

Water Quality Protection Note

Chemical blending

Purpose

This agency is responsible for managing and protecting Western Australia's water resources. This note

- provides a considered, timely and consistent view on a specific topic;
- guides on accepted practices that should help protect the quality of water resources; and
- provides for future development of a code of practice or environmental guidelines that seek to balance the views of industry, government and the community, while sustaining a healthy environment..

Chemicals have the potential to harm people and the environment if not managed correctly. Chemical blending can pose a threat to the quality of water resources through inappropriate storage, handling and disposal of the chemicals.

Algal blooms in sensitive environments, such as the Swan and Canning Rivers, have shown these waterways are under stress. The Swan-Canning Clean-up Program aims to protect the ecology and amenity of these systems through monitoring of river health, reducing contaminant inputs and enhancing protection of waterways. The cumulative effects of human activities put pressure on water quality. Improved land use management practice by many community members is needed. These notes encourage use of best environmental practice by the chemical blending industry as a contribution towards reducing contamination of sensitive water resources.

The note is intended as a general guide on issues of environmental concern, and to offer potential solutions based on professional judgement and precedent. Development proponents may propose alternative, innovative yet practical, environmental solutions suited to local conditions. This note's recommendations should not be used by regulators in place of a site specific assessment of any project's environmental risks. Any conditions set by regulators should consider the local setting and the protection needs of the surrounding environment. This note may not be used as this agency's policy position on a specific matter, unless confirmed in writing by an authorised officer. The note may also be varied at our discretion as new information becomes available.

The former State Government agencies the *Department of Environmental Protection and Water and Rivers Commission* are presently being combined to form the *Department of Environment*. This process will not be complete until enabling legislation has been passed by Parliament and proclaimed. This note aims to present a generic 'combined agency' position on the nominated topic.

Scope

The acquisition of raw materials (often in bulk) and their conversion to finished products is termed chemical blending. Chemical blending involves the storage of raw materials, their transfer or mixing, and storage and preparation of finished products for distribution to customers. Industries in Western Australia formulating and blending chemicals fall into 2 main categories:

- a. Domestic and industrial chemicals (inorganic or organic) including acids, alkalis, coolant, detergents, disinfectants, dyes, nutrients, paints, pharmaceutical products, polymers, salts, and solvents; and
- b. Pesticides, including insecticides, fungicides, rodenticides and herbicides.

This note applies to premises where chemicals or chemical products that are stored, decanted, blended, diluted or packaged, could cause contamination of waters in the environment in the event of spillage or discharge.

Recommendations

Siting of facilities

1. These facilities should be located on land with the following attributes:
 - a. Sites zoned for the activity in the local government planning scheme;
 - b. Have access to essential services, including appropriate waste treatment and recycling facilities;
 - c. Have sufficient on-site area to provide for safe and effective management of waste products;
 - d. Sufficient area for probable future expansion;
 - e. In a secure weatherproof building with flooring suited to containment and clean-up of chemical spills;
 - f. Have appropriate separation distance to sensitive environments.

Sensitive environments

Special regulatory constraints may apply in the following sensitive environments:

- a. Proclaimed areas used as a public drinking water source (PDWSAs);
- b. Designated Policy areas protecting water features under the *Environmental Protection Act 1986*;
- c. All waterways, including those managed under the *Waterways Conservation Act 1976* and *Water and Rivers Commission Act 1995*.
- d. Within the areas managed by the Swan River Trust;
- e. Wetlands of regional, national and international importance, including Conservation Category Wetlands (CCW), Resource Enhancement Wetlands (REW), *Environmental Protection Policy 1992 (Swan Coastal Plain Lakes)*, *A Directory of Important Wetlands in Australia* -Australian Nature Conservation Agency 1996, and Ramsar wetlands.
- f. Near surface water bodies with publicly recognised aesthetic, commercial, cultural or recreational use;
- g. Unconfined groundwater that sustains ecological functions or is used for any water supply purpose; and
- h. Surface waters or ground water drawn from the water table, that may contact people present at residential lots, school grounds, recreation facilities, hospital or nursing home surrounds.

To be sensitive environments, water resources should have at least one of the following environmental values that could reasonably be harmed by the land use activity:

- Aquatic ecosystems, including those pristine, slightly or moderately disturbed, CCW, and REW,
- Drinking water source (public or private),
- Garden or municipal irrigation source,
- Industrial or primary industry water source,
- Provide current recreational or aesthetic amenity,
- Have a recognised cultural or spiritual value.

Within Public Drinking Water Source Areas

Public Drinking Water Source Area (PDWSA) is the collective name given to a catchment declared for the management and protection of any water source used for public drinking water supplies. PDWSAs include Underground Water Pollution Control Areas, Water Reserves and Catchment Areas. Details on the laws and associated regulatory measures in PDWSAs are summarised in [Appendix B](#).

Within PDWSAs, this agency uses three classifications of land holdings, described as Priority 1, 2 and 3, to manage the contamination risk to water resources from land use activities. These priority areas and areas known as protection zones close wells and reservoirs, are each managed in a different way to effectively protect water resource quality. Priority classifications and protection zones are determined via specific Water Source Protection Plans, that are prepared in consultation with State government agencies, landowners, local government, and key industry and community stakeholders. For additional explanatory information on PDWSAs, please refer to our Water Quality Protection Note- *Land use compatibility in Public Drinking Water Source Areas*.

2. Within Priority 1 and Priority 2 PDWSAs, Well-head and Reservoir Protection Zones: The establishment or expansion of chemical blending facilities is considered incompatible with water resource management objectives. This agency will oppose development or expansion of blending facilities in these areas/ zones.

3. Within Priority 3 PDWSAs: These facilities are conditionally accepted, provided facility operators use of best environmental management practice. Guidance on acceptable environmental management practice is given in this note, or via project-specific conditions set by regulatory agencies.

Waterways management areas and the Swan-Canning estuary

Five Waterways Management Areas have been declared in Western Australia to provide special protection to specific estuaries and their associated waterways. These areas are the Albany Waterways, Avon River, Leschenault Inlet, Peel–Harvey and Wilson Inlet Management Areas.

4. In proclaimed Waterways Management Areas, this agency's written approval is required prior to development or expansion of any facility covered by these notes. For more detail, see [Appendix B](#).
5. The Swan-Canning estuary and abutting reserves are managed by the Swan River Trust. The Trust's written approval is required for any land or water based development that may have an effect on the estuary.

Wetlands with recognised conservation values

This agency aims to ensure that chemicals or contaminated water are not released close to sensitive ecosystems such as wetlands. Certain waters have been given conservation status e.g. under Ramsar, Australian Nature Conservation Agency, or state environmental protection policy provisions.

6. We will oppose or set conditions for commercial operations that could discharge harmful chemicals within buffer distances defined via assessment of local biophysical factors, and those that may pose a significant risk to ecology of conservation wetlands.

Separation distances to sensitive environments

7. The separation distance from any chemical blending facility property boundary to water supply bores, wells, full supply level of reservoirs and their feeder streams should be **100 metres** minimum.
8. The bio-physical features of a waterway, its values, the level of risk exposure and attributes of the fringing buffer should be used in determining an appropriate separation distance. See [Appendix A-Reference 3](#) and [Appendix D](#) for more information. Separation distances should be measured from the edge of damp-land dependant vegetation where present, otherwise from the flood fringe or defined banks.
9. Areas subject to seasonal flooding should be avoided (where practical).
10. Variable separation buffers to water bodies may be proposed to regulators for consideration provided they are supported with valid, comprehensive and site-specific scientific studies. Different buffers may be needed to manage noise, light spill, or community safety.
11. A minimum vertical separation buffer of **2 metres** to the maximum (wet season) groundwater table is recommended for free-draining soils to avoid waterlogging and allow for soil contaminant filtration / aerobic microbial action.

Approvals of development or expansion proposals

12. Plans for development or expansion of any chemical blending facility require planning approval from both State and local government agencies. Activities that may impact on the environment or sensitive water resources should be referred to this agency for assessment and response.
13. Under the *Environmental Protection Act 1986*, all chemical blending facilities also require a Works Approval from this agency prior to their construction or expansion. Operating facilities require either a licence or registration for the processing of chemicals. The requirements differ depending on the amount of chemicals being produced each year and are summarised in [Appendix C](#).
14. Within Priority 3 PDWSAs that are underground water pollution control areas (UWPCAs), require agency's approval in writing for the storage of hazardous chemical and/or fuel containers over 250 litres capacity.

15. The Department of Industry and Resources also regulates chemical storage and management of prescribed chemicals via the *Explosive and Dangerous Goods Act 1961*.

Operation and Management

Stormwater Management

Activities associated with chemical blending have the potential to contaminate stormwater should it mix with process wastewater, stored chemicals or run-off from areas likely to be subject to chemical spills.

16. Process wastewater or contaminated surface water should not be discharged to the stormwater drains.
17. Process waters should be kept separate from stormwater drainage areas. All process waters should be collected for treatment and appropriate disposal in well-maintained contained and weatherproof areas.
18. Process waters should be either recycled or removed to an authorised disposal site.
19. Stormwater that has been contaminated can be treated and used for process make-up water, or disposed as for process waters. Contaminated stormwater should be collected and stored in an impervious lined holding pond for treatment. Once effectively treated and tested, the stormwater may be discharged into an infiltration or soakage pit. The practice of allowing untreated stormwater to discharge to on-site soakage is a potential threat to groundwater, nearby wetlands and waterways. If on-site disposal is proposed, then licence conditions should ensure the end-of-pipe discharge consistently meets quality criteria for maintenance of the values of receiving waters.
20. For further information on stormwater management and treatment, see our Water Quality Protection Note: *Stormwater management at industrial sites*.

Chemical Storage

21. Any chemical storage facility should be constructed in accordance with the Department of Industry and Resources' (DoIR) guidelines to ensure chemicals are securely stored. Any areas where substances are being stored, mixed or transferred (e.g. loading and unloading bays) should be contained to ensure any spilled chemicals can be collected for recycling or safe disposal.
22. Any containment compound should have a minimum storage of 110% of the capacity of the largest chemical container, plus 25% of the capacity of all containers held within the compound.
23. For further information on bulk chemical and fuel storage, refer to the following Water Quality Protection Notes:
 - *Toxic and hazardous substances- storage and use;*
 - *Tanks– above ground chemical storage in sensitive environments.*

Waste management

24. Any waste produced should be managed and disposed of in accordance with the *Environmental Protection (Controlled Waste) Regulations 2001*, and the *Environmental Protection (Liquid Waste) Regulations 1996*.
25. Where liquid waste is produced from a commercial process and transported off-site, a *Liquid Waste Licence* is required. This licence details how the waste is to be presented for transport and disposal, specific requirements about the number, location and bunding of storage tanks, as well as any reporting or servicing requirements. A permit is required to remove controlled waste from any site. Any carriers, operators and vehicles transporting controlled waste must be licensed.
26. To apply for a controlled waste permit or a liquid waste licence, or for more information about waste regulations, contact this agency or visit the Internet site: www.environ.wa.gov.au.

Accidents and emergency response

27. In the event of an accident or chemical spill, an emergency response plan should be in place. All staff should be trained in the emergency procedures to enable efficient response that prevents chemical spills and leaks polluting groundwater, stormwater, drains and waterways. Copies of these procedures should be lodged with the Fire and Emergency Services Authority in Perth, c/- the Westplan-Hazmat coordinator.
28. Immediate action should be taken in the event of a chemical spill, including containment using spill kits, then chemical recovery or disposal at an approved site. Employee occupational health and safety issues should be considered when implementing measures to prevent contamination of the nearby environment. Spill kits should be located in workshops in high risk areas, identified with signage and should be easily accessible. They should be clearly labelled and contain absorbent materials such as pillows, sawdust, rags, or “kitty litter”, mops, brooms and dustpans and appropriate protective clothing. Where a spill escapes and has the potential to contaminate surface or groundwater, this agency should be notified as soon as practicable (within 48 hours).
29. For further information about preparing an emergency response plan, refer to our Water Quality Protection Note: *Chemical spills- emergency response*.

Monitoring and reporting

30. Where a premises does not require a licence or registration under the *Environmental Protection Act 1986*, the site should be periodically inspected by the Local Government Authority (council) to audit the site operator’s conformity with planning approval and community health requirements.
31. Where on site wastewater treatment is required, the site operator should monitor the effluent quality to ensure system performance. A typical monitoring program may include:
- Physical parameters e.g. pH, electrical conductivity and turbidity; at commissioning, and thereafter at weekly intervals;
 - Relevant chemical and biological parameters at commissioning, and thereafter at monthly intervals;
 - Periodic investigations of any impacts on local water resources as negotiated with regulatory agencies.
32. Records and results of the monitoring program should be retained on site for at least **2 years** for inspection or reporting if requested by regulatory agencies.
33. Further advice on water quality monitoring is contained in *Australian Standard 5667* and the *Australian Guidelines for Water Quality Monitoring and Reporting 2000*.

More information

We welcome your views on this note. Feedback is retained on our file no. **16132**. The note will be updated from time to time as comments are received, or activity standards change. For updates, refer to our Internet site- www.wrc.wa.gov.au/protect/policy, then click on Water Quality Protection Notes.

If you wish to comment on the note or require more information, please contact our Resource Quality Branch at our head office in the Hyatt Centre at 3 Plain Street, East Perth;
Phone: (08) 9278 0300 (business hours), Fax: (08) 9278 0585, or
E-mail: use the < feedback > section at our Internet site www.wrc.wa.gov.au, citing topic and version.



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Appendices

Appendix A - References and further reading

1. National Water Quality Management Strategy-Australian and New Zealand Environment and Conservation Council (ANZECC), and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) and /or National Health and Medical Research Council (NHMRC):
 - a. ANZECC, ARMCANZ: *Australian and New Zealand Guidelines For Fresh and Marine Water Quality 2000*;
 - b. ANZECC, ARMCANZ: *Australian Guidelines for Water Quality Monitoring and Reporting 2000*;
 - c. NHMRC, ARMCANZ: *Australian Drinking Water Guidelines 1996*.
2. Standards Australia: Australian/ New Zealand Standard AS 5667 *Water Quality- Sampling*.
3. Wetland categories data:
 - a. Ramsar wetlands- refer to the Internet site: www.ramsar.org;
 - b. Australian wetlands- refer to the Internet site: www.biodiversity.environment.gov/envirm/wetlands/siteindex ;
 - c. ANCA wetlands- refer to Australian Nature Conservation Agency: *Directory of important wetlands in Australia*, or contact the Western Australian Department of Conservation and Land Management;
 - d. Environmental Protection Policy wetlands– refer to Department of Environmental Protection’s *EPP (Swan Coastal Plains Lakes) policy 1992*. Maps of these sites may be accessed via local government libraries, referencing Hill, Semeniuk and Del Marco -*Wetlands of the Swan Coastal Plain*– (WRC and DEP, 1996);
 - e. *Foreshore Policy 1- Identifying the Foreshore Area*, WRC November 2002;
 - f. *Water Note 4- Wetland buffers*, WRC January 2000;
 - g. *Water Note 11- Identifying the riparian zone*, WRC January 2000;
 - h. *Water Note 23- Determining foreshore reserves*, WRC October 2001; and
 - i. *Position statement: Wetlands*, WRC 2001.
4. Plastics and Chemicals Industries Association (PACIA), 2001, *Code of practice cross reference guide, Manufacturing process safety*, or Internet site: www.pacia.org.au.
5. Plastics and Chemicals Industries Association (PACIA), 2002, *Code of Practice, Environmental Protection*.
6. Water and Rivers Commission, *Water Quality Protection Notes*:
 - a. *Land use compatibility in Public Drinking Water Source Areas*;
 - b. *Industrial sites near sensitive environments*;
 - c. *Toxic and hazardous substances – storage and use*
 - d. *Tanks– above ground chemical storage in sensitive environments*;
 - e. *Chemical spills - emergency response*;
 - f. *Stormwater management at industrial sites*.
7. Department of Industry and Resources- guidance notes:
 - a. *Storage of dangerous goods –licensing and exemptions*;
 - b. *Storage of dangerous goods - general requirements for licensed premises*;
 - c. *Storage of dangerous goods – general requirements for premises exempt from licensing*;
 - d. *Requirements for the storage of packaged flammable and combustible liquids*;
 - e. *Tank installations for the storage of flammable and combustible liquids*;
 - f. *Guidelines for the preparation of an emergency plan*;
 - g. *Tank installations for the storage of flammable and combustible liquids*.

Appendix B - Statutory requirements and approvals include

What is regulated	Statute	Regulatory body
Development approval	<i>Town Planning and Development Act, 1928</i>	Local Government Authority (Council)
Environmental impact assessment on the values and ecology of the environment	<i>Part IV of Environmental Protection Act, 1986</i>	Minister for the Environment with advice from the EPA
<ul style="list-style-type: none"> Regulation of prescribed activities; 	<ul style="list-style-type: none"> <i>Environmental Protection (Controlled Waste) Regulations 2001</i> <i>Environmental Protection (Liquid Waste) Regulations 1996</i> <i>Environmental Protection Regulations 1987</i> 	Department of Environment – regional office
Conservation, management and use of water resources	<i>Water and rivers Commission Act 1995</i>	Department of Industry and Resources
Licence to use surface water and groundwater	<i>Rights in Water and Irrigation Act, 1914</i>	
Chemical blending activities in public drinking water source areas	<ul style="list-style-type: none"> <i>Metropolitan Water Supply, Sewerage & Drainage Act, 1909</i> or <i>Country Areas Water Supply Act, 1947</i> 	
Storage and handling of chemicals and dangerous goods	<ul style="list-style-type: none"> <i>Explosives and Dangerous Goods Act 1961;</i> <i>Dangerous Goods (Transport) Act 1998</i> 	

Appendix C. –Environmental Protection Act 1986 Part V - requirements for chemical blending facilities

Category Number	Description of category	Production / design capacity	Requirement (see key below)
31	Chemical manufacturing	100 tonnes / year or more	WA + L
72	Chemical manufacturing	Less than 100 tonnes per year	WA +L or R
74	Chemical blending or mixing (causing a discharge)	50 to 500 tonnes per year	WA +L or R
33	Chemical blending or mixing (causing /likely to cause a discharge)	More than 500 tonnes per year	WA +L
75	Chemical blending or mixing (not causing a discharge)	More than 5000 tonnes per year	WA +L or R
32	Pesticides manufacturing	All facilities	WA +L
73	Bulk storage of chemicals	More than 1000 cubic metres	WA +L or R

KEY: WA = Works Approval, L = Licence, R = Registration

Appendix D. - Biophysical criteria

These are used to determine separation distances from disturbed land to sensitive water based ecosystems.

Biophysical criterion	Definition
Vegetation	Fringing vegetation, particularly remnant native vegetation, associated with or influencing the waterway, and its condition, and values.
Hydrology	Flow regime and changes in water levels and flow regimes; flood-prone land and areas subject to changes in channel location over time.
Soil type	Soil types that influence the extent of foreshore vegetation, active channel processes, and/ or the fate of potential contaminants.
Erosion	Soil types prone to erosion
Geology	Geological features which influence the waterway
Climate	Climatic variations and the resultant changes in waterway flow regimes, and riparian vegetation.
Topography	Landscape features including slope, shape, relief and diversity that influence, or are influenced by, the waterway.
Function/ uses	The function of the waterway and foreshore– flood protection, recreation or habitat conservation and related values.
Habitat	Habitat for flora and fauna such as river pools, woody debris, riffles and riparian vegetation and their condition and values
Land Use	Land uses, activities and/ or associated contaminants that influence, or are influenced by, the waterway and riparian area (i.e. how the pressure/ contaminant may affect the buffer/ waterway and how the buffer/ waterway may affect the pressure/ contaminant); management response to contamination
Heritage	Archaeological and ethnographic sites