Pollution Solutions

METAL FINISHERS AND ENGINEERS

JULY 2000

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EXPLANATORY NOTES FOR OPERATOR'S ENVIRONMENTAL GUIDE (OEG)

Purpose of the OEG

The *Environmental Protection Act 1994* states 'A person must not carry out an activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm (the "general environmental duty")'. This clause applies to all persons in Queensland.

Under the *Environmental Protection Act 1994* and *Integrated Planning Act 1997* Local Government licenses and approves businesses that have the potential to cause environmental harm – Environmentally Relevant Activities (ERA). Metal Finishers and Engineers are all level 1 and level 2 ERAs listed in the *Environmental Protection Regulation 1998*.

All ERAs must have a development and permit and/or an environmental authority (licence or approval) which lists the conditions of operation to prevent pollution. However, setting these conditions is only part of the story. Businesses should know how to meet these conditions (compliance) and to go beyond (best practice).

This Operator's Environmental Guide (OEG) – *Pollution Solutions for Metal Finishers and Engineers* - has been developed to assist metal finishers to achieve their general environmental duty as above. That is, to achieve compliance with the *Environmental Protection Act 1994* and progress towards best practice environmental management.

The OEG was developed jointly by the Brisbane City Council and representatives of the metal finishing and engineering industry.

Limitations of the OEG

Council has written this OEG as a guide only. It does not form part of the licence or approval conditions. Complying with this document does not necessarily exempt the operator from prosecution or ensure compliance with the *Environmental Protection Act 1994*, Regulation and Policies (Air, Water, Noise and Interim Waste).

Approvals or licences may contain conditions which vary from the requirements in the OEG. These are often included because of site specific requirements or because of the nature of the activity. Whether your operational performance meets the conditions of your development permit and/or environmental authority (licence or approval) will be the main determinant of compliance.

The control measures in the OEG are recommendations only. **It remains the responsibility of each operator and employee of the business to satisfy the general environmental duty applicable to that business.** The operator should carefully consider the information in this OEG and put in place measures that may help to achieve this objective.

This OEG represents accepted metal finishing industry practice at the time of issue and is therefore subject to change. Please note the date recorded on the front.

How to use the OEG

This OEG is based on three central concepts. These are explained below and each operational process is defined according to these concepts.

Environmental Outcomes
are the outcomes or goals that Council considers important to achieve if the environment is to be protected. **The Environmental Outcomes are highlighted in bold text.** You should try to satisfy the general environmental duty. The environmental outcomes in the OEG, however, do not ensure that this duty is achieved and should be considered in conjunction with your development permit and/or approval/licence conditions.

Compliance
means the control measures that Council recommends as the minimum required to meet the environmental outcome for the metal finishing and engineering industry.

In some cases, a number of compliance control measures may be listed for one process. In these cases, you are advised to aim for the control measure or combination of control measures that is most likely to achieve the environmental outcome for that process.

Alternatively, you may be able to meet an environmental outcome in a manner that is not listed in this OEG. It is recommended that in these instances the alternatives be discussed with a Council Officer prior to implementation.

Although this guide lists some solutions, Council encourages operators to develop alternative ideas or innovations that are consistent with the environmental outcomes and other relevant requirements.

Best practice
means the control measures that are considered to be above the minimum requirements. They are not compulsory. Best practice incorporates concepts such as cleaner production, waste minimisation, recycling and reuse. Use of best practice control measures may help to improve industry standards and progress towards best practice in the industry. Best practice measures are marked with a in the text.

In some cases, a business may be required to use a best practice control measure, rather than compliance, if an authorised officer believes that it is necessary to achieve an environmental outcome.

The best practice options listed are not fully inclusive; they only indicate what options may be available. Other best practice options not listed in this OEG may be implemented.

Importantly, this OEG takes into account changing industry standards, technology improvements, and scientific knowledge and community expectations.

ENVIRONMENTAL DUTY

Develop environmental commitment and sound environmental performance

- Develop a commitment to being good neighbours and to preventing or minimising pollution.
- Ensure all staff are aware of the development permit and/or approval/licence conditions and the relevant methods and procedures contained in this OEG.

Develop an environmental management system (EMS) specifically for your business.

Involve staff in developing environmental management procedures.

Ensure all staff are trained in the environmental management of the business.

ENVIRONMENTAL MANAGEMENT

Implement environmental policies and practices

- The object of the *Environmental Protection Act 1994* is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development).

Environmental Management Program (EMP)

Achieve compliance for non-conforming activities

- Operators who are currently unable to comply with the requirements of approval/licence conditions and the OEG may be required to submit an EMP for approval.

- An EMP is a binding agreement between your business and Council that sets out the areas where your business needs to improve to achieve compliance, and the time frame to achieve them. This allows you to operate your business although you may not fully comply, as long as Council has a firm arrangement with you to rectify problem areas in a mutually agreed time.

Environmental Management System (EMS)

Maintain compliance with licence conditions and implement best practices

Develop an EMS to ensure environmental performance and compliance with approval/licence conditions and the OEG. An EMS provides a systematic method for meeting environmental outcomes, licence conditions and the ways or procedures for meeting and exceeding compliance. It allows for:

- better practices
- monitoring of, and reporting on, performance
- training of staff
- keeping of relevant records
- complaint response
- emergency and incident response.

Plan to protect your environment and reduce your business risks

An EMS addresses noise, air quality, waste and any other relevant environmental issues associated with processes that could reasonably pose a significant risk to the environment, if not appropriately controlled, monitored and/or managed.

- For low risk activities, the EMS should be kept concise with control measures, checklists and records (e.g. development permit, waste disposal) maintained.
- In higher risk activities, licence conditions and procedures generally require more detail in an EMS. In some cases, preparation by an environmental consultant is recommended.
- The basic objectives are to increase business performance and reduce environmental risks through good management practices. Key components in the EMS include:
  - monitoring and reporting
  - records
  - training of employees
  - complaint response
  - emergency and incident response.

METAL FINISHERS AND ENGINEERS PROCESSES AND MANAGEMENT

- BOILER MAKING/ENGINEERING AND METAL FORMING
- ELECTROPLATING AND ANODISING
- METAL SURFACE COATING
- GALVANISING

Cleaning and Preparation

Prevent dust nuisance and metal contamination

- Conduct dry sanding of coatings or metals so as not to cause environmental nuisance to neighbours. Metals must not cause contamination to land or stormwater.

- Use tools that are connected to an efficient dust extraction system when dry sanding and grinding.

- Do not let dust from rubbing down accumulate in areas where it may cause dust nuisance to neighbours or be washed by rainfall into stormwater drains.

Minimise trade waste and airborne dust / Reduce waste disposal and labour costs

- Use physical cleaning methods such as scraping, scrubbing or blasting techniques where ever possible.

- Avoid wet sanding, instead use a dry sanding system with dust extraction to completely prepare surfaces.

- Use a wet sponge and a bucket to wet sand and clean prepared surfaces. Then use a wet/dry vacuum cleaner with bag filter to collect the sludge and dust instead of sweeping and hosing down with water. Bag the dust or dried sludge before placing it in the industrial bin for appropriate disposal.

- To clean oily or greasy parts, use 'quick-break' degreasing compounds and detergents to reduce the emulsification of oils and other hydrocarbons. Check with you supplier on the availability of these products.

- When using chemical cleaning baths extend the life of cleaning solutions. Use filtration systems to remove sludge and rejuvenate the solution by topping up with fresh solutions and emulsifiers. Use cleanable filters and reusable filter medium where possible.

Prevent contamination of stormwater and damage to the sewerage system

- Always conduct surface cleaning and preparation on an impervious area, such as concrete, which is covered and bunded to contain spills and exclude stormwater.

- Drain wastewater to sewer via an approved trade waste treatment device and under the conditions of a Trade Waste Permit.

- If not serviced by Council sewerage system collect wastewater in a sump for either:
  - disposal via a licensed liquid waste removalist
  - treatment and reuse see (refer to Appendix 5).
- Never allow liquid wastes to spill, flow or drain on to the ground or to stormwater.
- Dispose of accumulated sludge from waste paints, sanding or rubbing down by a licensed waste removalist.

Minimise solvent emissions

- Always collect solvents that are unsuitable for reuse in sealed containers for recycling or disposal by a reputable solvent recycler .

Reuse or recycle solvent wherever possible.

Abrasive Blasting

Prevent off-site air and water contamination by airborne dusts containing heavy metals and other toxic substances

- Always conduct abrasive blasting, particularly dry blasting, in an enclosed booth or chamber.
- Fine abrasive dust from abrasive cleaning of metal that will contain metal particles must be disposed of to a licensed landfill by a licensed waste removalist.
- For more information refer to the *Operator's Environment Guide – Pollution Solutions for Abrasive Blasters* or consult Council for special disposal requirements of sweepings, filters, spent abrasive blasting material and other associated particulate from abrasive blasting.

Prevent dust and particles escaping into the environment from abrasive blasting operations

- Avoid using copper or zinc slags outside of a blasting chamber and do not allow contamination of land or water.

Use other abrasives (e.g. ilmenite) which do not produce toxic waste.

- Abrasive blasting materials and debris must not enter stormwater or waterways.
- Do not store spent abrasives and debris where contamination of soil or water may occur.
- Recycle spent abrasives or dispose by a licensed waste removalist. A Toxicity Characteristic Leachate Procedure (TCLP) test may be required on the wastes for disposal.
- Handle contaminated residues or solid wastes as for solid wastes (refer to Solid Wastes section).

AVOID THE USE OF SILICA SANDS

Spray Painting and Enamelling

Spray painting or enamelling must be carried out with sufficient controls to ensure minimal emission of overspray (particles) and VOCs to the environment. Such controls can be achieved by using a fully enclosed booth with suitable filters or water scrubbers, sufficient stack height and adequate air velocity (refer to Appendix 1 for Spray Booth Requirements).

Paint Mixing

Protect air quality and workers' health from paint emissions

- Conduct paint mixing and batch preparation in a well-ventilated room.

Position a vapour extraction inlet to draw vapours away from the operator and connect to a filtrated extraction system such as the spray booth ventilation system.

Spray Painting Guns

Reduce overspray wastes and air emissions

- Use efficient spray painting equipment (transfer efficiency > 65%) such as high volume low pressure (HVLP) spray guns and airless electrostatic spray guns. Their use will substantially reduce solvent VOC emissions as well as paint use and operating costs.

Spray Painting

Minimise the release of hazardous compounds to the environment

- Spray painting objects smaller that 2.5M x 2.5M x 3.0M **must** be conducted in a spray booth as specified in Appendix 1.
- Never spray paints containing isocyanates (ie. some two pack paints) outside a spray booth.
- Conduct surface coating of objects too large for a spray booth on an impervious surface or groundsheet which is:
  - fully enclosed (sides and top) with screening materials **or**
  - fully screened (sides only) to a height 2 M above structure, **and**
  - use efficient spray equipment such as HVLP spray guns,
  - discharge or over-spray must not escape through workshop doorways and windows.
- Never conduct spray painting or enamelling (other than small touch-ups) in the open.

Train staff to minimise overspray when conducting surface coating operations.

Ensure proper functioning of the spray booth

- Properly and regularly maintain filtering devices as per manufacturers' advice and specifications or as required for effective operation. Points to watch are:

  Water Scrubber

  – sprays must function correctly

  – make-up water float level must be correct

  – manometer must be fitted to indicate negative pressure between the entrainment and distribution plates

  – follow suppliers' recommendations on addition of water and chemicals.

  Dry (Fibre) Filter

  – filter must fully cover support frame spaces

  – dial gauge or manometer must be fitted to indicate static pressure drop and replacement of filters

  – spare filters must be kept on the premises.

Ensure proper disposal of waste material

- Collect accumulated sludge from any wet scrubber systems for recycling, or dispose using a licensed waste removalist.

- Collect waste paints, thinners and solvents in covered containers either for recycling or for disposal through a licensed waste removalist

Spray Painting Equipment Cleaning

Minimise solvent emissions, use of filters, paints, solvents and operating cost

Use a gun wash station or similarly effective equipment for the cleaning of spray painting equipment. Scrape the paint cups free of residual paint with a plastic spatula before cleaning equipment.

- Store all volatile solvents, such as paint thinners and gun wash, in covered containers fitted with taps. This will avoid the need to pour solvents.

- Store all contaminated and spent solvents used for cleaning equipment in sealed drums for:

  – disposal by a licensed waste removalist

  – recycling offsite via a solvent recycler

  onsite recycling and reuse (refer to Appendix 5).

Note: The above control measures are the minimum requirements for spray painting operations. Under some circumstances such as large scale operations in sensitive areas and where complaints have arisen from the operation, more stringent standards may be applied, including modelling, evaluation and monitoring.

Cutting Operation

Prevent fire hazards and the emissions of fumes and smoke

- Always use oxy-acetylene torches away from possible ignition sources such as oils, grease and rubber. This will avoid accidental combustion and the generation of dangerous fumes and smoke.

Avoid fire hazards and smoke emissions

- Where feasible, use the appropriate saws for your cutting operations, as these will not ignite rubber and other materials.

Minimise airborne dusts

- Conduct all cutting operations on a paved, covered surface so that metal scraps and filings can be vacuumed or swept up.

ELECTROPLATING AND ANODISING PROCESSES AND MANAGEMENT

Process Controls

Minimise waste and improve resource efficiency

- Regularly check all solution temperatures and concentrations. Maintain them within recommended working limits to optimise chemical usage.
- Incorporate two stages of water rinse after alkali and acid treatments to minimise carryover between treatment stages and to optimise chemical use.
- Use additives in chemical tanks to minimise foaming, mist generation and splashing. This will help to reduce the generation of wastes, promote efficient chemical usage and reduce costs.

Minimise contamination and generation of wastewater

- Run chemical baths at the lowest practical concentrations to reduce the amount of chemical carried forward to rinse water.
- Ensure items are as free draining as possible.
- Use drain boards between process tanks. Slope the boards to direct caught solution back into the tank from where the workpiece has been drawn.
- Use flow controllers in the water lines to the rinse tanks. This will save water and reduce the amount of water to be treated.
- For most heated plating solutions, make the first tank after the plating tank a 'drag out tank' which is a static tank (no running water). Top up the plating solution from this 'drag out tank' to reduce chemical replenishment costs and the amount of materials needing treatment prior to discharge.
- Spent tank solutions and sludges must be removed from site by a licensed waste removalist for safe disposal at a licensed regulated waste treatment and disposal facility.

Minimise energy and water use and the generation of wastewater

- Reuse the out-flowing water and the plating rinse tank in the rinse tank immediately before plating (e.g. nickel plating).
- Recycle water from the treatment plant into such areas as non-critical rinses after cleaners or pickle tanks or in hose-down areas.
- Cover hot chemical tanks with floating balls or satchels to minimise heat loss, evaporation, spillages and splashing as items enter and leave the process tanks.
- To further reduce heat loss insulate heated tanks and cover while the baths are not in use.

- In large electroplating installations it may be economic to:
  - recycle metal salts (separate from wastewater by ion exchange)
  - recycle water (distilled from wastewater using heat).

Control Spills/Leaks

Prevent site, stormwater groundwater and waterways contamination

- Use alarms based on conductivity bridges to detect spills, leaks and process accidents. These can alert staff for prompt corrective action.
- Regularly check all instrumentation to validate it is correct and operational.
- Ensure that bunds and drains are in place to prevent spills and overflows from process tanks baths, vessels or pipes. Have emergency procedures to manage such an event.
- Drain the bunded process areas into holding tanks/pits for treatment or liquid waste disposal.
- Routinely check any process tanks (eg. acid or alkaline tanks) and bunds for structural integrity. Have emergency procedures for equipment failure, pipe rupture or any other potential problems.

Minimise Toxic Emissions

Protect air quality and human health

- Provide extraction and ventilation near the top of each tank emitting toxic gases. Treat toxic emissions through mist eliminators and gas scrubbers and pass final effluent to the stack. Pass all extraction system blowdown and/or condensate to the wastewater treatment plant.
- Ensure that the maximum temperature of the sulphuric acid is 70°C. Keep the acid concentration within recommended limits to minimise fume formation.
- Alternatively use cold hydrochloric acid.

Pre-treatment

Prevent contamination of stormwater and damage to the sewerage system

- Contain liquid pre-treatments (e.g. chromate conversion coatings and phosphate conversion coatings) and rinse water used to prepare the metal surface for powder coating within a bunded and covered work area. Any liquid waste from these processes is to be collected and treated prior to disposal.

  Note: Where effluent quality is satisfactory it may be disposed of to the sewer under the conditions of a Trade Waste Permit.

- Routinely check any process tanks and bunds for structural integrity. Have emergency procedures for equipment failure, pipe rupture or any other potential problems.

Application of Powder Coating

Prevent off-site air contamination by airborne dusts containing heavy metals and other toxic substances

- Application of powder coating materials must be completed within a spray booth. Appendix 2 details information regarding Powder Coating Booth Design Requirements. Only large items may be powder coated outside a booth in accordance with the guidelines below.

- Always complete 'touch ups' of powder coat **after** initial coating is applied and **prior** to curing within the spray booth.

- Complete application of powder coat in the centre of the booth and as close as practical to the exhaust points within the booth. This will ensure optimum collection of overspray. Make sure overspray does not escape from within the confines of the booth.

- Vacuum up spills of powder coat as soon as possible. The floors surrounding the powder coating booths should be vacuumed a minimum of twice daily.

  Note: Consideration should be given to the potential for creating explosive atmospheres and guidance should be sought regarding this issue from the Division of Workplace Health and Safety and AS 3754-1990.

- Where a job cannot be carried out within a booth the following is required:
  - it must be demonstrated that an operation will not cause environmental harm or environmental nuisance (advice should be sought from Council)
  - use a base, such as a dropsheet which can hold any unused powder
  - erect temporary sheeting or any other suitable material around the job to hold and contain any unused powder
  - never do powder coating during unsuitable environmental conditions such as strong winds or rain
  - direct spray in a downward direction wherever possible
  - vacuum up spills immediately
  - make sure that staff are fully aware of the controls in place.

Reduce process wastes, increase efficiency and reduce operating costs

Collect and reuse powder overspray.

Curing of Coatings

Prevent fire or explosions

- Always store all flammable and combustible liquids away from the curing oven or booth.

Reduce process wastes, increase efficiency, reduce operating costs and ensure proper disposal

- Waste powder coat material should be:
  - collected and reused
  - cured in the oven prior to disposal to the industrial waste bin

  Note: Contact the Council for further information regarding disposal requirements of powder coating materials.

- Ensure safe ventilation of curing oven.

NO EMISSIONS FROM CURING ARE TO ESCAPE INTO WORK AREAS

Dust Control

Minimise airbourne dust

Empty collected powder from vacuum and booth filtration system within the spray booth.

- Clean powder from operators and articles within the spray booth.

GALVANISING OPERATIONS PROCESSES AND MANAGEMENT

Process Controls

Minimise waste and improve resource efficiency

- Regularly check all solution temperatures and concentrations. Maintain them within recommended working limits to optimise chemical usage.
- Incorporate two stages of water rinse after alkali and acid treatments to minimise carryover between treatment stages and to optimise chemical use.
- Use additives in chemical tanks to minimise foaming and splashing. This will help to reduce the generation of wastes, promote efficient chemical usage and reduce costs.
- Insulate heated tanks and cover when not in use to minimise heat loss.

Prevent site, groundwater, stormwater and waterways contamination

- Use alarms based on conductivity bridges to detect spills, leaks and process accidents. These can alert staff for prompt corrective action.
- Regularly check all instrumentation to validate it is correct and operational.
- Bund process areas and drain them into holding tanks/pits for treatment or liquid waste disposal.
- Routinely check any process tanks (eg. acid or alkaline tanks) and bunds for structural integrity. Have emergency procedures for equipment failure, pipe rupture or any other potential problems.
- Spent tank solutions and sludges must be removed from site by a licensed waste removalist for safe disposal at a licensed regulated waste treatment and disposal facility.

Galvanising Controls

Maintain and protect local and regional air quality

- Minimise ash formation on the surface of the galvanising tank by:
  - using the dry flux process
  - double rinsing after acid wash to minimise iron carryover into the flux and galvanising tanks
  - minimising immersion time in the galvanising tank.
- Ash and dross removed from the galvanising tank must be disposed of by a licensed waste removalist or sold to a bona fide metal recycling merchant.
- The dry fluxing process is recommended for general industry use. Dry fluxing is usually cheaper to operate than wet fluxing.

- Emissions from this activity must comply with those outlined in the *Environmental Protection (Air) Policy 1997* or those prescribed by Council.
- The stack height must be at least 14 metres above ground level or 4 metres higher than the roof ridge of the highest structure within a 40 metres radius.
- Exit velocity of air emissions from the stack must be at least 10 metres per second and must be directed vertically upwards.

  Note: Greater stack heights may be required to meet the criteria for design ground level concentrations or in specific situations where Council determines that adequate dispersion will not be achieved by the minimum height.

- Extraction and ventilation must occur from close to the surface of the hot flux and molten zinc tanks. The extraction gas flow must be treated by a wet scrubber or bag filter system. The molten zinc bath should be kept hot, between 440°C and 460°C to minimise dag formation.
- Runs and dags can be removed from the items by pneumatic or mechanical means.
  – Pneumatic dag/run removal produces zinc dust. This dust can be reclaimed by cyclones or bag filters for direct sale to end users of this material. This material is very fine and must be directed to drums for transport off the premises

The use of gas heating is recommended.

STORAGE OF POTENTIAL CONTAMINANTS

Minimise accidental spills and prevent contamination of soil, stormwater, ground-water and/or air

- Store chemicals and other materials that may contaminate soil, stormwater, groundwater and/or air in a manner that prevents or minimises the impact of any accidental spills or releases. This means:

  – potential liquid contaminants stored in a secure, covered area away from through traffic. Such contaminants may include disinfectants, fuels, oils, detergents, poisons, cleaning solvents, alkaline or acidic solutions;

  – storage areas provided in an impervious bunded area or compound to contain any leakage or spillage. The capacity of the compound shall be at least the capacity of the largest tank or package in the compound (Bunding may not be required where the storage is inside a workshop or similar area and the operator can demonstrate that any spills will not escape the area and contaminate stormwater or surrounding ground.); and

  – implement a routine maintenance program that checks the condition of storage tanks and their bunds and liners;

  – where dangerous goods (as defined by the ADG Code) are stored in quantities in excess of minor storage (refer to Note below), the capacity of the compound shall comply with the requirements of the relevant legislation, Australian Standard and/or Code of Practice.

  Relevant Australian Standards may include:

  – *AS 1940 The storage and handling of flammable and combustible liquids*
  – *AS 2022 Anhydrous ammonia - Storage and handling anhydrous ammonia*
  – *AS 2714 The storage and handling of hazardous chemicals - Class 5.2 substances (organic peroxides)*
  – *AS 3780 The storage and handling of corrosive substances*
  – *AS 3833 The storage and handling of mixed classes of dangerous goods in packages and intermediate bulk containers*
  – *AS 4081 The storage, handling and transport of liquid and liquefied polyfunctional isocyanates*
  – *AS 4326 The storage and handling of oxidising agents*
  – *AS 4452 The storage and handling of toxic substances*

  Note: Storage of materials in excess of minor storage quantities may require approval, licensing and full compliance with the above standards. Contact Council or the relevant dangerous goods administering authority for further information.

- Storage must be:
  – away from any heating or ignition sources
  – provided with adequate natural or mechanical ventilation relevant to the nature of the substance and its use.

Reduce volatile emissions

- Store volatile liquids (e.g. solvents, thinners) in closed containers that are kept closed when not in use. This will avoid unnecessary exposure of volatile liquids.

- Keep Material Safety Data Sheets (MSDS) for all hazardous substances used or stored on site. In case of an emergency an MSDS is the most effective means of assessing risk.

CAUTION!: Some classes of materials may react dangerously if mixed or stored together. Incompatible materials must be segregated to minimise the possibility of any reaction. Read and follow all directions on labels. Refer to the material's Material Safety Data Sheet (MSDS) or contact the manufacturer for further information.

Respond promptly to spills and leaks

- Keep clean-up equipment, absorbent materials, and any materials for neutralising or decontaminating spills on the premises. Staff are to be adequately trained in the use of these materials.

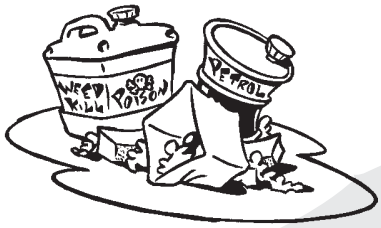
- Immediately take action to clean-up spills or leaks. Contaminated materials are not to be reused and must be appropriately contained and packaged for transport for either recycling or disposal by a licensed waste removalist.

Minimise chemical risks

Kit containers of chemicals (e.g. solvents) with tops to enable pumping instead of pouring.

- Position trays under chemical container taps to catch any spillage or drips. Ensure the tray's material is compatible with the chemical.

WASTE MANAGEMENT



Reduce wastage of material resources and landfill space

- Minimise all wastes produced by site activities.

Recycle and reduce waste disposal costs

Disposal of wastes should be viewed as the **last** option in environmental management strategies. The life of material resources may be extended by recovery, reuse and recycling.

Implement a waste recycling (reuse) system for non-hazardous solid wastes using separate containers for individual waste streams (refer to Solid Wastes section).

- Clearly label waste containers and locate them in convenient areas to encourage use. Mixing wastes may make them unsuitable for reuse or recycling.

Protect soil, stormwater and groundwater quality

- Store solid wastes undercover so contaminants cannot be washed to stormwater by rain.
- Never dispose of waste on site.

Use wet/dry vacuum cleaners with dust filters for general cleaning of floors instead of sweeping and hosing with water.

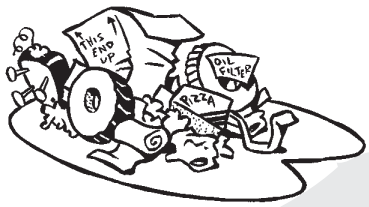
Prevent landfill hazards

- Material put into industrial bins will generally go to landfill. Do not dispose of gas cylinders, asbestos-containing materials or synthetic-mineral fibres into an industrial bin; instead these wastes should be disposed through a licensed waste removalist.
- Put only solid inert waste in industrial bins.

Protect air quality

- Incinerating waste on site is prohibited.

SOLID WASTES



Hazardous Wastes (regulated)

Prevent contamination of landfill, soil and water

- Regulated wastes are those that have been identified as unsafe for municipal or refuse landfill disposal. These wastes are listed in Schedule 7 of the *Environmental Protection Regulation 1998* (refer to Appendix 2) and must be disposed through a licensed waste removalist.

- Keep proof of proper disposal of hazardous wastes for presentation to Council officers. Proof includes:
  - hazardous waste disposal facility dockets
  - waste manifest documents
  - licensed waste transport receipts.

Non-hazardous Wastes

Conserve material resources, landfill space and reduce waste disposal costs

The following solid wastes are recyclable. They should be collected in separate containers for disposal at a waste recycling and reprocessing facility:

- clean cardboard
- aluminium cans, drink bottles
- plastics
- steel drums, drained steel cans
- metals and metal parts
- rags (can be laundered and reused).

Ensure appropriate disposal of non-recyclable solid wastes

- Always dispose of non-recyclable solid waste at a licensed general waste disposal facility (e.g. local government service or approved waste removalist).

Prevent contamination of landfill and groundwater with hazardous wastes

- Empty all containers or vessels containing oils, solvents, and other chemicals or potential contaminants before disposing via the industrial bins.

Prevent air contamination by harmful dusts

- Bag floor sweepings and other dusty wastes before disposing via the industrial bins.

- Only transport general solid waste in your own vehicle, or by a licensed waste transporter.

LIQUID WASTES

Non-sewerable Wastes (regulated)

Prevent contamination of land, soil and water

- Non-sewerable (regulated) wastes (e.g. spent tank solutions) are those that have been identified as unsafe for sewer disposal. These wastes are outlined in Schedule 7 of the *Environmental Protection Regulation 1998* (refer to Appendix 4) and must be disposed of by a licensed waste removalist.
- Keep proof of proper disposal of non-sewerable wastes for presentation to Council officers upon request. Proof includes:
  - hazardous waste disposal facility dockets
  - waste manifest dockets
  - licensed waste transport receipts.

Separate out recyclable liquid wastes for collection by a licensed waste removalist. Recyclable liquid wastes include solvents, thinners, waste oils and fuels.

Sewerable Wastes

Ensure compliance with licence conditions (Trade Waste Permit)

- Obtain a Trade Waste Permit from Council prior to discharge of any trade waste to the sewer. The permit establishes the discharge conditions for the waste.
- Maintain wastewater treatment systems (eg. settling, precipitation and neutralisation) to conditions of the discharge permit (eg. pH and metal content).
- Water-miscible solutions are generally accepted under a Trade Waste Permit. This may include **dilute** organic wastes.

Prevent contamination of land, soil and water

- As a guideline the minimum treatment required for discharge to sewer is an oil/interceptor trap. Design the wastewater treatment system to meet the requirements of a current Trade Waste Permit and the *Environmental Protection Act 1994*.
- Washdown waters must either be directed to the sewerage system under the conditions of the Trade Waste Permit, or collected for recycling or disposal by a licensed waste removalist.

On-site treatment and reuse of wastewater (eg. washdown waters, distillation) can be used to replace or reduce disposal of wastewater to sewer. However, the systems of treatment and nature of reuse must not cause pollution or be hazardous to persons (refer to Appendix 5).

Prevent health and explosion hazards to sewerage workers and the public, and protect the sewerage system

- **Never** discharge contaminants such as sludge, volatile solvents and hydrocarbons to the sewerage system.

STORMWATER MANAGEMENT

Prevent contamination of soil, stormwater and local watercourses

Stormwater flows untreated to your local creek or waterbody.

- Prevent stormwater from entering or leaving work areas where it may become contaminated with grease, oils, chemicals, particulates or solvents.
  - Cover and bund work areas where necessary to avoid the incursion of stormwater and prevent hazardous and trade wastes from contaminating the surrounding soil and stormwater system.
- Prevent wastewater containing contaminants (e.g. ammonia, detergents, acids, alkalis and metal solutions) from contaminating stormwater or ground. Do not hose workshop floor, vehicles or machinery parts on to the surrounding soil or the stormwater drains.
- Store wastes undercover so that contaminants cannot be washed to stormwater by rain.

Avoid sewerage system overload

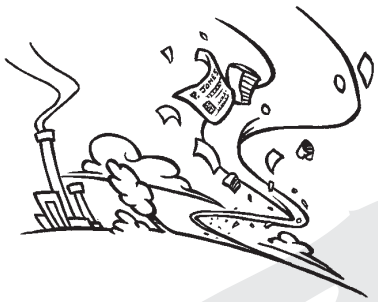
- Do not direct stormwater to the sewerage system. It is an offence under the *Sewerage and Water Supply Act 1949*.
- Contain any contaminated stormwater (e.g. holding tank) and either:
  - dispose of by a licensed waste removalist
  - treat on-site to an appropriate standard for discharge
  - treat on-site for recycling or reuse (refer to Appendix 5).

For large or high risk sites, a stormwater management plan should be included as a sub-plan within the environmental management system. Erosion and sediment control should also be covered.

CAUTION!: Contaminating stormwater and other Queensland waters may result in an 'on the spot' fine or prosecution under the Environmental Protection Act 1994.

The Environmental Protection (Water) Policy 1997 prohibits the discharge of 'certain things' into a roadside gutter, stormwater or a water, or to a place where it could be reasonably expected to move or to be washed into a roadside gutter, stormwater or a water. Discharges to stormwater must comply with the Environmental Protection (Water) Policy 1997.

AIRBORNE WASTES



Stack Emissions

Maintain and protect local and regional air quality, soil and waters

- Emissions from this activity (e.g. dusts, solvents or odours) must comply with those outlined in the *Environmental Protection (Air) Policy 1997* or those prescribed by Council.
- The stack requirements are detailed in Appendices 1 and 2.
- Use air-dispersion modelling to determine:
  - buffer distances between the activity and sensitive land
  - optimum stack height and exit velocity.

Maintain air pollution control equipment

- Examine and review the need for enhanced emission controls and if you receive complaints about performance.
- Regularly maintain any emission control equipment such as cyclones, baghouse filters or afterburners as per manufacturers' instructions.
- Immediately replace or repair any emission control equipment that is blocked, frayed, leaking or not functioning within specifications. Spare bags and filters must be kept on-site.

Ensure emissions are below prescribed Air Quality Limits

- Undertake regular monitoring, recording and reporting of air emissions to ensure compliance with the stack emission standards and ambient standards set in the *Environmental Protection (Air) Policy 1997.*
- Install monitoring ports in all stacks and other air emissions discharge points. Refer *AS 4323.1 (1995) - Stationary Source Emissions: Method 1: Selection of Sampling Positions.*
- Keep a register of all recorded emissions and air quality indicator levels measured and have available for Council inspection.

Dust Control

Maintain and protect local and regional air quality, soil and waters

- Control dust generation so that particles do not move off-site. Dusts may also contain hazardous materials and contaminate air, soil and waters.
- Immediately clean up material spilt on traffic areas before vehicle movement can move it.
- Regularly collect and place in a sealed bag any floor sweepings, dust, powder waste or absorbent clean up materials, before disposing in a covered waste bin.

- Use wet/dry vacuum cleaners with dust filters for general cleaning of the workshop floors instead of sweeping and hosing with water.
- Cover any raw material with a high dust generating potential.
- Transport dry fine or dust material in covered vehicles to reduce odour and dust nuisance.
- Enclose truck loading and unloading areas to reduce dust emissions.
- Provide dust extraction systems for loading/unloading activities with a high dust generating potential.

Minimise dust emissions and potential contaminants from exposed surfaces

- Specify speed limits on exposed road surfaces (<40km/hr).
- Regularly water unsealed roads (clean water @ 1-2l/m^2). This will prevent dust nuisance from traffic.
- Erect barriers to discourage vehicles on unsealed areas.
- Seal, turf or cover sites with a dust suppressant to minimise airborne dust.
  Suppressants include:
  - compacted road base
  - aggregate
  - organic dust-binding agents.
- Never use waste oil or other contaminants on dirt roads as dust suppressant or weed killer. This may lead to the site being notifiable under the *Environmental Protection Act 1994*.

Odour/Volatile Emissions

Reduce odour and volatile emissions to prevent environmental nuisance

- Maintain adequate ventilation and hygiene to reduce the generation of odour.
- Control any exhaust emissions from vehicles to prevent nuisance or objectionable odours / fumes off-site.
- Maintain good housekeeping and cleaning practices.
- Use mechanical ventilation systems and activated carbon filters or scrubbers to prevent the release of any uncontrolled and objectionable odours from buildings or rooms.
- Volatile liquids (solvents):
  - are to be kept cool and be stored in a covered container to prevent evaporation into the environment
  - should be pumped instead of poured.
- Avoid use of volatile and odorous solvents, cleaning chemicals or sprays.

NOISE MANAGEMENT

Prevent nuisance and unreasonable noise

- The activity must not cause an 'unreasonable noise' as defined in the *Environmental Protection (Noise) Policy 1997.*

Use the layout of the buildings and the natural topography as noise barriers where possible. Cost-effective landscaping improvements (e.g. fencing, mounds, and plants) can be implemented to reduce noise emissions and therefore noise complaints.

- It is best to avoid using extension telephone bells and public address systems but if they are considered necessary keep them at the lowest possible audible level. Ensure that music does not cause an annoyance to the neighbours.

- Ensure that silencers fitted to air compressors, pumps, fans and blowers and other noisy machinery are effective.

- Enclose or acoustically screen noisy equipment not complying with *Environmental Protection (Noise) Policy 1997* to muffle noise. Locate equipment or operations away from noise sensitive land uses.

- Reduce structural-borne noise and vibration by mounting equipment on vibration isolating platforms, rubber mats, or by increasing the mass weight of equipment.

- Fit mechanical ventilation systems (e.g. air conditioners, fans) with noise-proof ducting and acoustically designed intake and exhaust openings.

Ask for noise-reduction devices when purchasing new plant and equipment.

Close windows and roller doors facing noise-sensitive premises and seal all unnecessary openings.

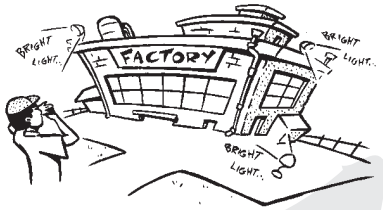
Only operate heavy vehicles in daylight hours .

- Regularly maintain all equipment and vehicles and attend promptly to any loose parts, rattling covers, worn bearings and broken components. This should be addressed through a regular maintenance schedule and correct staff training.

Note: Premises causing ongoing noise problems may be required to introduce other noise control measures, including noise monitoring and reporting.

Operators should be aware of the cumulative effects of noise levels on the receiving environment, and where practical, take appropriate steps to reduce noise levels from their operation, particularly before 7am and after 6pm.

VISUAL AMENITY



Prevent environmental nuisance

- Ensure that lighting of the premises for security or any other reason does not cause annoyance to the occupants of neighbouring residential areas.

  Control measures for lighting include:

  – design and layout of lights and reflective surfaces
  – brightness of lights/shading of lights
  – height of lights
  – hours of operation of lights.

- Signage is to be compatible with Council town planning requirements for amenity.

APPENDIX 1 – SPRAY BOOTH REQUIREMENTS

- Spray painting must be conducted in a fully enclosed booth that has an exhaust fan and a filtration system with a particle removal efficiency of at least 90%. The following table lists preferred filtration methods:

APPLICATION RATE	FILTRATION SYSTEM	FILTRATION EFFICIENCY
0-4 litres per hour	Dry (fibre) filter, water scrubber	> 90%
> 4 litres per hour	Water scrubber, activated carbon adsorption & dry (fibre) filter	> 90%

  Overspray from large production can rapidly block dry filter pads, therefore where paint application rate is more than 4 litres/hour a water scrubber is the preferred filtration system.

- Exhaust gases must be discharged vertically through a stack with:
  - an internal diameter of not less than 0.5 metres and
  - either 8 metres high above the ground or 4 metres higher than the highest ridgeline of the surrounding buildings within 15 metres of the stack, whichever is higher.

  Note: For Galvanising Electroplating and Anodising Workshops *the stack height must be at least 14M above ground level or 4M higher than the roof ridge of the highest structure within a 40M radius. The exit velocity of stack air emissions must be directed vertically upwards.*

- Exit velocity of the exhaust gases must not be less than 10 metres per second.
- Fit emissions stack with an effective rain protection device that does not impede the discharge of exhaust gases from the stack.
- Install a monitoring port at the exhaust stack. Refer to Australian Standard AS4323.1 (1995) - Stationary Source Emissions. Method 1: Selection of Sampling Positions.

  The above conditions may be adjusted for particular circumstances if warranted by the risks involved. Large continuous spray painting operations and operations very close to sensitive areas may be required to install more advanced filtration system (e.g. activated carbon filter) to reduce the total volatile organic compound (VOCs) levels in the exhaust gases. These operations will be assessed on a case by case basis.

- *For spray booth design requirements, refer to Aust. Standard (AS/NZS 4114.1 and 4114.2:1995) for Spray Painting Booths and check with the Queensland Division of Workplace Health and Safety.*

APPENDIX 2 – POWDER COATING BOOTH REQUIREMENTS

Guidance on the construction of Spray Booths for Powder Coating should be taken from the specifications as detailed within AS *'Safe Application of Powder Coatings by Electrostatic Spraying'.*

The design of the powder-coating booth should be such that airborne powder must not escape from the booth into the workplace. The following table lists general requirements.

Where two or more spray guns operate simultaneously, the booth apertures through which the powder is sprayed should be located directly opposite each other and should not be located within 600 mm of each other when measured horizontally.

AVERAGE AIR VELOCITY THROUGH EACH BOOTH OPENING	STACK REQUIREMENTS		FILTRATION EFFICIENCY
	HEIGHT	EXIT VELOCITY	
< 0.40 M/S	• 8 metres above the ground **or** • 4 metres above the highest ridgeline of the buildings (which ever is highest)	> 10 m/s	> 90%

Exhausted air/powder coat mix collected within the spray booth should be removed from the booth through a filtration system. This filtration system should consist of a cyclone filter and/or a wet scrubber, textile or cartridge filter.

Exhausted air quality from stacks venting spray booths will be required to comply with the standards prescribed by the *Environmental Protection (Air) Policy 1997.*

Consideration must be given to hazards due to dust explosion and fire associated with the application of powder coating.

Consideration should be given to adjacent buildings and structures when designing exhaust stacks, to ensure that the dispersal of effluent does not adversely impact on the amenity of, or cause an environmental nuisance to persons occupying such buildings or structures.

A monitoring port is to be installed within the exhaust stack.

Spare filters should at all times be kept on site. Weekly inspections of the filtration system should be completed to ensure that the system is not leaking.

Leaks are to be repaired immediately and maintenance records kept by the operator. Filters should be wrapped in plastic bags prior to disposal to prevent escape of dust.

Booths should be positioned within the work area so as they are not affected by any air draughts flowing through the building, thereby potentially affecting the overspray capture efficiency within the booth.

APPENDIX 3 – DEFINITIONS

Bund
An impervious embankment or wall of brick, stone, concrete, or other approved material that may form part or all of the perimeter of a compound. For example, a bund may be used to contain spills from a fuel tank.

Environmental Harm
An adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value and includes environmental nuisance, *Environmental Protection Act 1994*.

Environmental Management Program (EMP)
A specific program that, when approved, achieves compliance with the *Environmental Protection Act 1994* for the matters dealt with by the program by:
(a) reducing environmental harm
(b) detailing the transition to an environmental standard.

Environmental Management System (EMS)
Is a systematic approach to managing the environmental aspects of an activity. As a minimum for the lower risk activities administered by Council, an EMS would entail documenting standard operating procedures for the aspects of the activity that may result in environmental harm or nuisance.

Environmental Nuisance
Any unreasonable interference or likely interference with an environmental value that is caused by noise, dust, odour, light, an unhealthy, offensive or unsightly condition because of contamination, or another way prescribed by regulation, *Environmental Protection Act 1994*.

Environmental Value
(a) A quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety; or
(b) another quality of the environment identified and declared to be an environmental value under an environmental protection policy or regulation, *Environmental Protection Act 1994*.

General Environmental Duty
A person must not carry out an activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm.

Material Safety Data Sheets (MSDS)
Information sheets on products that manufacturers are required to provide. They outline the composition, applications and precautions that need to be taken in using such products.

Regulated Liquid Wastes
Those wastes that have been identified as unsafe for sewer disposal due to their chemical nature (e.g. flammable). These wastes are outlined in Schedule 7 of the Environmental Protection Regulation 1998.

Regulated Solid Wastes
Those wastes that have been identified as unsafe for landfill disposal. These wastes are outlined in Schedule 7 of the *Environmental Protection Regulation 1998*.

Stormwater
Rainfall that runs off hard surfaces, such as roofs, roads and car parks, or off ground that has become saturated. Stormwater flows untreated to local creeks.

Trade Waste
Liquid wastes from any business, industry, trade or manufacturing process approved for sewer disposal other than domestic sewage

Unreasonable Noise
An unreasonable noise is one which:

(a) causes unlawful environmental harm because of:
- its characteristics
- its intrusiveness
- the time at which it is made
- where it can be heard
- other noises ordinarily present at the place where it can be heard

(b) is not declared to be reasonable in and Environmental Protection Policy.

VOCs (Volatile Organic Compounds)
Evaporated organic solvents (e.g. hydrocarbons or alcohols, or unburnt liquid fuels) that are known or suspected to have environmental or health effects. Examples of VOCs include solvents, thinners, acrylic lacquers and fuels.

APPENDIX 4 – SCHEDULE 7 - REGULATED WASTES

- Abattoir effluent
- Acids and acid solutions
- Adhesives (other than solid inert polymeric materials)
- Alkalis and alkaline solutions
- Antimony
- Arsenic
- Asbestos (all chemical forms)
- Azides
- Barium
- Batteries
- Beryllium
- Biocides
- Boiler blowdown sludge
- Boron
- Cadmium
- Caustic solutions
- Chlorates
- Chromium
- Contaminated soils
- Copper compounds
- Cytotoxic wastes
- Detergents
- Distillation residues
- Dyes
- Electroplating effluent and residues
- Filter backwash waters
- Filter cake sludges and residues
- Fish processing waste
- Fly ash
- Food processing waste
- Grease interceptor trap effluent and residues
- Halogen compounds (other than solid inert polymeric materials)
- Heat treatment salts
- Heterocyclic organic compounds containing oxygen, nitrogen or sulphur
- Hydrocarbons (oxygen, nitrogen or sulphur)
- Industrial plant wash down waters
- Infectious substances
- Inks
- Inorganic cyanides and cyanide complexes
- Inorganic sulphur compounds
- Isocyanate compounds (other than solid inert polymeric materials)
- Laboratory chemicals
- Lead
- Lime neutralised sludges
- Lime sludges
- Materials or equipment contaminated with infectious substances
- Mercaptans
- Mercury and anything containing mercury
- Metal finishing effluent and residues
- Methacrylate compounds (other than solid inert polymeric materials)
- Nickel
- Oil interceptor sludges
- Oil water emulsions and mixtures
- Oils
- Organic solvents
- Oxidising agents
- Ozone depleting substances
- Paint sludges and residues
- Perchlorates
- Pesticides
- Petroleum tank sludges
- Pharmaceutical substances
- Phenolic compounds (other than solid inert polymeric materials)
- Phosphorus
- Pickling liquors
- Polychlorinated biphenyls and related substances
- Polymeric lattices
- Poultry processing wastes
- Quarantine waste
- Reactive chemicals
- Reducing agents
- Resins (other than solid inert polymeric materials)
- Saline effluent and residues
- Selenium
- Silver compounds
- Solvent recovery residues
- Surfactants
- Tallow
- Tannery effluent and residues
- Tars and tarry residues
- Tellurium
- Textile effluent and residues
- Thallium
- Timber preservative effluent and residues
- Treatment tank sludges and residues (including sewage tank sludges and residues)
- Tyres
- Vanadium
- Vegetable oils
- Vehicle wash down waters
- Wool scouring effluent & residues
- Zinc compounds

APPENDIX 5 – ON-SITE TREATMENT AND REUSE OF WASTEWATER OR STORMWATER

a) The operator should consult with the Council regarding any system for the collection, treatment and reuse of wastewater (e.g. washdown waters) or stormwater that may be contaminated. This needs to be approved by Council to ensure the method and level of treatment is adequate and safe.

b) It is generally necessary to test and monitor treated waters to demonstrate effectiveness of the system for Council approval.

c) Consideration must be made of:
   - volumes to be treated
   - handling and storage
   - key contaminants
   - types of treatment
   - disposal of wastes (e.g. sludge)
   - safety and hygiene
   - testing and frequency.