollution of waters

(1) A person who pollutes any waters is guilty of an offence.

(2) In this section:

pollute waters includes cause or permit any waters to be polluted.

Section 167 Control equipment (exerpts)

(1) The occupier of any premises must maintain any control equipment installed at the premises in an efficient condition.

(2) The occupier of any premises must operate any control equipment installed at the premises in a proper and efficient manner.

(3) This section does not apply to any control equipment prescribed by the regulations as being excluded from this section.

(4) An occupier of premises who contravenes this section is guilty of an offence.

Dictionary (exerpts from POEO Act 1997 dictionary)

In this Act:

control equipment means any apparatus or device used or designed:

(a) to prevent, limit or regulate pollution (including any emission of noise), or

(b) to monitor or to give warning of pollution (including any emission of noise), or

(c) to give warning of any emission, leak, spill or other escape of substances causing pollution,

and includes any apparatus or device that, though not so used, is or would, if properly maintained and operated, be capable (without modification) of being so used, but does not include any apparatus or device prescribed as excluded from this definition. An apparatus or device can be control equipment whether or not it is used for additional purposes or designed for other or additional purposes.

environment means components of the earth, including:
(a) land, air and water, and
(b) any layer of the atmosphere, and
(c) any organic or inorganic matter and any living organism, and
(d) human-made or modified structures and areas,
and includes interacting natural ecosystems that include components referred to in paragraphs (a)–(c).
harm to the environment includes any direct or indirect alteration of the environment that has the effect of degrading the environment and, without limiting the generality of the above, includes any act or omission that results in pollution.
pollution means:
(a) water pollution, or
(b) air pollution, or
(c) noise pollution, or
(d) land pollution.
water pollution or ***pollution of waters*** means:
(a) placing in or on, or otherwise introducing into or onto, waters (whether through an act or omission) any matter, whether solid, liquid or gaseous, so that the physical, chemical or biological condition of the waters is changed, or
(b) placing in or on, or otherwise introducing into or onto, the waters (whether through an act or omission) any refuse, litter, debris or other matter, whether solid or liquid or gaseous, so that the change in the condition of the waters or the refuse, litter, debris or other matter, either alone or together with any other refuse, litter, debris or matter present in the waters makes, or is likely to make, the waters unclean, noxious, poisonous or impure, detrimental to the health, safety, welfare or property of persons, undrinkable for farm animals, poisonous or harmful to aquatic life, animals, birds or fish in or around the waters or unsuitable for use in irrigation, or obstructs or interferes with, or is likely to obstruct or interfere with persons in the exercise or enjoyment of any right in relation to the waters, or
(c) placing in or on, or otherwise introducing into or onto, the waters (whether through an act or omission) any matter, whether solid, liquid or gaseous, that is of a prescribed nature, description or class or that does not comply with any standard prescribed in respect of that matter,
and, without affecting the generality of the foregoing, includes:
(d) placing any matter (whether solid, liquid or gaseous) in a position where:
(i) it falls, descends, is washed, is blown or percolates, or
(ii) it is likely to fall, descend, be washed, be blown or percolate,
into any waters, onto the dry bed of any waters, or into any drain, channel or gutter used or designed to receive or pass rain water, floodwater or any water that is not polluted, or
(e) placing any such matter on the dry bed of any waters, or in any drain, channel or gutter used or designed to receive or pass rain water, floodwater or any water that is not polluted,
if the matter would, had it been placed in any waters, have polluted or have been likely to pollute those waters.
waters means the whole or any part of:
(a) any river, stream, lake, lagoon, swamp, wetlands, unconfined surface water, natural or artificial watercourse, dam or tidal waters (including the sea), or
(b) any water stored in artificial works, any water in water mains, water pipes or water channels, or any underground or artesian water.

References

Department of Environment and Conservation 2004, *Environmental guidelines: Assessment, classification & management of liquid & non-liquid wastes*, phone 131 555 for a copy or visit www.environment.nsw.gov.au/publications/epa/hazardous.htm

Environment Protection Authority, *Information for authorised officers in local government*, visit www.epa.nsw.gov.au/mao/index.htm

Environment Protection Authority 1997, *EPA compliance audit handbook*, phone 131 555 for a copy

Protection of the Environment Operations Act 1997, visit www.legislation.nsw.gov.au/viewtop/inforce/act+156+1997+first+0+N

Protection of the Environment Operations Act (Clean Air) Regulation 2002, visit www.legislation.nsw.gov.au/viewtop/inforce/subordleg+642+2002+first+0+N