



Strategic Environmental Compliance and Performance Review

Industrial estates

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The *Strategic Environmental Compliance and Performance Review: Industrial Estates* was undertaken by the Compliance and Assurance Section and Sustainability Programs Division, Department of Environment and Climate Change, in partnership with Tamworth Regional Council and Wollongong City Council.

Use of the term 'industrial estates': geographical clusters

In this report 'industrial estates' refers to geographical clusters of industries generally – including those clusters in areas designated 'industrial estate' and those located in other areas where industries are in close physical proximity.

More information

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Executive summary

A joint review of industrial estates

The Department of Environment and Climate Change NSW (DECC), Tamworth Regional Council and Wollongong City Council have completed a joint review focusing on improving the environmental performance of industries within geographic clusters – referred to in this report as ‘industrial estates’.

The review focused on two industrial estates: the Taminda industrial estate in Tamworth and Unanderra industrial estate in Wollongong. The review process combined compliance audits and site inspections with research into best environmental management practices.

The objectives of the review were to:

- achieve improved environmental performance
- reduce cumulative environmental impacts of industrial estates
- encourage industries to adopt best environmental management practices
- develop greater consistency in regulation by DECC and councils, by sharing information and regulatory approaches
- encourage industry to consider resource efficiency and cleaner production opportunities.

About this report

This report summarises the findings of the compliance audits completed by DECC and the inspections completed by the local councils at the two industrial estates.



If waste oil is stored without secondary containment, there is a risk of soil contamination (DECC)

The report also provides:

- guidance on how industry can improve its environmental performance by implementing best environmental management practices in order to mitigate or prevent cumulative impacts
- opportunities for business to adopt resource efficiency practices
- information on other initiatives to help industry improve its environmental performance.

Key findings

The results of the audits and review of best management practice show that industry can improve its environmental performance and reduce the potential for environmental harm by:

- effectively managing stormwater
- improving dust and odour control measures
- properly containing chemicals
- storing waste materials away from stormwater drains and waterways
- monitoring the integrity of underground storage tanks
- identifying potential risks and developing management plans to handle those risks
- properly maintaining plant and equipment.

A systematic and rigorous process of follow-up actions has been completed to ensure that issues identified are being addressed at the audited sites.

Helping local council regulation

The findings of this review provide valuable information to help local councils proactively regulate sites in a consistent manner in order to prevent and reduce cumulative impacts.

The resource efficiency opportunities identified at the premises in Tamworth and Wollongong are likely to be applicable in other areas, and the information provided in this report can help councils across NSW to work with industry to adopt resource efficiency and cleaner production practices.

To support councils in their environment protection regulatory role, this report is being sent to all local councils and regional organisations of councils in NSW.

Valuable information for industry

The review findings provide valuable information to help industry improve its environmental performance and potentially make cost savings by adopting resource efficiency practices. Some initiatives identified as part of this review include:

- separating 'clean water' for alternative uses
- maintaining plant and equipment and investigating the runtime management of machinery to reduce energy use
- investigating opportunities to recycle waste material
- reusing wastewater to reduce potable water usage
- increasing the use of natural light.

The findings of this review will also be used to inform DECC's ongoing review of licences and assessment of any future development applications for new licences. DECC will continue to work with industry and councils to improve environmental performance at sites in NSW.



When responding to spills, do not hose down the area (DECC)

Related initiatives

Other DECC initiatives include:

- a cleaner production self-help tool to help small-to-medium sized premises reduce their operating costs
- a Sustainability Advantage Program which is a partnership between DECC and industry to help businesses manage environmental risk, use resources more efficiently, integrate environmental strategies with business planning, enhance customer relationships and engage and train staff
- an education package providing guidance to industry on managing environmental risks and understanding legal obligations in relation to the storage of liquids
- five liquid waste fact sheets providing important information on best management practices and managing liquid waste, entitled: *Handling liquid waste*; *Storing liquid waste*; *Preventing spills*; *Responding to spills* and *Reducing liquid waste through cleaner production* (DEC 2005).

1 Strategic compliance and performance reviews

DECC's strategic environmental compliance and performance reviews

In addition to its other ongoing regulatory activities, the Department of Environment and Climate Change NSW (DECC) undertakes an ongoing program of strategic environmental compliance and performance reviews. The aim of these reviews is to encourage industries to improve their environmental performance. The reviews combine compliance assessments (i.e. assessing compliance with environmental legislation) with research into best environmental management practices. Industry, licensees, state agencies, local government, the community and other stakeholders provide input into various stages of the review process.

Selecting activities and sectors for review

The reviews focus on priority environmental issues. Previous reviews have looked at:

- the wood preservation industry
- liquid chemical storage, handling and spill management practices
- preventing contamination of sites.

Sectors and activities targeted for strategic environmental compliance and performance reviews are chosen by assessing major environmental and community concerns alongside DECC's corporate objectives and strategies.

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

Relevant legislation

Protection of the Environment (Operations) Act 1997

The *Protection of the Environment (Operations) Act 1997* (POEO Act) broadly allocates responsibilities for pollution prevention and control to the EPA, local councils and other public authorities. DECC is the appropriate regulatory authority for:

- regulating activities listed in Schedule 1 of the POEO Act and premises where scheduled activities are carried out
- ensuring environment protection licences are adhered to
- regulating activities carried out by the State or a public authority.

In nearly all other cases the appropriate regulatory authority is the local council. A local council may exercise its powers under the POEO Act only in or in relation to the local council's area.

Premises that undertake scheduled activities and meet the activity threshold criteria are licensed and regulated by DECC. Activity types include coal mines, livestock intensive industries, waste facilities, petroleum works and sewerage treatment systems. For a full list of all the scheduled activities and the classifications under them refer to Schedule 1 of the POEO Act (www.legislation.nsw.gov.au/fragview/inforce/act+156+1997+sch.1+0+N).



Chemicals should not be stored close to stormwater inlets (DECC)

Environment protection licences issued under the POEO Act set environmental performance requirements. Licences may specify a required performance outcome or a specific environmental management practice. Licence conditions take into account factors such as the surrounding environmental conditions, type of activity and the available technology. Pollution reduction programs and pollution studies are often attached to licences, requiring licensees to carry out work within a specified timeframe to enable them to comply with environmental requirements. Changes to environment protection licences are negotiated with the licensee.

The POEO Act prohibits certain actions that may pose a risk to the environment, including the pollution of waters (section 120) and leaks and spills of substances (section 116). These restrictions apply to industries and activities whether or not they are licensed.

Authorised officers are appointed to help regulatory authorities exercise their functions under the POEO Act. The powers of authorised officers include:

- the powers of entry and search
- powers to question and identify persons
- powers to issue notices.

The principal types of notices are:

- notices to provide information and records
- clean-up, prevention, prohibition, compliance cost and noise control notices
- penalty notices.

2 About the industrial estates review

Partnership with councils

The strategic review of industrial estates was conducted in partnership with Tamworth Regional Council and Wollongong City Council in 2007. It focused on improving the environmental performance of industries within geographical clusters.

The objectives of the review were to:

- improve environmental performance
- reduce the cumulative environmental impacts of industries within the industrial estates
- encourage industries to adopt best environmental management practices
- make the regulation process more consistent, with DECC and local councils sharing information and approaches
- encourage industries to consider resource efficiency and cleaner production opportunities.

DECC conducted compliance audits on a selection of premises for which it is the appropriate regulatory authority under the POEO Act, and accompanied Tamworth and Wollongong Councils on inspections of premises they regulate. (Premises involved in the review are listed in Appendix A.)

Consistent regulation and knowledge sharing

A key intention in carrying out this review was to encourage a consistent approach to regulation of industry by State and local government agencies. DECC and local councils worked in the planning of the review and accompanied each other on compliance audits and inspections. This approach provided opportunities to share valuable knowledge and skills in relation to compliance principles and management practices.

Cumulative environmental impacts

Environmental incidents have shown that clusters of industries have significant potential to cause cumulative environmental impacts. The cumulative impact depends on the number and size of industrial premises and their location. Environmental concerns include an increase in localised air emissions, increase in concentration of pollutants discharged to a common water body, storage and disposal of wastes, industrial accidents, spills, and nuisances such as noise.

Combined emissions or discharges may mean that environmental and pollution threshold limits are reached, which cause impacts, but there is no one point source responsible. However, with effective environmental management, activities can co-exist in a sustainable way. By complying with legislative requirements and adopting best environmental management practices the cumulative impact of industrial estates can be reduced.

Scope of the review

The review examined the following activities:

- stormwater management
- wastewater collection, management and treatment
- air emission management
- noise management

- chemical and waste management
- emergency and spill management
- monitoring and record keeping practices.

Activities within the review 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 and for the 12 months prior to the date of the audit inspection.

DECC-regulated premises

Scheduled premises

The review included eight premises (see Appendix A) within the Taminda and Unanderra industrial estates undertaking activities listed in Schedule 1 of the POEO Act and therefore licensed by DECC.

The scheduled activities included:

- waste facilities
- livestock processing industries – poultry
- agricultural produce industries
- concrete works
- mineral processing or metallurgical works.

The audits examined compliance with the following operating, monitoring and recording requirements included on individual licences:

- Licensed activities must be carried out in a competent manner.
- All plant and equipment installed at the premises or used in connection with the licensed activity must be maintained and operated in a proper and efficient condition and manner.

The audits also assessed compliance with licence requirements for:

- recording and managing monitoring records
- monitoring concentrations of pollutants discharged
- recording pollution complaints.

DECC's public register contains details of all licences issued under the POEO Act. Licences are available for public inspection on DECC's website at www.environment.nsw.gov.au/prpoeo/searchregister.aspx.

Non-scheduled premises

DECC also regulates activities not listed in Schedule 1 of the POEO Act which are conducted by public authorities including councils. These premises are regulated by DECC through the requirements of the POEO Act.

One non-scheduled premises owned and operated by a local council was audited. The audit criteria 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 appear in Appendix B of this report.

Audit methodology for DECC-regulated premises

The compliance audits were performed in accordance with the procedures and protocols in the Compliance Audit Handbook (copies are available from DECC's Pollution Line: 131 555 or www.environment.nsw.gov.au/resources/cahandbook0613.pdf). When an audit is completed, the findings are presented to the audited organisation as an individual compliance audit report. Individual compliance audit reports are publicly available in the DECC Library on Level 15, 59–61 Goulburn Street, Sydney; phone (02) 9995 5302.

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

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

The findings presented in this report are a collation of the findings presented in the individual compliance audit reports.



Filling mobile tankers without containment is dangerous (DECC)

Analysing the risks

The risks associated with the non-compliances identified were assessed and colour-coded according to their environmental significance.

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:

- past environmental performance
- current environmental performance
- potential contributing factors.

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 1.

Table 1 Risk analysis matrix

		Likelihood of environmental harm occurring		
		<i>Certain</i>	<i>Likely</i>	<i>Less likely</i>
Level of environmental impact	<i>High</i>	Code red	Code red	Code orange
	<i>Moderate</i>	Code red	Code orange	Code yellow
	<i>Low</i>	Code orange	Code yellow	Code yellow

Non-compliance assessed as '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 'code yellow' suggests that the non-compliance could receive a lower priority but must still be addressed.

Council-regulated premises

Premises not regulated by DECC are generally regulated by local councils. Nineteen premises were selected by the Tamworth Regional Council and Wollongong City Council to be included in the review (see Appendix A).

Council-regulated activities included:

- auto wrecking
- food manufacturing
- automotive repairing
- nursery and landscaping
- engineering and timber manufacturing
- tyre repairing
- engine reconditioning
- fertiliser manufacturing
- abrasive blasting.

These premises were inspected by council and DECC officers. Compliance was assessed against sections 116, 120 and 167 of the POEO Act.

Assessment methodology for council regulated premises

Compliance assessments were conducted on the non-scheduled council-regulated premises using 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 site representatives and observations made during site inspections. The assessments were limited to determining whether activities related to the management of chemicals, emergency incidents, water pollution and air pollution (such as dust or odour emissions), were being carried out in a competent manner, and whether plant and equipment was being maintained and operated in a proper and efficient condition and manner.

Following the compliance assessments, Tamworth Regional Council and Wollongong City Council provided each site with information on the findings outlining the corrective, preventive or improvement actions required. As part of ongoing compliance activities, council staff follow up on individual premises to ensure that each site is implementing the required actions.

During the site inspections Wollongong City Council also invited the premises to participate in a council Sustainability in the Workplace Program aiming to help businesses improve their environmental performance.

3 Review findings

DECC-regulated premises

This section of the report collectively summarises the various issues identified and reported on in the individual compliance audits DECC conducted at Taminda (Tamworth) and Unanderra (Wollongong) industrial estates.

Risk analysis of non-compliances identified

Non-compliances identified during the review were categorised using the risk analysis process illustrated in Table 1. The percentages of non-compliances found in each category during the audit process are shown in Table 2.

Table 2 Percentage of non-compliances found in each risk category

Colour code of issue	Code red (high risk)	Code orange	Code yellow	Total
Percentage of issues	17%	13%	70%	100%

Stormwater management

Poor stormwater management practices can cause contamination of areas that were previously uncontaminated and increase the risk of soil contamination and contaminated discharges to stormwater.

Examples of poor stormwater management practices observed were:

- Concrete bunding around yard areas contained large cracks and areas of significant damage. The height of a speed hump bund situated across an entrance driveway was not sufficient to effectively contain contaminated wastewater from discharging offsite.
- Potentially contaminated stormwater within a bunded area serving a scrubber system was not contained for inspection and assessment before being discharged via an overflow pipe to stormwater.
- Inadequate maintenance of channels and drains was reducing the residual capacity of a dam, increasing the likelihood of the dam being bypassed or overflowing.
- A small volume of grain material was found within the drainage lines of a stormwater system, increasing the potential for the drain to be bypassed in storm events and for the grain to leave the site and potentially pollute waters.
- Management procedures, including recording or monitoring effluent volumes or quality, were not in place where potentially contaminated wastewater was being used for irrigation, increasing the potential for soil, surface or groundwater contamination.
- The presence of a release valve on a first flush tank was increasing the risk of the tank discharging onto a yard area if the valve was inadvertently opened.

Air emission management

Air pollution arising from industries which store, process or handle chemicals or operate boiler systems or generate animal by-products 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 or dust emissions may affect local amenity. Sections 124–128 of the POEO Act cover the operation and maintenance of plant and materials and the standards of air impurities not to be exceeded, and Section 129 of the POEO Act prohibits the emission of an ‘offensive odour’ from licensed premises.

The following issues were identified:

- Fine dust was being generated from a conveyor system serving bulk loading bins, and there were no systems in place to capture dust from the underside of the conveyors or at transfer points.
- Inadequate maintenance of seals around an autoclave door was causing potentially odorous steam emissions.
- Exhaust fans and hoods serving both an autoclave and shredder were not effectively capturing all the steam generated.
- Odour control measures were not being evaluated on an ongoing basis, so there was no scope for identifying further actions to reduce odours.
- Fine particles of grain fermenting at the bottom of a first flush wastewater holding tank were generating odours.

Chemical and waste management

Chemical and waste management includes storage, transfer (delivery and dispatch) and transport within a premises. Poorly designed, installed or maintained pipework, transfer areas or areas where materials are transported within a premises increase the potential for incidents to occur. Leaks and spills that occur during storage, handling and movement of chemicals and waste in areas that are not provided with appropriate secondary containment, or have no measures in place to detect leaks, have potential to contaminate soil and groundwater and either drain or be flushed to waters, causing surface water pollution.

Instances where chemicals and waste were not being managed in a manner that would effectively contain spills and leaks were:

- Monitoring or testing of the integrity of underground storage tanks, or soil monitoring, was inadequate to determine whether the tanks were leaking, increasing the risk of soil or groundwater contamination.
- Activities including filling fuel storage tanks, refuelling vehicles and removing waste oil were being undertaken in a yard area without secondary containment, increasing the potential for chemical spills or contaminated stormwater to leave the site via the stormwater system.
- No measures were in place to contain spills from fuel storage containers and drums adjacent to a stormwater drain.
- Waste materials from processes and control equipment were being stored outside in areas accessed by vehicles and in close proximity to stormwater drains.
- Fuel and diesel was being stored on spill containment pallets suitable only for temporary storage, or within a shed without impervious containment walls on all sides.
- Intermediate bulk containers (IBCs) containing oil were being stored on a transportable plastic bund with no secondary containment and no residual capacity left within the bund.
- Paint and other materials were being stored on pallets without any containment measures in place, or within a shed with inadequate bunding.



Storing chemicals properly, with appropriate containment, prevents spills and leaks from escaping (DECC)

- Batteries were temporarily stored in close proximity to a drainage system and on a tray which would not capture spills or leaks in the event of a rupture.
- Batteries were stored outside on pallets in an area that was not impervious and had no secondary containment measures in place.
- Spent scrubbing liquor was being discharged to the sewer through a pipe without any secondary containment measures in place to prevent spills or leaks discharging to stormwater.



Batteries and chemicals should not be stored without containment (DECC)

- Contaminated absorbent materials had not been removed from a diesel and oil storage shed, reducing the residual capacity of the containment structure.
- Stormwater ingress into underground concrete drains used to transport wastewater to a treatment tank increased the likelihood of the tank overflowing and discharging into the holding dam and increased the potential for the dam to overflow during rain events.
- A diesel tank storage bund was half full of contaminated water, reducing its capacity to contain a leak or spill.
- Spill trays used for storing chemicals contained liquid, reducing their residual capacity to contain leaks and spills.
- Untreated contaminated run-off from the site was being captured by the drainage system and discharged into the stormwater system without any monitoring.
- An underground system of drains and tanks used to convey wastewater had no leak detection systems or groundwater monitoring, resulting in the potential for undetected groundwater contamination.

Incident management

Incidents which have the potential to pollute waters or contaminate soil include leaks and spills, fire or explosions. 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 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



Spills can be managed more easily if spill kits are available in the appropriate location (DECC)



Properly labelled and equipped spill kits enable prompt remedial action (DECC)

incident management, such as untrained or poorly trained staff flushing spills or leaks down stormwater drains, can cause serious pollution incidents.

The following issues were identified:

- Plant and equipment on site for managing larger spills was inadequate.
- Spill kits were not readily available in the event of an incident, reducing the capacity to take prompt remedial action.
- Not all staff were aware of the location or the procedures for operating a central stormwater drain isolation flap – the equipment in place to contain potential spills that may occur in an emergency situation.
- An isolation valve designed to prevent spills from leaving a refuelling area was left in the open position, increasing the potential for spills to enter the stormwater system.

Emergency response plans

Inadequate emergency response plans result in uncertainty and a lack of systems and procedures to deal with emergencies and the potential for chemicals and wastes to pollute surface water, groundwater and to cause soil contamination.

The following issues were identified:

- an emergency response plan had not been developed to document procedures for dealing with all types of incidents that may occur and there was a lack of staff training
- insufficient procedures were in place to manage incidents including fire or explosion.

Monitoring and recording practices

The monitoring and recording conditions attached to environment protection licences are intended to ensure that licensees are collecting information on the environmental impacts of their activities. Monitoring must be undertaken in accordance with the requirements of the licence and the DECC Approved Methods publications. Licensees should use this information to manage their sites in a way that reduces and minimises their environmental impacts.

Monitoring is an important environmental management tool. In order to properly monitor any actual or potential environmental issue, samples or measurements must be taken at the required frequency and with appropriate rigour to provide a reliable basis for analysis and assessment. The results must be analysed and assessed on an ongoing basis, including comparison with previous results and relevant criteria so that trends can be identified.

The following issue was identified:

- not recording the times at which samples were taken, which may impact on the licensee's ability to effectively monitor trends.

Council-regulated premises

This section of the report summarises the various issues identified during the compliance inspections conducted by Tamworth Regional Council and Wollongong City Council.

The Council inspections were conducted to assess the level of compliance with the relevant requirements of the POEO Act administered by the councils.

DECC officers accompanied council officers during the compliance inspections, providing an opportunity for information sharing between DECC and the councils.

Sections 116, 120 and 167 of the POEO Act are provided in full in Appendix B.

Compliance with section 116 – leaks or spills must not escape in a manner that harms or is likely to harm the environment

Leaks and spills of liquid chemicals from storage tanks or drums 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.

Examples of issues identified were:

- No secondary containment measures were in place to contain and collect spills or leaks that might occur during refuelling or refilling activities.
- There was a lack of containment for the storage of chemicals, oil and spent batteries.
- Leaks from oil containers were observed, increasing the potential for soil contamination.
- Shipping containers used for chemical storage were not sealed to minimise leaks and spills entering stormwater systems.
- Chemical waste bins with residue chemicals were not being stored with proper containment.
- Spills or leaks from the maintenance of vehicles were evident on unsealed areas or unroofed sealed areas adjacent to a workshop area, risking chemicals entering the stormwater system.
- Chemical spill kits were inadequately stocked or not kept on site.

Compliance with section 120 – prohibiting the pollution of waters

Poor stormwater management practices can cause contamination of areas that were previously uncontaminated and increase the risk of soil contamination and contaminated discharges to stormwater causing water pollution.



Do not place hoses over stormwater inlets (DECC)

Examples of poor stormwater management practices – particularly activities which increase the risk of contaminated water entering the stormwater system – include:

- Clean and dirty activity areas were not separated.
- Raw materials were stockpiled near stormwater drains without adequate controls in place.
- No or inadequate controls were installed to contain wastewater generated by activities.
- No containment measures were in place to prevent run-off from wash bay solids which have the potential to cause soil or ground contamination.
- Housekeeping such as the sweeping of yards was inadequate.
- Wastewaters were irrigated to land without adequate controls to prevent surface run-off.
- Waste materials including waste batteries were stored without adequate controls to prevent contaminated surface run-off.
- There was inadequate or no spill containment for the storage of liquid chemicals in above-ground storage tanks, IBC and 200 L drums.
- Spill kits were not positioned around the premises to ensure minimal time delay in responding to an incident.
- There were inadequate controls to prevent spent garnet used as abrasive material becoming mobilised and entering the stormwater system.
- Excavated material was stored near a watercourse without proper containment or sediment controls.

Compliance with section 167 – control equipment must be operated in a proper and efficient manner

Control equipment is installed to prevent or give warning of the release of potential pollutants to the environment. Poor operation or inadequate maintenance of control equipment increases the risk of pollution.

The following examples of poor maintenance of control equipment were observed:

- Maintenance of air pollution control equipment including filters, scrubbers and cyclones was inadequate, allowing excess particulates and odours to leave the premises.
- Maintenance of dust collection systems and vacuum exhaust systems was inadequate.
- Maintenance of first flush pits was inadequate, reducing their residual capacity and thereby increasing the likelihood of the pit being bypassed or overflowing.

4 Follow-up: what has happened since the review?

Follow-up by DECC

Follow-up by DECC confirms that issues identified during the compliance audits are being addressed by the licensees to improve environmental performance. These include:

- constructing containment systems around drums and containers with adequate capacity to contain spills and leaks, and ensuring that containment systems have impervious surfaces to prevent spills and leaks from discharging outside the system
- establishing regular inspection and maintenance programs for stormwater and spill containment systems
- maintaining residual capacity in bunded areas used to capture leaks and spills
- providing suitable spill containment for transfer points outside a bund
- establishing monitoring procedures for stormwater discharges from drainage systems
- establishing ongoing operational monitoring of equipment including underground pipes, drains and storage tanks
- maintaining plant and equipment to control dust and odour emissions
- establishing appropriate procedures and containment measures for storing batteries
- developing and implementing emergency management plans to deal with all types of incidents
- providing emergency response equipment and placing this equipment in appropriate locations to enable emergencies to be dealt with effectively
- implementing procedures to maintain emergency response equipment
- developing and implementing procedures to ensure that all operational staff are trained in emergency management procedures and would be able to manage an environmental incidents if one was to occur
- establishing procedures to ensure that all monitoring records are kept.



Poor management of stormwater can result in water pollution (DECC)

Integration with licence reviews

The findings of this review will be used to guide the review of environment protection licences. Section 78 of the POEO Act requires the DECC to review environment protection licences once every five years. The licence reviews:

- focus on desired environmental outcomes
- enhance consistency between licences issued to an industry
- improve the effectiveness of the licensing system
- strengthen DECC's accountability to stakeholders.

By successfully integrating these licence reviews with other regulatory activities, such as compliance audit programs, a more holistic licensing approach is being implemented.

The findings of this review will also inform the assessment of any future applications for new licences, helping to implement best practice in preventing cumulative environmental impacts.

Follow-up by local councils

Follow-up by Tamworth Regional Council and Wollongong City Council confirms that issues identified during their compliance assessments are also being addressed.

Actions to improve environmental performance include:

- establishing a regular program to remove debris from stormwater drains
- installing chemical spill kits
- constructing secondary containment systems for chemicals and waste oil
- developing procedures for proper disposal of contaminated waste
- maintaining records of all waste products leaving sites
- relocating raw material stockpiles into covered buildings
- developing a maintenance program for dust filter systems
- establishing proper disposal techniques for blasting by-products
- establishing procedures to ensure that spray painting activities are being undertaken in a contained area to minimise overspray.

5 Best environmental management practices for activities

Guidance material

In reviewing best environmental management practice for industrial activities, DECC has researched current environmental management standards and guidance in the Australian Standards, codes of practice and guidelines addressing environmental risk. In addition DECC has identified best environment management practices from other jurisdictions and operations that could further reduce the environmental risks from industrial activities.

The following guidance material is particularly relevant to industrial estates:

- *AS 1940:2004 Australian standard for the storage and handling of flammable and combustible liquids* provides industry with best practice requirements and recommendations for storing and handling flammable and combustible liquids. This standard was updated in 2004 as AS 1940:2004 to incorporate new information on control philosophies and innovative designs that had been developed since the last edition.
- *Bunding and spill management guideline* provides information on designing, constructing, operating and maintaining bunds or spill containment systems to minimise the risk of pollution from liquid spills and leaks (www.environment.nsw.gov.au/mao/bundingspill.htm). In addition, there are factors and criteria that should be considered in designing first flush stormwater pollution control systems to handle potentially contaminated waste material, see www.environment.nsw.gov.au/mao/stormwater.htm.
- *Assessment and management of odour from stationary sources in NSW* is a policy framework for assessing and managing activities that emit odour and offers guidance on dealing with odour issues to industry, consent authorities, planners, environmental regulators and odour specialists, see www.environment.nsw.gov.au/air/odour.htm.
- *Industry and small business guides* to manage potential environmental concerns and improve environmental performance within different industry groups, see www.environment.nsw.gov.au/sustainbus/industryandsmallbusiness.htm.
- *Liquid Chemical Storage and Spill Management (Part B: Best Practice and Regulation)*, see www.environment.nsw.gov.au/resources/ecrchemicalsb05590.pdf.

In NSW, DECC and other government organisations and industries have also produced numerous guidelines to help organisations deal with environmental impacts (see reference list).

DECC has produced a valuable resource, *Environmental Management Planning*, to help industries build more sustainable businesses that include a commitment (policy and strategy) to drive environmental improvement, see www.environment.nsw.gov.au/sustainbus/envmgtplanning.htm. The purpose of this document is to help organisations plan for potential environmental events by identifying and understanding statutory compliance obligations, identifying and ranking environmental issues specific to each site and preparing a monitoring and reporting plan to ensure implementation.

Reducing the risk of stormwater and groundwater pollution

Stormwater is rainwater that flows across outside surfaces into the stormwater system. The stormwater system includes street gutters, drains, underground pipes and channels that transport rainwater to waterways.

The POEO Act states that 'water pollution' includes introducing litter, sediment, oil, grease, wash water, debris and flammable liquids such as paint, etc. into waters or placing such

material where it is likely to be washed or blown into waters or the stormwater system or percolate into groundwater.

Everyone involved in business (including owners, managers, supervisors, operators, contractors and subcontractors) needs to be aware of environmental laws that apply to their operations including the discharge of stormwater from their premises.

Stormwater management planning

A comprehensive approach to addressing issues relating to stormwater includes developing a stormwater management plan. Implementing the plan would include:

- identifying and segregating clean and dirty activity areas
- maintaining and operating stormwater controls in a proper and efficient condition and manner.

Examples of possible 'dirty areas' include:

- delivery, transfer and storage areas (spills and leaks are possible)
- processing areas (contaminated waste waters should not be allowed to enter the stormwater system)
- waste storage areas and wash down areas (spills or leaks from disused containers and damaged drums and packages are possible).

All practicable steps must be taken to ensure that unforeseen events, such as spills or leaks, do not result in contaminated water entering the stormwater system or groundwater, such as conducting all activities with the potential to pollute water (e.g. processing, manufacturing or workshop activities) within a roofed and bunded area or indoors. If the activity is carried out outdoors clean water should be diverted away from relatively dirty areas to minimise the amount of potentially contaminated water requiring treatment.



The proper storage of chemicals reduces the risk of stormwater and groundwater pollution (DECC)

Treating wastewater

Wastewater generated on site should be:

- treated and recycled for further use on site, e.g. for watering of gardens or lawns
- collected in drums or tanks and removed by a licensed waste contractor to a liquid recycling or treatment facility, or
- treated and discharged to the sewer in accordance with the requirements of the local sewerage utility.

Pollution traps

There are various types of stormwater pollution traps that all act like filters to catch pollution before it has a chance to enter waterways. They have to be cleaned or emptied regularly and should not be used as a control for contaminants or pollutants that they are not designed for.

Types of pollution traps include:

- artificial wetlands
- oil and litter booms
- gross pollutant traps
- trash racks
- sediment traps
- first flush systems.

Reducing the risk of air pollution

Some activities can generate dust and odour if the controls installed are not adequately capturing the emissions or the controls are not properly maintained.

Minimising dust

The following best environmental management practices can reduce the generation of dust and minimise its impact on surrounding business and residents:

- **Negative pressure systems** minimise the release of dust from an operation by maintaining a small negative pressure or suction to confine the dust to a particular operation.
- **Dust collection systems** remove dust by filtration. The storage and disposal of collected dust should be carefully considered so that it does not become a source of fugitive dust. There are many different types of dust collection systems, including:
 - inertial separators (settling and baffle chambers and centrifugal collectors)
 - fabric collectors (baghouses)
 - wet scrubbers where a scrubbing liquid (usually water) comes into contact with a gas stream containing dust particles; the greater the contact of the gas and liquid streams, the higher the dust removal efficiency
 - electrostatic precipitators
 - unit collectors.
- **Other techniques** to control or minimise dust include:
 - planting vegetation to stabilise exposed areas against wind erosion

- using water sprays to confine and settle the dust from the air by dust and water particle adhesion
- using street sweepers to effectively remove fine dust particles from general yard areas.

Minimising odour

The following best environmental management practices can be applied separately or in combination to reduce odour generation:

- **Materials selection**
 - Where possible use materials that minimise the generation of odour, including raw materials for processes or feed material for animals.
- **Project design**
 - Locate odour generating activities, taking account of the site's topography and property boundary, to maximise the 'on-site buffer' between the odour generating activities and the boundary and receptors (i.e. other premises that could detect the odour).
 - Where feasible, minimise the likely generation of odour through the choice of facility design, equipment or processes.
 - Where feasible, maximise the containment of diffuse odour sources so they can be controlled and treated if necessary. Examples include building structures around diffuse sources that convert them to point sources as these types of odours are generally more easily controlled; loading and unloading odorous materials within a building; operating buildings or structures as environments that have negative air pressure so that odour does not escape when doors are opened.
- **Appropriate works scheduling**
 - Conduct odour generating activities or use odour generating equipment during the least sensitive time of day or under the most favourable weather conditions. For example, wait until the wind is blowing away from sensitive receptors before flushing a sewage system.
 - Where a number of odour generating processes operate on a site, it may be possible to schedule them so they occur separately rather than concurrently.
- **Appropriate management and maintenance regimes**
 - Design maintenance programs to minimise fugitive emissions.
 - Establish management programs that provide incentives for employees to minimise incidences of poor environmental performance.
 - Conduct programs to educate staff about work practices that can help to minimise odour, and about the physical and psychological impacts of odour on neighbours.

Air pollution control technology

Allied with best environmental management practice is the use of best available control technology. Where management practices fail to achieve the required odour reduction by themselves, the use of best available control technology should be considered. Equipment, plant and processes that have the potential to produce odour should incorporate the most effective and affordable control equipment to reduce odour by a specified amount, beyond that which can be achieved using best environmental management practices.

Affordability is not necessarily determined by the price of the equipment alone. Increased productivity sufficient to offset the initial outlay may result from the use of more advanced equipment to reduce odour such that longer operating hours are possible. For example, equipment that generates fewer odours than previously (or than other available equipment)

may be operated through the night or in a wider range of wind conditions, without causing complaints.

The choice of control equipment is the responsibility of the proponent or operator of an activity. The proponent or operator is encouraged to thoroughly review the currently available technologies when selecting appropriate control equipment for their activity. The use of control equipment is likely to be more applicable to point sources of odour, where ducting can be used to capture and direct the flow of odorous air to the equipment. Examples of commonly used odour-control technologies are dispersion, flaring, scrubbing systems, absorption systems, biofiltration and adding masking compounds to odorous air. In some situations, it may be necessary to use more than one of these techniques, for example, scrubbing may be needed before adsorption or biofiltration.

If the temperature of a gas stream is high, it may also be necessary to cool gases before they are treated. This may be needed before either chemical scrubbing or activated carbon adsorption is used.

Managing odour at the source

Examples of such strategies include situating odour generating activities or equipment behind natural or built structures – these act as barriers that direct odour emissions away from any sensitive areas – or maximising odour dilution.

- Establishing a stand of trees or shrubs can help disperse odour before it reaches the boundary of a facility or reduce the wind from reaching an odour source (for example, an effluent pond). The effectiveness of a vegetation barrier is determined by its height, thickness and width, as well as the appropriateness of its location. This solution may be particularly useful when other odour source controls are impractical or too costly.
- Purchase or long-term leasing of neighbouring properties can provide a secure buffer zone around a facility and increases the separation distance between the site of the odour emissions and existing (or potential) sensitive receptors.

Reducing the risk of environmental incidents

Spill and incident management practices

- Spills should be cleaned up immediately, and waste must be disposed of in accordance with DECC requirements to mitigate any discharge to soil or waters.
- Contaminated water and other waste (spill materials) from the clean-up of spills must be collected and disposed of in accordance with DECC requirements.
- Water used for cleaning up and decontaminating spills should not be allowed to enter stormwater drains or watercourses.
- Records of the location of all tanks and associated pipework should be maintained to help with incident management.
- Details of the appropriate emergency services to be contacted during an emergency should be collated and maintained.
- Employees should be trained in emergency response procedures, including spill clean-up procedures.

Limited incidents

Limited incidents are considered to be small-scale spills and leaks which can be dealt with by on-site personnel using spill management procedures and spill kits.

- Spill response plans should be developed, implemented, reviewed and updated as required.
- Spill response training and drills should be conducted regularly or as appropriate.
- Adequate supplies of spill response equipment should be maintained in accessible locations.
- Any spill should be contained, and all spilled liquids should be recovered immediately. The spilled liquid and other clean-up waste should be properly disposed of.
- Spills should be covered and protected from stormwater run-off during rainfall to the extent that it does not compromise clean-up activities.

Significant incidents

Significant incidents are considered to be emergencies which are generally large-scale, require an urgent response, and may involve emergency services.

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

Underground storage tanks

Leaking underground storage tanks are a significant source of groundwater and soil contamination. Appropriate prevention and mitigation measures can provide a high level of confidence that releases will be prevented or detected within sufficient time for a response to be implemented.

The Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008 commenced on 1 June 2008. It focuses on a preventative approach to minimise the risk of leaks from underground petroleum storage systems (UPSS) and subsequent soil and ground water contamination. A phased adoption of performance standards is proposed, that is consistent with the *Code of Practice for The Design, Installation and Operation of Underground Petroleum Storage Systems* (CP4-2002) published by the Australian Institute of Petroleum Ltd.

The Regulation allows for a phased adoption of performance standards for existing systems, which are consistent with Australian Standard *The Design, Installation and Operation of Underground Petroleum Storage Systems* (AS 4897-2008).

The measures stated in the Regulation and the Australian Standard are designed specifically for petroleum products. However, they can be applied to the underground storage of any liquid chemicals. The best practice for the underground storage of liquid chemicals, consistent with the intent of the Australian Standard, are summarised below.

Installation of new underground tanks

- New or replacement tanks should be non-corrodible, double-skinned and compatible with the product.
- Regular inspection during the installation of new underground storage systems should be undertaken.
- Protection devices such as an automatic flow shut-off or a high level alarm to prevent over filling of tanks should be installed.
- All tanks should be fitted with leak detection systems.

Fill points and associated pipework

- Each fill point should be accessible from the vehicle unloading and loading position to avoid spillage.
- All underground pipework should be protected from surface loading (such as heavy traffic areas).
- Adequate closure requirements should be in place, including:
 - appropriate chemical decanting methods
 - the disconnection of lines and capping
 - removal of product-saturated soils
 - necessary site assessment for contamination.

Ongoing monitoring

- Pressure, precision tightness and equipment integrity tests.
- Regular inventory control or stock reconciliations should be conducted on all underground storage systems to detect loss of product.
- Release detection monitoring including manual or automatic tank gauging, vapour monitoring and groundwater monitoring should be conducted regularly.

6 Improving resource efficiency

Improving the bottom line as well as the environment

Cleaner production is an overall approach to business management. It involves changing attitudes and rethinking products and processes. However, cleaner production is not only about manufacturing and production. It covers all processes, products and services and their impacts, including aspects of planning and design such as resource efficiency. Resource efficiency can be defined as producing the desired outcome from a product or service using the minimum materials and energy needed over the entire life cycle of the product or service.

In many cases it has been proven that organisations can actually protect the environment better and save money. By applying resource efficiency approaches they can discover how to increase efficiency and reduce waste and pollution. Modest commonsense improvements or changes in production can dramatically reduce environmental problems and reduce ongoing costs.

Resource efficiency goes beyond meeting regulatory obligations and looks for further improvements to benefit the company as well as the environment. Owners and managers know their businesses best and can identify inefficiencies. Often this involves little more than 'good housekeeping' for example:

- reusing or recycling wastes rather than sending them to landfill
- reducing or reusing packaging
- maintaining equipment and checking for wasteful compressed air leaks
- turning off equipment when not in use
- installing water saving devices and checking for leaks.

In conjunction with the audits and assessments conducted as part of this review, DECC undertook a preliminary assessment of the premises visited to identify opportunities for operators to adopt resource efficiency practices, focusing on energy and water use and waste generation and disposal.

Opportunities to improve resource efficiency

Many of the resource efficiency opportunities identified here could also be used by other industries and operations.

Water saving initiatives

- Separate clean water for potential reuse on site or for use by other businesses or operations.
- Reuse wastewater within the process to reduce potable water usage.
- Use stormwater and roof water for gardens around the site or for dust suppression.

Energy saving initiatives

- Maintain air compressors to reduce energy use.
- Investigate the use of shade material to provide heat insulation and introduce fittings or procedures that increase use of natural light.
- Investigate the run-time management of machinery to identify the potential for energy savings, e.g. limiting conveyor run times once product is delivered.
- Convert coal-fired boilers to gas.

- Manage hot water supply and demand, including configuring boiler operations to suit operational demands.
- Investigate air conditioning run times in relation to peak power costs and processing rosters.

Waste reduction initiatives

- Separate cardboard and plastic from general waste to reduce the amount of waste sent to landfill.
- Source alternative uses for wastes, e.g. dust collected within baghouses.
- Investigate opportunities for better waste product separation so that separated wastes can be used in the production of higher end use products, enhancing cost recovery.
- Investigate opportunities for the reuse of waste material by neighbouring premises rather than transporting waste long distances for disposal (e.g. potential for fly ash waste produced by a boiler at one premises to be used in the cement production process at another nearby facility).

Many businesses have found that initiating a team-based reward system has been a valuable mechanism to engage staff in identifying resource efficiency and waste reduction ideas.



Cleaning up spills immediately prevents pollution from entering stormwater drains (DECC)

Other general principles

All business, large and small, can adopt the following principles to enhance resource efficiency:

- Carry out a waste audit to identify any materials you are wasting, and how you could substitute materials or reduce, reuse or recycle the wastes your processes are creating.
- Investigate using alternative materials or processes that may:
 - be less environmentally damaging
 - result in your end product having less impact on the environment
 - save you money.
- Reduce your energy and water use by first carrying out an energy and water audit. You may be able to reuse some of your wastewater in your processes. Energy efficient lighting and thermostats can also make a difference.

Investigating how your business operates may further reduce pollution and increase efficiency, leading to a reduction in costs associated with managing energy, water and waste.

Further information

The DECC website provides examples of how other organisations have adopted various approaches. See www.environment.nsw.gov.au/cleaner_production/ipccasestudies.htm.

7 Related initiatives

DECC sustainable business resources

DECC works with industry sectors in a partnership role, looking beyond traditional regulation and education in order to integrate environmental sustainability into daily business operations.

Guides have been developed for many types of businesses, to help improve environmental performance, understand environmental risks and take actions to improve environmental management. The guides cover industry types such as:

- auto dismantlers
- car detailers
- small factories
- concreters
- food retailers
- marinas, boatsheds and slipways
- service stations.

Further information

Industry and small business guides can be found at www.environment.nsw.gov.au/sustainbus/industryandsmallbusiness.htm.



Guides for small businesses provide industry with valuable information on environmental management (DECC)

Cleaner production self-help tool

Cleaner production focuses on minimising resource use and avoiding the creation of pollutants, rather than trying to manage pollutants after they have been created. It involves rethinking products, processes and services to move towards sustainable development.

The cleaner production self-help tool was developed by the DECC and the NSW Department of State and Regional Development as part of a joint Cleaner Production Pilot Program.

The tool has been developed to help small-to-medium sized premises reduce their operating costs through a systematic process of identifying cleaner production opportunities and implementing cost effective measures.

The tool helps businesses uncover hidden costs and outlines five stages in developing and implementing a cleaner production program to improve efficiencies and reduce costs.

Further information

The self-help tool is available on the DECC's website at www.environment.nsw.gov.au/resources/selfhelptool.pdf.

Sustainability Advantage program

Working in partnership with industry, DECC uses the Sustainability Advantage program to help industry demonstrate how good environmental performance reduces risk, lowers costs, improves productivity and enhances reputation. The program helps industry with:

- managing environmental risk and ensuring compliance
- using resources more efficiently
- integrating environmental strategies with business planning
- enhancing customer, supplier and community relationships
- engaging and training staff and becoming an employer of choice.

The program brings groups of businesses together in clusters that share regional, industry or supply chain interests and draws on the ideas and experiences of like-minded companies. While results depend on the participants' efforts, Sustainability Advantage provides expertise, training, tools and a network of companies working together towards sustainability.

The Sustainability Advantage recognition program also promotes its partners' work towards environmental performance and advocacy.

Further information

For more information about this program, see www.environment.nsw.gov.au/sustainbus/sustainabilityadvantage.htm.

Education package – chemical storage, handling and spill management practices

In 2005 DECC conducted a Strategic Environmental Compliance and Performance Review focusing on liquid chemical storage, handling and spill management practices. The review included an audit of industrial and government premises, best environmental management practices and the development of educational material.

The education package is a guide to help industry manage environmental risks and understand legal obligations. It contains the CD 'Storing and handling liquids', a 'train-the-trainer' kit consisting of a training plan, trainer's presentation, case studies, activities, photos, participant's manual (guide), and a site action plan.

The CD has been distributed to all councils, industry groups and relevant stakeholders, and is also available on the DECC website.

Further information

For more information about the chemical storage, handling and spill management compliance review, see www.environment.nsw.gov.au/licensing/envcomplchemicals.htm.

Liquid waste fact sheets on protecting the environment and business

Five liquid waste fact sheets have been released, providing important information on best management practices and managing liquid waste. The fact sheets are entitled: *Handling liquid waste*; *Storing liquid waste*; *Preventing spills*; *Responding to spills* and *Reducing liquid waste through cleaner production* (DEC 2005). These fact sheets are available on the DECC website at www.environment.nsw.gov.au/publications/liquidwastefs.htm.

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Appendix A

Premises audited in this review

DECC-regulated premises

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

Scheduled activity	Licence number	Accountable party
Agricultural produce industries	1327	Joe White Maltings Pty Ltd
Agricultural produce industries	1324	Ridley Agriproducts Pty Ltd
Agricultural produce industries	2127	Allied Mills Pty Ltd
Concrete works	1158	Rinker Australia Pty Ltd
Livestock processing – slaughter	10815	Baiada Poultry Pty Ltd
Mineral processing or metallurgical	4414	Metalcorp Recyclers Pty Ltd
Waste activities	11292	Integral Energy Australia
Waste facilities – HIGAB processing	12171	Redlam Waste Services Pty Ltd

Activity	Local authority
Works Depot	Tamworth Regional Council Depot

Council-regulated premises

Activity	Company name
Automotive repairs	Retorque Engine Reconditioning
Engineering	Obeico Industries
Food manufacturing	Buttercup Bakeries
Panel beaters	Nymans Smash Repairs
Abrasive blasting	North West Powder Works and Sandblasting
Fertiliser manufacturing	Rutec Pty Ltd
Engineering/fence manufacture	Belmore Engineering/Tamworth Balustrade
Landscape/nursery supplies	Tamworth Landscaping
Road freight terminal	Eathers/Timberline Transport
Timber frame manufacture	Trusted
Tyre repairs/sales	Colonial Tyres
Wreckers	Taminda Auto Wreckers
Protective coatings	M&S Engineering
Brick kiln – refractory products	Shinagawa Refractories
Abrasive blasting	Krop Industries
Welding	Bluescope Welded Products
Heavy machinery servicing	South Coast Equipment
Coil manufacture/ repairs	Bluescope Coil Processing
Heavy metal fabrication	Klondu Engineering

Appendix B

Excerpts from Protection of the *Environment Operations Act 1997* (sections 116, 120, 167 and dictionary definitions)

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
 - (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.

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.

167 Control equipment

- (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 (excerpts 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 rainwater, 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 rainwater, 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 mean 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.

Glossary

autoclave	A pressurised device designed to heat aqueous solutions above their boiling point to achieve sterilization.
bund	A raised, impermeable barrier forming the perimeter of a secondary containment area.
cyclone	A device used by industry as a primary pollution control device. Cyclones use centrifugal force to separate particles from industrial exhaust streams.
first flush	The proportion of run-off produced during a rain event that is most capable of transporting pollutants from surfaces.
first flush system	A system of weirs, pumps, dams or tanks that is used to both collect and store the first flush from each rain event. The water collected is then stored, tested and either reused or disposed of.
scrubber	An air pollution control device that can be used to remove particles or gases from industrial exhaust streams. Traditionally, the term 'scrubber' has referred to pollution control devices that used liquid to 'scrub' unwanted pollutants from a gas stream.
scrubbing liquor	Liquid used to 'scrub' unwanted pollutants in a scrubber.



