INTEGRATED WASTE *STRATEGY FOR* METROPOLITAN ADELAIDE

1996–2015

June 1996
Environment Protection Authority
Department of Environment and Natural Resources

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From the Minister

The Integrated Waste Strategy prepared by the South Australian Environment Protection Authority (EPA) will guide the next two decades of waste management in the Adelaide metropolitan area.While I recognise that it is extremely difficult to predict how the world will look in twenty years, I believe that it is important to have a vision for the future. This Strategy provides that vision and a framework for waste management which will carry us well into the next century.

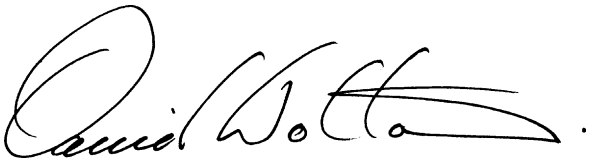
While it will continue to play a central role in refining and implementing the Strategy, the role of the EPA will in many cases be to promote and encourage others to develop or contribute to policies and programmes highlighted in the Strategy. It is neither appropriate nor feasible for the EPA to attempt to "run the whole show". It is essential that other interested parties—industry, local government and communities—accept ownership and work towards a waste management system which serves the wider needs of the State, without leaving a legacy for future generations to clean up.

In fostering a sense of community ownership, the EPA has endeavoured to present its proposals to a wide cross-section of people. The initial public discussion paper, *Options for an Integrated Waste Management Strategy for the Adelaide Metropolitan Area*, was published at the end of March 1995. During the following six months, it was subjected to review through a series of technical and community workshops and invited submissions. The Office of the EPA has collated the results of that review into a companion report to this Strategy, and has modified the Strategy to incorporate significant comment. I wish to express my gratitude to those who contributed to the production of the Strategy through public workshops, written submissions and discussions with staff from the Office of the EPA.

This Strategy is not "set in stone". It must be seen as a "living and adaptable document" if it is to remain useful over the next two decades. It must be reviewed in the light of new technological developments, social needs and demands. Clearly, there are new technologies just over the horizon which, if successful, could change the whole direction of waste management in Adelaide. The EPA will continue to support innovative programmes and technologies which it believes hold promise for future waste management in this State.

Above all the Strategy must be a practical document, based on sound understanding of the balance of needs of the environment, the community, Government and industry.

The Strategy forms an important component of the Premier's *A Cleaner South Australia* Statement, which outlines the Government's position on pollution and waste issues. The release of this Strategy now further details and strengthens this Government's commitment to the environment and the community. Along with intiatives such as the clean up of our waterways, including the River Murray; the development of a State litter Strategy, and the EPA's excellent work in the field of industrial pollution minimisation, the *Integrated Waste Strategy* will assist this Government in providing a cleaner and greener environment for present and future South Australians.



Hon. David Wotton, MP
MINISTER FOR THE ENVIRONMENT AND NATURAL RESOURCES

June 1996

Message from the Environment Protection Authority

The Integrated Waste Strategy is the first of a series of strategies to be developed by the EPA in its programme to establish a culture of best practice for environmental management in South Australia. It reflects a commitment by the EPA to develop and maintain a high standard of waste management practice in the metropolitan area and to extend those practices across the State over coming years. We echo the Minister's words in expressing our appreciation of the efforts of people from industry, State Government, local government, Recycle 2000, community and environmental organisations and a wide range of individuals who took the time to contribute to the consultative workshop or prepare written submissions.

Among a range of concerns addressed by the Strategy is the need for more effective community participation in development of waste facilities, promotion of waste minimisation and a viable resource recovery industry, user pays and polluter pays mechanisms. The need for rational development and siting of depots, alternatives to landfill, buffer zones and protection of the community from avoidable public liability are also important issues. In addition, improvements to beverage container provisions and measures to deal with excess packaging have been raised consistently at community workshops.

To be successful, the Integrated Waste Strategy needs to be embraced by the community. The next phase, the task of implementing the programmes embodied in the Strategy, will commence in 1996. Cooperation from State and local government, industry and community organisations will be critical to the success of the implementation programme. The EPA will be calling on representatives from these sectors to assist with development of policies and the design of programmes.

Among its many responsibilities, the EPA has an essential role in promoting programmes which improve standards of education and training throughout industry. This is aimed at ensuring that industry accepts its fair share of responsibility for the waste it produces, through better operating practices. However, the need for us, as members of the broader community, to accept a share of responsibility for our own waste must also be clearly stated: Can we continue to expect that our waste will be collected and disappear from our lives with little thought for our own contributions to that waste? The EPA will establish systems which encourage better information flow between industry, government and the community, to improve understanding of the real economic and environmental benefits and costs of waste disposal, recycling and resource recovery. This will assist the community to make informed judgements about waste management options.

The EPA is committed to providing leadership in its quest to satisfy the principles and objectives embodied within this document and has already commenced development of some programmes and codes-of-practice in conjunction with industry organisations. The EPA will provide incentives to industry to develop new or innovative programmes for waste management across South Australia. As a spin-off from such programmes, the EPA has an important role in helping to build environmental technologies and expertise which can be exported, particularly within growing Asia-Pacific markets.

Stephen Walsh, QC
Chairperson
Environment Protection Authority

Rob Thomas
Executive Director
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Executive Summary

The development of an Integrated Waste Strategy for the Adelaide Metropolitan Area comes at a critical time, when issues relating to resources and waste are being discussed locally, nationally and internationally.

Waste management practices in Adelaide over the last decade have been guided by the *Metropolitan Adelaide Solid Waste Management Plan 1984-1994* and the *Hazardous Waste Strategy*. Recognising the limitations of these plans, the South Australian Waste Management Commission (SAWMC) initiated a comprehensive review in 1993. The task was subsequently assigned to the staff of the Environment Protection Authority, an organisation established by the *Environment Protection Act 1993*.

Since the original plans were formulated, significant changes have pointed to the need for a new approach. In response, the EPA undertook to develop an integrated Strategy, to guide decision making and policy initiatives for all forms of waste. It provides for continuing review in response to changing waste management practices in South Australia, interstate and overseas, a growing community awareness of environmental, social and resource management issues, and a changing waste stream over the last decade.

As a signatory to the document *Agenda 21*, discussed at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, Australia is committed to the three key points of waste management contained within Chapter 21:

- waste minimisation
- environmentally sound waste reuse and recycling
- environmentally sound waste treatment and disposal.

To achieve these goals, a strategic framework is required which takes into account the waste management requirements of the metropolitan community. Further, this Strategy needs to be placed firmly within a broader setting of social, economic and environmental responsibility, encompassing State, national and international support.

A prime driving force for the EPA is the set of principles contained in the Objects of the *Environment Protection Act 1993*, which in essence promote Ecologically Sustainable Development (ESD), allowing:

- people and communities to provide for their economic, social and physical wellbeing and for their health and safety;
- all reasonable and practical measures to be taken to protect, restore and enhance the quality of the environment;
- where practical, elimination of harm to the environment;
- prevention, reduction, minimisation.

In addition to ESD, the Objects also embrace the following underlying principles, as laid out internationally in *Agenda 21* and nationally in the *Inter-Governmental Agreement on the Environment*:

- precautionary principle;
- inter-generational equity;

- conservation of biological diversity;
- improved valuation, pricing and incentive mechanisms, embodying “polluter pays” and “user pays” principles and costing using life-cycle analysis.

The *Environment Protection Act 1993* provides a means of achieving these objects, including orders and penalties, particularly where breaches are shown to be deliberate or reckless. It also provides for the development of Environment Protection Policies (EPPs), which may be mandatory and brought into effect only after extensive public consultation. Only a small number of the initiatives contained in the Strategy set out regulatory solutions to waste management policies. However, the development of EPPs is a priority for those areas which require laws to ensure that environmental and public health are not compromised.

The EPA also endorses the principles of Best Practice Environmental Management and Best Practice Environmental Regulation.

Significant changes expected during the next twenty years include:

- the majority of existing landfill depots will close, due mainly to environmental and social factors;
- the rehabilitation of closed sites will become a priority, as will the provision of alternative waste disposal options;
- costs can be expected to increase, although the application of developing technology and economies of scale may allow for more efficient waste management.

High standards of waste management may be achieved at a relatively low cost when combined with waste minimisation and resource recovery activities. However, a key element must be improved planning of future waste management facility sites, addressing the needs, both of the facilities and of the host communities.

Other important considerations include international agreements on the disposal of hazardous wastes, now enforced through the recently revised *Australian Hazardous Wastes Act 1989*, and the new National Environment Protection Council (NEPC) which will have a strong influence on hazardous waste and recycling and resource recovery issues.

Therefore, an Integrated Waste Strategy must account for a range of principles, factors and constraints external to South Australia, while providing a framework for practical waste management within metropolitan Adelaide. In addition, it is recognised that ultimately, many issues will go beyond metropolitan boundaries and influence policy and practice throughout South Australia.

Using the Strategy

Each section contains Objectives, Programmes and Explanatory Notes and has a consistent format.

Objectives: can be found on the left hand page under their relevant section headings and appear in bold type.

Programmes: are listed in point form directly under the relevant objective.

Explanatory Notes: describing the objectives and programme implementation are listed on the facing page to each objective.

Glossary: explaining technical terms and abbreviations can be found at the end of the document.

Index: can be found at the end of the document.

Objectives and Programmes

An Integrated Waste Strategy for Metropolitan Adelaide accounts for a range of principles at many levels whilst providing a practical framework for waste management.

The broad Strategy is contained in a set of objectives which embody these principles as they apply to the Adelaide environment. These are supported by a range of programme statements, indicating how the Strategy will be implemented. Some programmes have already begun, with the main implementation phase commencing in the second half of 1996.

Explanatory Notes

A brief explanation is provided for all objectives and their associated programmes. Where appropriate this includes their genesis and rationale and in some cases, why the given course of action was chosen over another. The explanations are necessarily brief, but further detail can be gleaned from the original options paper. A report collating and responding to public comment has also been released as a companion to this Strategy.

1. Consultation

Encourage and promote effective community participation programmes

by:

- *promoting the formation of community liaison groups for new and existing waste depots;*
- *promoting well–informed, rational consideration of proposals for new or extended waste treatment or disposal facilities;*
- *advising developers to initiate participation programmes as early as possible and well before a proposal is submitted for development approval;*
- *developing, in conjunction with government agencies, industry and community groups, guidelines for community participation.*

1. Consultation

Encourage and promote effective community participation programmes

Community interest in the environment and particularly the waste industry, has grown rapidly in recent years. Responses from the EPA consultation programme undertaken in 1995 has highlighted a degree of cynicism and mistrust of industry and government organisations. Past performance has resulted in a lack of effective communication between these groups and communities affected by the proximity of waste facilities.

Often project design is well advanced before the community is made aware of a proposal. The community then perceives the proposal as a *fait accompli*, and expresses feelings of powerlessness. As a result they are often tagged with the NIMBY (Not In My Back Yard) label, or accused of opposing development.

From the developer's point of view, the solution may appear to be to use the "expert" or "scientific" approach to defeat opposition to a project, rather than to involve the community in its formulation from the early stages. This is particularly true if large amounts of money have already been spent in marketing and design studies. The result can be unproductive ill-will and extensive legal argument.

The *Environment Protection Act 1993* requires public advertisement of a licence application before a licence is granted, and the "Major Developments and Projects" process under the *Development Act 1993* has provision for extensive public and government agency assessment of proposals. However, it is essential that communities be offered the opportunity to become involved in projects as early as possible, in order to avoid prolonged argument whenever a new development is mooted.

A well-informed community may enhance and aid a project, while a poorly-informed community will only mistrust developers and oppose the project at every turn. It is in everybody's interest that developers take the initiative in the early stages of a project by approaching the community openly to participate in the formulation of the project. This will allow the community to assess the issues throughout the development phase and on into the lifetime of the facility.

The EPA will encourage developers to establish community participation programmes as early in the process as possible, and before submitting a formal development application.

The EPA public discussion paper *Options for an Integrated Waste Management Strategy for the Adelaide Metropolitan Area 2015 and beyond* includes a more detailed discussion on community participation in Section 10. This highlights the range of tools available to ensure effective communication, including:

- public meetings and discussions
- workshops
- advisory committees
- telephone hot-lines
- press releases, advertising and brochures
- audio-visual presentations
- information stands and exhibitions
- local radio and television
- field trips

and discusses the types of questions that will need to be answered.

The model proposes that developers approach communities to form liaison groups for new and existing waste depots. Such groups could use local knowledge and expertise to assist with project design and to provide "watchdog" groups to oversee the operation of the facility during its working life. In this way, the possibility of a smooth transition through the planning process is enhanced, as the local community will have some ownership of the project.

A further possibility is the establishment of trust funds by developers, which provide working capital for development within host communities adversely affected by the project.

2. Environment, Health and Safety

Minimise adverse impacts of waste operations on public and environmental health and safety

by:

- *ensuring that protection of public and environmental health and safety is an integral part of all waste management operations;*
- *promoting best practice occupational health and safety programmes for all personnel (including volunteers).*

Minimise adverse impacts of waste operations on public and environmental health and safety

Issues of public concern reflect how activities can affect the lives of those in the community, particularly:

- the environment in which they live;
- the health and wellbeing of workers in the industry, both paid and voluntary;
- the health of the environment and the planet as a whole.

This Strategy views the new South Australian *Environment Protection Act 1993* within a broad context including human health and safety as a subset of environment protection. There are many issues of concern which do not strictly fall within its scope, but could nevertheless have important consequences for management programmes and associated public liability.

Historically, the protection of public health and safety has always been a primary objective of environmental legislation, particularly in relation to waste management. It is only in recent times that attempts to redress the balance between health and environmental issues have been successful. The new Act is an important step in that process, but community health remains a key facet of environmental management programmes.

The Strategy does not address the general issues of occupational health and safety of paid employees in detail or issues which may arise with volunteer workers, who play an important role in recycling of waste materials. Scout groups and school children are becoming increasingly involved in collecting and sorting materials for recycling or reuse. However, it is not at all clear whether they are being adequately trained, or whether liability issues are being properly addressed. The potential for cuts, penetration injuries, and trips and falls is substantial, possibly resulting in serious injury or disease.

Workers of all varieties are covered under the *Occupational Health, Safety and Welfare Act 1986*. Employers are required to take all reasonable measures to protect the health and safety of their workers, including providing equipment and facilities, training and support. However, many volunteer groups may not be aware of their obligations, and may be creating potential problems which could lead to injury, legal sanctions and liabilities.

It is important that education programmes be implemented to help ensure that such organisations and enterprises are not put out of business by a tragedy which could have been avoided.

A further issue is highlighted by recent requests for domestic hazardous materials to be handled through council transfer stations. It is likely the people operating such stations will have little real knowledge of chemicals or the risks they pose to workers. In many cases the exact nature of chemicals may not be known at the time of acceptance. Without adequate training of supervisors and employees in safe handling practices and emergency procedures, there is a high risk of injury. If local transfer stations are to handle these materials, safeguards need to be in place before approval is given. The potential problems weigh against local collection unless proper procedures are developed to minimise risk to workers and the public at these facilities. Alternatively, depots could simply restrict the range of materials which they will accept, to those which have a ready market. The EPA considers that these depots should restrict the range of hazardous household wastes they will accept to lead-acid batteries, oil, paint and pharmaceuticals.

3. Responsibility, Accountability and Liability

Protect the community from liabilities arising from waste management operations

by:

- *developing an Environment Protection Policy (EPP) requiring that all licences include requirements for adequate financial assurances, based on environmental risk assessment, to indemnify the community;*
- *developing rehabilitation plans and funding strategies for closed and abandoned (orphan) sites.*

3. Responsibility, Accountability and Liability

Protect the community from liabilities arising from waste management operations

The operation of waste depots carries with it the risk of environmental damage through accidental or negligent action by the landfill operator. It is desirable that the community be adequately safeguarded against the impact of clean-up and rehabilitation costs.

There are several ways in which this can be achieved:

- personal guarantee
- bank guarantee
- registered charge over the land
- pecuniary sum
- insurance
- a fund.

It is possible that a variety of financial security measures may be appropriate depending upon the circumstances of each site. To a great extent,the risk of serious associated problems arising with a landfill site is dependent on the standard of the depot site and operation. Accordingly, the unit cost of providing such security for a new best practice site should be less than that for an older and lower standard site.

There may be some merit in the establishment of a fund to cover contingencies arising from problems at closed depot sites, and possibly for those currently operating under earlier approvals without comprehensive liability funding arrangements. This fund could be based on a per tonne levy at each landfill—either a uniform charge or a sliding scale charge, reflecting in some way the risk exposure of the site. Allocation of expenditure from this fund could be through drawdown of reserves or loan repayment.

Such a sliding scale could be based on a site rating system. For example, the best (and lowest levy) rating might reflect fully lined and thoroughly monitored sites, with poorer ratings (and higher levies) applied to those sites with lesser safeguards.

It is desirable that communities are provided with effective financial assurance systems which safeguard them against transfer of liability for the failings of landfill operators. At the same time, it is essential that the cost of providing that assurance be distributed in accordance with “user pays” principles. In addition, the net cost of providing that security should be minimised through risk assessment and management, and funds retained in South Australia where possible.

Further consideration should be given to alternative systems of providing financial assurance for waste depots and to providing funds for treating serious environmental damage arising from past solid waste disposal practices.

Long term costs and liabilities

Concern has been raised over waste management practices which have resulted in environmental problems being handed to future generations. This has generally been a consequence of the poor standard of disposal, rather than the quantity of material. Higher standards of disposal could be expected to incur higher costs but reduce the risk of future environmental harm. A less desirable Strategy is to provide a contingency fund to cover expected future consequences, whilst operating at a lower standard. In any event, long term costs and liabilities should be considered in the assessment of current disposal charges. This points towards operating philosophies which combine Best Practice Environmental Management (BPEM), together with financial assurance, to cover the minimised future liabilities. It is essential that long term costs and liabilities be adequately covered, as an integral part of the approval processes for the establishment and operation of waste facilities.

3. Responsibility, Accountability and Liability cont'd...

Existing Sites

The metropolitan area is currently serviced by 21 licensed solid waste depots. They range in size from small scale private waste depots to relatively large operations conducted by or on behalf of local government. Many have been operating for more than 15 years and began before South Australian Waste Management Commission (SAWMC) controls were imposed. They pre-date comprehensive land use controls.

Consequently, some of these depots are poorly located and only limited improvements can be made towards best practice management. Quality management and accountability at existing landfills is necessary and may be attained by implementing comprehensive monitoring programmes and data collection on waste, and regular environmental audits.

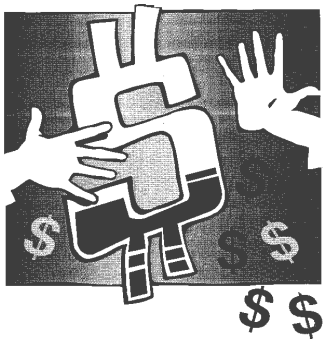
Economics of options for treatment of such sites must be carefully considered against overall negative impacts on the environment. In some cases, the best option may still be to properly close down a site and leave the material where it is.

Old, Closed and Orphan Sites

Throughout the metropolitan area, there are a number of old landfill sites, often in locations which were convenient for "dumping" such as excavations, low lying and swampy ground, or watercourses. Some were operated formally by, or on behalf of, councils, private companies or individuals, and some were informal community dumps.

Such sites can be an obstacle to urban development, or may be creating adverse environmental impacts. These problems cannot be ignored. Clean-up of old landfill sites is difficult and expensive. Excavation may release gases and odours, and without thorough investigation, it is difficult to determine the nature and extent of hazardous materials. In addition, such issues tend to focus community attention on landfills and strengthen opposition to new and existing depots.

In the event that the current owner of the site is deemed to be responsibile for remedial work, the issue of capacity to pay may arise. There may be opportunities to distribute costs more broadly. In order for this to be encouraged and facilitated, rehabilitation plans and funding strategies to redress these past failures need to be developed.



4. Resource Management and Conservation

Encourage government, industry and the community to embrace and promote waste minimisation and resource recovery

by:

- *encouraging development of strategies for waste avoidance, recycling and reuse;*
- *developing guidelines and policies for waste audits and waste minimisation plans;*
- *negotiating industry waste reduction agreements;*
- *promoting investigation into optimising the use of packaging materials;*
- *requiring waste management and minimisation plans as part of the approval process for new developements;*
- *promoting improvements to effectiveness and efficiencies of recycling through*
  - reduced contamination
  - reduced transport and collection costs
  - coordinated sorting, processing and distribution
  - promoting improved marketability of collected materials;
- *promoting the development of a strategic plan for waste transfer, treatment and resource recovery facilities;*
- *providing funding for waste minimisation research and development through government incentive schemes eg the Recycling and Resource Recovery Scheme;*
- *initiating agreed policy on the purchasing of recycled products by governments through Australian and New Zealand Environment and Conservation Council (ANZECC) and the Australian Local Government Association (ALGA);*
- *encouraging councils to participate in recycling schemes and to target other municipal wastes such as green waste through the Local Government Recycling and Waste Management Board (Recycle 2000);*
- *promoting investigation of segregation and separate disposal of components of the commercial and industrial waste stream, through waste audits and other waste composition data collection systems;*
- *developing codes of practice with industry and local government for waste minimisation;*

Encourage government, industry and the community to embrace and promote waste minimisation and resource recovery

Effective waste management is not confined to waste disposal alone. Wastes are generated throughout a product's life-cycle. Solutions must be sought to the whole problem rather than its components. This approach is embodied by the waste management hierarchy.

Most Preferred	
Minimisation	Avoid
	Reduce
	Reuse
	Recycle
	Recover (eg energy)
Least Preferred	Treat
	Dispose

Waste minimisation leads to resource conservation, a reduced need for treatment and disposal facilities, and reduced cost to industry and consumers. By reducing consumption, we generally reduce waste. Figures for recent years suggest that the major influence in reducing the quantity of waste to landfill is the level of economic activity within the State.

National Solid Waste Targets

On 7 February 1992, the Australian and New Zealand Environment and Conservation Council (ANZECC) endorsed a National Kerbside Recycling Strategy, which incorporates a set of targets for achievement by the year 2000. The aim of these targets is to ensure that there will be:

- a 50% reduction in the total quantity of solid waste going to landfill (based on a weight per capita from a 1990 base);
- a 50% reduction in the quantity of domestic waste going to landfill on a per capita basis.

These targets are supported by a range of material recycling rates, which were to be achieved by 1995.

There is an urgent need to implement the following to achieve the 50% reduction in waste to landfill, through waste minimisation:

- the EPA to develop guidelines for completing waste audits and waste minimisation plans;
- industry to develop agreed targets for waste reduction and recycling, consistent with nationally agreed goal;
- the EPA to develop Environment Protection Policies (EPPs) and Environment Improvement Programmes (EIPs) which include Industry Waste Reduction Agreements;
- the EPA to promote community awareness of excess packaging and poor disposal practices;
- industry to present waste management and minimisation plans, prior to development approval being given to new developments.

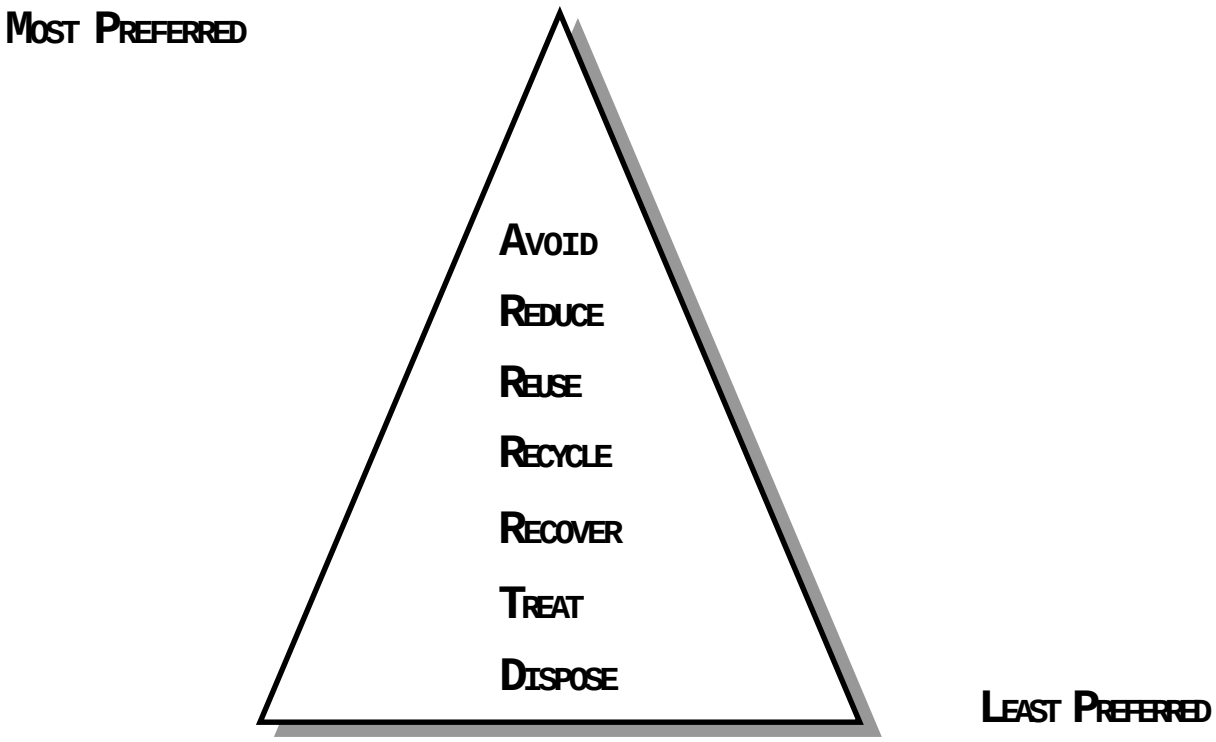
To further achieve waste minimisation objectives, improvements to the effectiveness and efficiencies of waste minimisation (especially recycling) need to be promoted by:

- reducing contamination by source separation of wastes;
- reducing collection and transport costs;
- improving and coordinating sorting, processing and distribution of collected materials;
- improving markets for those materials.

An important element in developing effective waste management systems is a coordinated approach to regulation and service provision throughout the metropolitan area. The EPA has responsibility for waste management regulation in the whole State, including Adelaide, and should also coordinate overall policy development for waste management.

- *monitoring the impacts of legislation on waste minimisation and resource recovery programmes;*
- *improving the awareness of waste minimisation through education, dissemination of information and monitoring of community attitudes.*

WASTE MANAGEMENT HIERARCHY



There is already a strong trend towards regional groupings of councils in Adelaide. Significant economies of scale will be achieved through further integration of metropolitan waste service provision, particularly if, as expected, the number of metropolitan councils reduces and the scale of operation increases. There is a need for the strategic development of waste transfer, treatment and resource recovery facilities. These facilities may be combined to achieve efficiencies in operation. Opportunities should be further explored to create a single metropolitan joint enterprise, with participation by both local government and industry. If so, this may deliver significant economies of scale together with the highest standards of service and environmental protection.

Methods which can be applied to ensure conservation of resources and waste minimisation include:

- banning of some wastes and their disposal through legislation;
- enforcement of regulations, ensuring environmental standards are met and breaches heavily penalised;
- grants and loans to establish alternative processes which reduce or use wastes to produce new products, and allow rebates for resource recovery and waste minimisation;
- increased costs of disposal and treatment brought about by improved standards and application of levies;
- education, dissemination of information;
- effective coordination between groups;
- implementation of environmental purchasing policies.

Waste reduction strategies are easier to implement than waste avoidance strategies, and can be adopted for the short term. In most instances small changes can lead to large waste reductions.

Examples include:

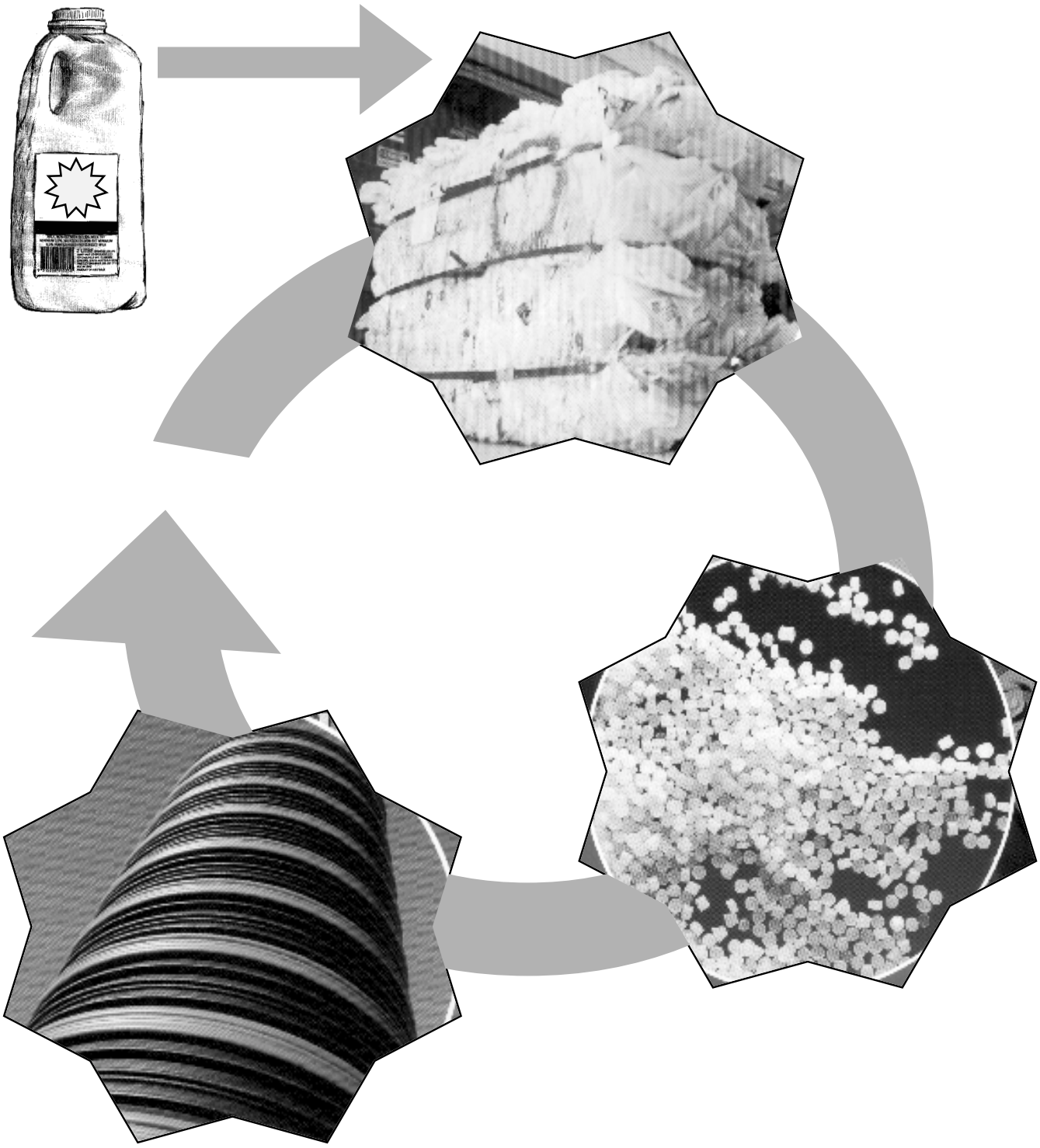
- more efficient packaging
- improved quality control on products.

Full life-cycle analysis of any product needs to be implemented to ensure that environmental and other benefits are maximised. Recycling is often seen as a costly exercise which cannot be justified by an economic life-cycle analysis. However, many of the economic arguments do not take into account the intangible benefits of reuse, recycling, recovery and conservation. Instead, costs and benefits are often worked in today's dollars rather than through the life-cycle of the product or the resource.

In a strict sense, only waste oil and a diminishing range of refillable bottles can be said to be reused in South Australia. But recycling programmes have shown considerable progress over recent years. Although investment in capital equipment and the range of products derived from recycled materials has increased, the recycling industry in South Australia is still relatively small and immature, with much of the material leaving for markets interstate and overseas.

Recycling has a high public profile and strong public support. There is an arguably unrealistic expectation that recycling programmes alone will remove the need for landfill facilities. Nonetheless, significant progress has been made in removing certain materials from the waste stream.

The effectiveness of any recycling programme is based on the value of the material in the marketplace. Stable or improving markets, with higher prices for recycled products are a key to increasing the viability of recycling in South Australia but this requires efficient, uniform collection and quality of materials. The difficulty is that recycled materials compete with virgin materials, which have stable quality, stable supply, and stable markets.



The EPA has a range of schemes providing incentives for development of innovative technology or programmes for resource recovery. Among these is the Recycling and Resource Recovery Scheme (RRRS), designed to provide seed funding to industry and local government to start new programmes.

The community has an essential role in ensuring a consistent supply of quality material. People must also be able to make clear choices about purchasing products containing recycled material. Therefore, improved community information on recycling materials, products and processes is a primary requirement.

Government Incentive Schemes

Schemes for the collection of material are important. However industry needs encouragement to take up the challenge of recycling. The RRRS programme targets recycling and resource recovery of post consumer materials, and looks at problem areas within the recycling industries. The objectives of the scheme are to:

- achieve a greater level of waste reduction within the South Australian community;
- encourage the development of new products and industries using recycled materials in their manufacturing process;
- improve and promote waste minimisation and recycling industries within South Australia;
- provide funds for waste minimisation research and development.

The EPA will encourage participation in waste minimisation through such schemes as the Cleaner Production Programme and the Recycling and Resource Recovery Scheme.

Local Government Recycling and Waste Management Board (Recycle 2000)

The board was set up initially to oversee and administer metropolitan Adelaide kerbside recycling and is responsible for formulating priorities, marketing and negotiating with industry for the sale of collected material, promotion and education.

Most councils have kerbside collection of recyclables. The allocation of subsidies back to councils is based, not on the volumes of recyclable materials collected, but on amounts actually sold to industry, so there is a strong incentive to source markets for this material.

The difficulty with kerbside recycling schemes is:

- they concentrate on domestic waste which constitutes only 40% of total waste;
- only a small proportion of domestic waste is recyclable (excluding organic wastes);
- current kerbside programmes can only recover between 7 and 10% of the total waste stream (excluding organic wastes).

Recycle 2000 needs to continue to encourage councils to participate in Recycling and Resource Recovery Schemes, adopt waste minimisation practices and target other municipal wastes such as green waste. To advance the cause of resource conservation and waste minimisation, there is a need for the EPA to initiate the:

- monitoring of changes in attitudes, impacts, quality and quantity of waste materials;
- development of codes of practice with industry and local government for waste minimisation;
- removal of unnecessary regulatory and legislative impediments and barriers to recycling;
- development of a policy for waste reduction plans which require local government and industry to state options for disposal and recovery of wastes;

4. Resource Management and Conservation cont'd...

- improving public awareness of waste minimisation in all areas of the community through education and information;
- investigating and researching alternative disposal (non-landfill) and treatment options including
  - waste to energy
  - pyrolysis
  - refuse derived fuel (RDF)
  - anaerobic digestion
  - composting
  - integrated systems.

New techniques under development in Europe may virtually eliminate waste to landfill. A new automated system promises substantial recycling efficiency and energy recovery from municipal waste. If workable, this offers economic advantages over the current use of human sorters to separate recyclables. Care needs to be taken with any new technology which offers a cure-all to solve long-standing problems. However, the EPA is keen to support innovative solutions to waste management problems which lessen the impact of our activities on the environment. If South Australia can develop and exploit such new technologies, there may be opportunities for expertise to be sold into Asia, bringing in valuable foreign exchange.

To date in South Australia the alternatives have been much more costly than landfill disposal. This is due to low cost and low standard of landfills, the high cost of alternative processes, ready availability of cheap natural construction materials around Adelaide and the abundance of cheap supplies of fossil fuels in Australia. Such factors have made these alternative processes uncompetitive.

Environmental Purchasing Policy

The State Government has endorsed the existing purchasing policy which essentially gives priority to products made from recycled materials. This policy (originally implemented in 1984) is currently under review, with an objective to make the policy more appropriate to today's needs.

5. Best Practice Environmental Management

Promote Best Practice Environmental Management in all areas of waste management

by:

- *monitoring, and where appropriate, promoting new technologies and alternatives for waste minimisation and the management of waste;*
- *ensuring that waste management regulation and coordination of policy development is an EPA responsibility;*
- *using Environment Improvement Programmes (EIPs) for existing metropolitan landfills;*
- *regularly reviewing licence conditions for waste depots to reflect required improvements to operating standards and to incorporate*
  - lifespan plans for closure, post–closure care and after–use
  - operating instructions for personnel;
- *developing an Environment Protection Policy (EPP) for performance measurement of landfills incorporating quality monitoring and reporting systems;*
- *requiring all existing recycling and waste depot licensees to review their current practices with a view to optimising operations through*
  - application of new technologies
  - facilitating diversion of materials from the site
  - nuisance avoidance measures;
- *reviewing all current operating landfill sites to identify*
  - those sites best suited to continue waste processing and transfer activities
  - priorities for future development and end uses of remaining sites;
- *investigating future landfill options, including integrated, zoned sites accepting a range of wastes, based on maximum environmental benefit at lowest cost through*
  - economies of scale
  - maximising efficiency of infrastructure use;
- *promoting the adoption of best practice in the management of Listed Wastes;*
- *requiring that generators of Listed Wastes retain ownership of those wastes unless formally transferred to another person;*
- *continuing to track Listed and liquid wastes within South Australia and across state and territory borders, through the manifest system;*
- *securing the establishment of a Listed Waste Management Centre.*

Promote Best Practice Environmental Management in all areas of waste management

Best Practice Environmental Management (BPEM) should be promoted in all areas of waste management, embracing the interdependent components of:

- policy and regulatory frameworks (including the use of EIPs);
- planning and economic factors (including integrated operations);
- development and operational management factors (including minimisation of adverse impacts and optimisation of diversion from landfill);
- application of technology (including the monitoring of innovation);
- risk-based management (including quality monitoring).

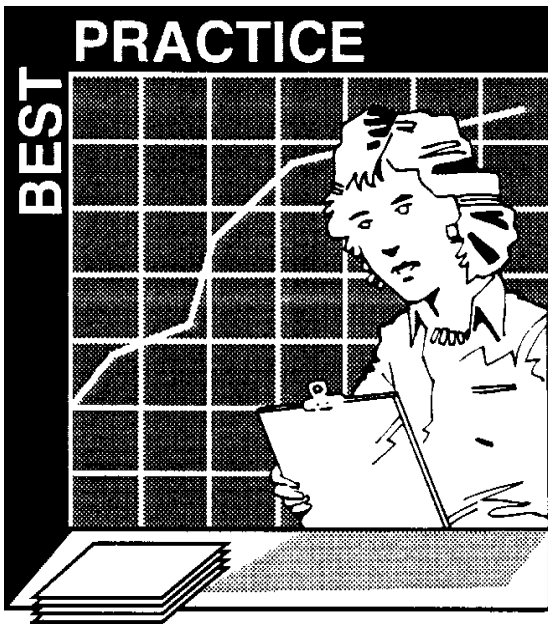
Specific issues arise in promoting best practice for Listed Wastes management. These incorporate a range of hazardous and other materials which are difficult to dispose of or control, and are listed in the schedules of the *Environment Protection Act 1993*. They include materials which may be flammable, corrosive, highly reactive, infectious or toxic and therefore pose a high risk to the community or the environment.

The EPA will keep this area under constant review and encourage waste generators, transporters and depot operators to follow its lead. The EPA will promote the use of new technology for reducing and improving management of Listed Wastes as it becomes available.

The issue of who owns waste materials and when does liability shift from a waste generator to a transporter or a treatment depot, is important, and can often be contentious. The EPA will develop clear policies for transfer of ownership of Listed Wastes, in conjunction with industry groups.

The EPA administers a tracking system for movements of Listed Wastes within South Australia. This also links in to a national system which tracks transport across State boundaries. The system is designed to ensure that Listed Wastes are taken only to properly licensed depots and reduce opportunities for illegal disposal, with heavy penalties for breaching the law. It also provides data to enhance planning for future management.

Ultimately, there are some hazardous wastes which cannot be treated effectively with current technology. It is not appropriate that these wastes be accepted into normal landfill, and it is unlikely that they can ever be completely eliminated from the waste stream. To ensure that they are properly managed, the EPA is promoting construction of a Listed Waste Management Centre, designed to provide secure storage for Listed Wastes in an immobilised form, until technology becomes available to treat or recover them effectively. The EPA will require that the centre meets stringent design criteria and operates to the highest standards.



6. Training and Education

Promote and facilitate training to improve operating standards towards best practice

by:

- *developing in conjunction with relevant institutions, programmes to meet the needs of*
  - the waste industry
  - local government
  - generators of waste
  - State and Federal governments
  - the community.

6. Training and Education

Promote and facilitate training to improve operating standards towards best practice

Education and training of all people associated with waste management is an integral ingredient in ensuring that waste is managed according to best practice principles. Developments in this area will lead to improvements in the performance of those associated with waste management and greater understanding by the general community. This will lead to a reduction in risks to:

- public and occupational health and safety
- the environment.

Other benefits include:

- a better, safer and more efficient service
- the establishment of a skilled workforce
- increased client satisfaction
- greater self-reliance
- ease of implementation of best practice.

No single training programme can provide for the needs of all people at all levels of responsibility and skill across the spectrum of waste management. The EPA will require minimum standards of education and training in some areas. It is expected that much of this training will be undertaken in conjunction with the Department of Employment, Training and Further Education.

7. Economics/User Pays

Promote "user-pays" and "polluter-pays" principles and improved economic efficiency in waste management

by:

- *promoting clear assignment of costs and benefits to waste service provision, including volume or weight based charging systems;*
- *ensuring that where possible, all external costs associated with the siting and operation of each waste depot are internalised;*
- *encouraging the establishment of community trust funds to offset social impacts borne by host communities.*

7. Economics/User Pays

Promote “user-pays” and “polluter-pays” principles and improved economic efficiency in waste management

Waste management is a community problem, and requires all levels of government, industry, community groups and individuals to take responsibility for their wastes. The driving force must be outside the legislative process. That is, it requires a real change in attitude and it must be based within the community.

Overriding concepts include:

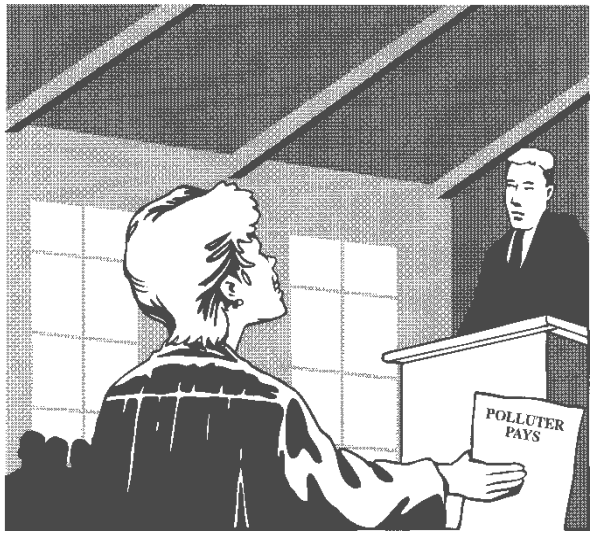
- the polluter pays principle, where polluters and potential polluters contribute to the cost of pollution prevention, by observing regulations and adopting prevention measures;
- the user pays principle, meaning that costs identified with the treatment and disposal of wastes should be borne by waste disposers including all operating costs of facilities;
- the responsibility of waste generators to recognise that they are responsible for the proper disposal of their wastes. They must select the best possible waste management Strategy with due consideration to economics.

7. Economics/User Pays cont'd...

Promote recognition of, and research into, the significance of economic factors in waste management operations

by:

- *investigating the best possible allocation of scarce resources to competing needs in the area of environmental management;*
- *encouraging research into cost and energy efficient waste handling systems, including economies of scale;*
- *developing an EPP for landfill supply management, ensuring that*
  - adequate supplies of landfill capacity are available
  - landfill sites are financially viable whilst operating at an appropriate standard
  - landfill costs are not distorted by controlling forces or by imbalances between supply and demand;
- *encouraging rationalisation of waste management service provision for metropolitan Adelaide, through regional and metropolitan joint enterprises involving local government and industry;*
- *monitoring trends in production and consumption patterns to develop indicators of*
  - per capita waste generation
  - waste stream composition.



Promote recognition of, and research into, the significance of economic factors in waste management operations

It is frequently asserted that the real cost of waste disposal is not being charged in the market place. This raises the question "What is the real *cost*?"

The Bureau of Industry Economics in 1992 included the following factors in landfill pricing:

- value of the site
- fixed establishment cost of the landfill
- capital equipment
- buildings and structures at the landfill
- operating or variable costs including monitoring
- closure costs
- post closure costs
- environmental contingency costs
- environmental amenity costs.

There are other, less easily determined costs which may need to be considered, including:

- third party property devaluation
- external infrastructure costs, capital and recurrent
- the opportunity cost of the land.

Third party property value impacts are generally a psychological reaction of consumers and are difficult to assess. The real estate market is sensitive in times of weak demand, less so in buoyant times. It may be that adverse public reaction to the proposed siting of a waste facility weakens the market more so than the direct impact of a well managed facility. Such impacts should be evaluated as thoroughly as possible.

Compensation and transfer of risk

Interstate experience, where the waste depot operator has accepted some responsibility for property devaluation, may be a useful guide to future developments in this area. Research into the impact that major developments have on third party property values is required, including:

- if compensation is supported for waste depots then should it be applied to other activities with similar impacts, including shopping malls and transport;
- where property values increase as a consequence, should those benefiting be asked to contribute?

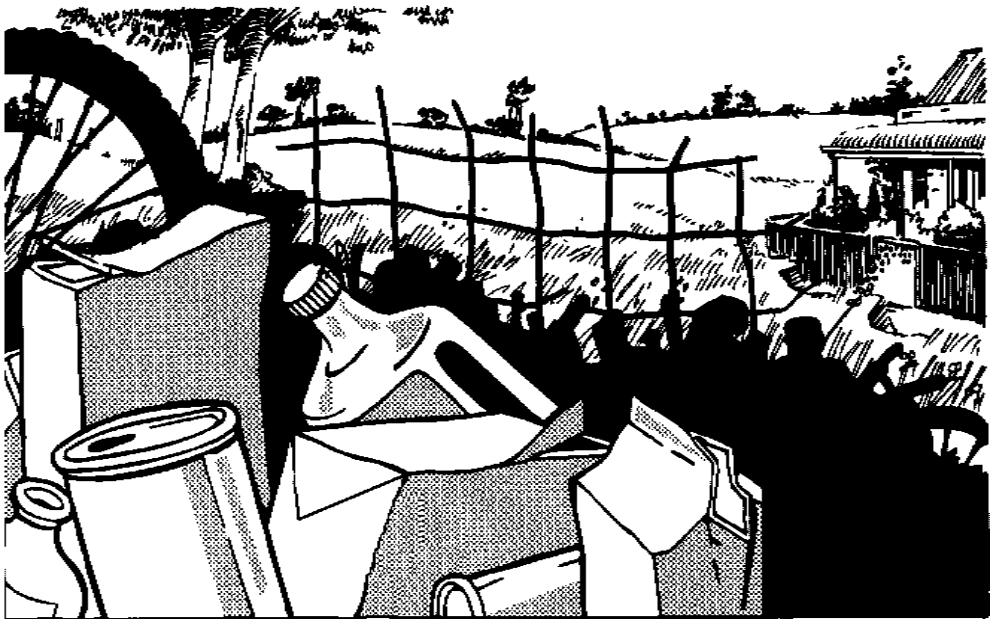
The issue of infrastructure costs may be dealt with more simply. Where appropriate, external costs should be absorbed by the development and a fair assessment of such costs carried out to determine the waste depot's share. For a new facility this may involve upgrading of public roads and additional maintenance due to traffic loadings. Progress has been made interstate and overseas in the provision of trust funds to assist rural communities who act as hosts to metropolitan waste management facilities. Such trust funds may act as a catalyst for further social and economic development in the host community.

8. Siting Waste Facilities

Ensure the optimum site selection, establishment and management of recycling and waste depots

by:

- *incorporating site selection and assessment criteria within an EPP to assist in selecting preferred sites for recycling and waste depots;*
- *developing a guideline which establishes minimum buffer distances for recycling and waste depots;*
- *investigating options for securing suitable landfill sites to serve the projected solid waste disposal needs of metropolitan Adelaide;*
- *establishing an inter-agency group to recommend changes to planning strategies, with the intention of rationalising number, scale and siting of major landfills.*



8. Siting Waste Facilities

Ensure the optimum site selection, establishment and management of recycling and waste depots

Wastes arising from human activity which cannot be recovered as resources must ultimately be assimilated by the environment, in a solid, liquid or gaseous form or through conversion to energy.

Even if significant reduction in solid wastes is achieved through waste reduction and recycling, substantial quantities of waste material from human activity will remain for disposal, unless major changes to waste and resource management systems occur.

Landfill will continue to be a major destination for solid waste in the foreseeable future, even though methods of waste minimisation and recycling will most likely continue to improve.

Even if waste is incinerated (with or without energy recovery) there will always be residual solid materials including ashes and clinkers. Accordingly, provision must be made for safe disposal of these residues.

Waste to energy is unlikely to become commercially viable within South Australia during the Strategy period, as conventional energy sources remain abundant and cheap.

However, developments in the field of waste to energy, refuse derived fuels and other resource recovery options should be monitored. Opportunities for production of energy, fuels and feedstock materials for local industry should be identified and active industry participation in research and development encouraged.

It must be assumed for the development of waste management strategies for the period 1996 to 2015 and beyond, that major landfills will be required to cater for most solid waste disposal needs for metropolitan Adelaide.

A range of potential impacts arise from the presence of a waste depot in a given area. Initial siting, engineering design, operation and post-closure care are all essential considerations for developers of new facilities.

Site Selection Criteria

Many householders and businesses are accustomed to easy access to disposal sites. This has led to some landfills being sited and managed for public access rather than for optimum landfilling practice. However, communities must recognise and accept the increased costs associated with stringent siting criteria and high standards of waste disposal. This is in line with polluter pays and user pays principles.

The provision of transfer and treatment facilities will increase operating costs. However, economies of scale with fewer landfills serving larger catchment areas, should partially offset these increases.

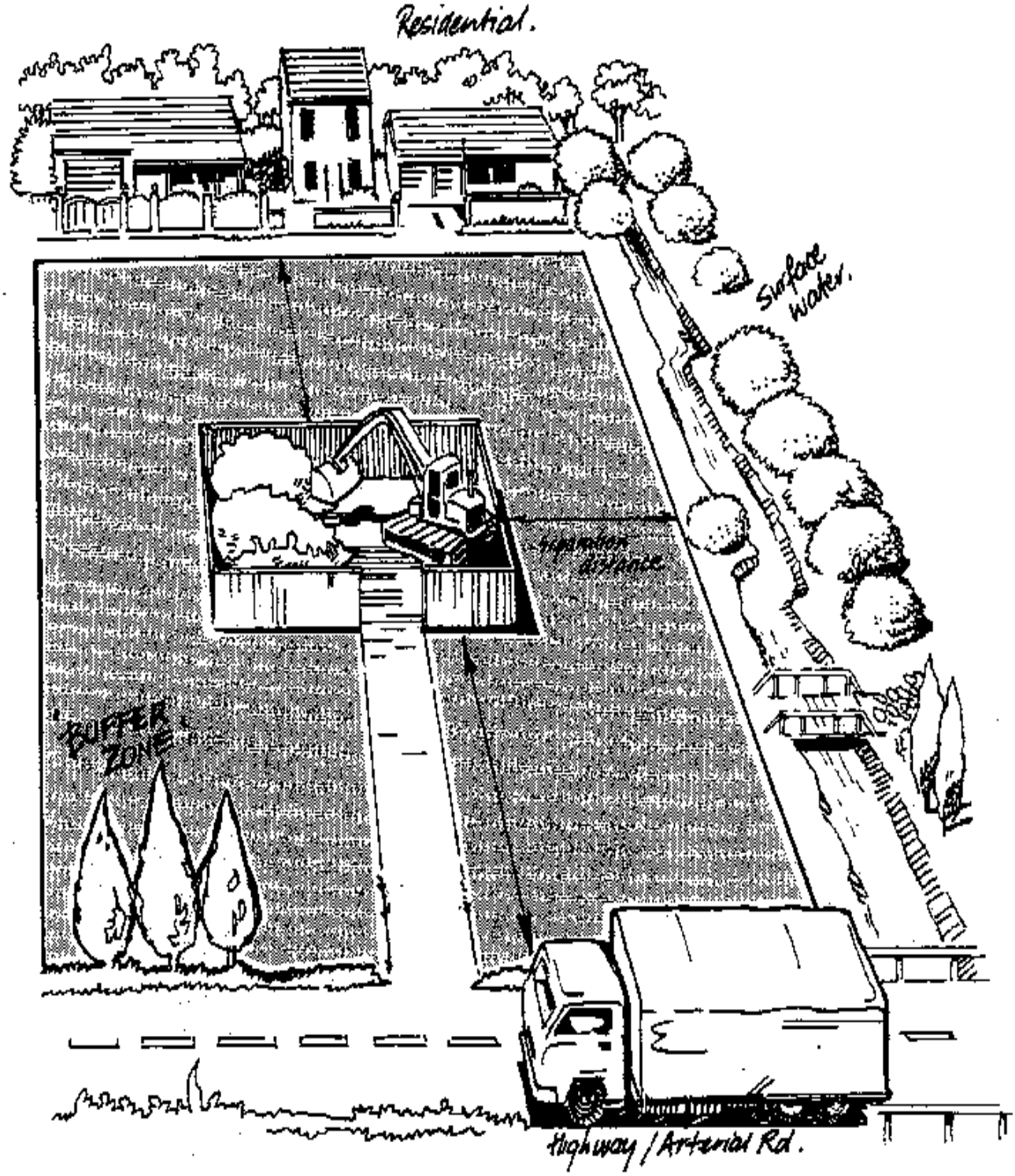
The success of any landfill rests heavily on the planning and preparation carried out before waste disposal. Guidelines will be developed to assist selection of future landfill sites.

Siting should be considered in conjunction with design and operation. Many site factors can be improved by engineering design and adverse impacts can be eased by appropriate methods of operation, although increased development and operating costs may result. A decision on the operating life of a waste depot should be carefully evaluated. It is likely that the economic benefit of preparing, developing and operating a single, large, long-life site will far outweigh that for several smaller sites.

Developers should hold early discussions with the relevant consent authorities including councils, the Department of Housing and Urban Development and the EPA to assist in determining the likely requirements and constraints for a particular locality.

Landfill sites are currently being proposed and developed in an ad hoc manner, as cheap land becomes available. These are often not the best sites for rational and environmentally sound landfill development. Suitable landfill sites need to be

by:


Residential.
Surface water.
separation distance
BUFFER ZONE
Highway / Arterial Rd.

identified and secured to serve the solid waste disposal needs of metropolitan Adelaide.

As with other major developments, consideration must be given to social and amenity issues when dealing with siting of waste facilities. These issues should be identified and addressed in the development assessment process. In particular, opportunities for community participation should be provided.

It is necessary that environmental effects on sensitive ecosystems arising from development are established. In particular, the need for any ecological monitoring should be identified.

Development proposals should address cultural and heritage issues to ensure that adequate protection is provided for significant sites.

Impacts on economic resources including agricultural activities, fisheries, mineral resources and the like should be identified and addressed. Other resources of economic significance, including surface and subsurface waters should be treated in a similar way. Value of land resources, including alternative best uses of land, should be considered.

To minimise conflict, the EPA is developing guidelines to promote effective separation of compatible land uses (buffer zones). These aim both to protect the environmental values of specific areas and to protect industry from costly conflicts arising from inappropriate development.

9. Litter Control

Enhance litter control through improvements to beverage container provisions and development of comprehensive longterm strategies for litter management

by:

- *removing anomalies from and enhancing the beverage container provisions of the* `Environment Protection Act 1993`*;*
- *monitoring the effect of beverage container provisions on kerbside recycling collection schemes and services;*
- *investigating legislative and other options to cover non-beverage litter.*

9. Litter Control

Enhance litter control through improvements to beverage container provisions and development of comprehensive longterm strategies for litter management

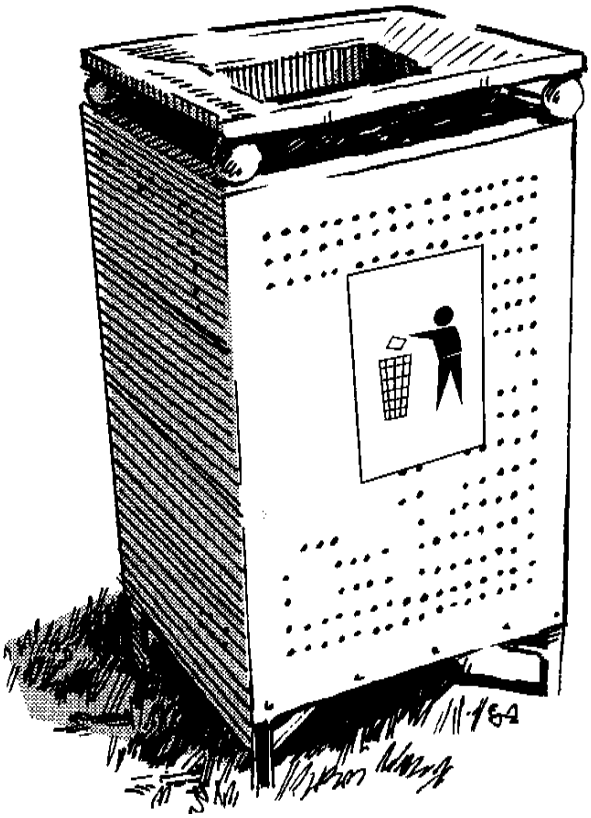
South Australia is the only State in Australia to have Container Deposit Legislation (CDL), which has wide public support (80 - 90%). This legislation is commonly confused with recycling, recycling initiatives and waste minimisation.

The beverage container provisions of the *Environment Protection Act 1993* have a primary focus of litter control. It has been very successful in keeping certain beverage containers from the litter stream. The beverage container provisions have resulted in the establishment of a significant recycling industry. The scheme is funded by consumer and industry while the enforcement and approval processes are undertaken by the EPA.

It is commonly argued that CDL removes valuable items from kerbside collection schemes. While this may be true to some extent, it is also true that many deposit bearing beverage containers are disposed of through kerbside collection services. This helps to subsidise the cost of collections. Costs are incurred in sorting materials to a higher level, ie to a manufacturer level rather than a generic material level. This also has the benefit of increasing the quality of product through less contamination. As kerbside collection schemes improve in Adelaide they will be closely monitored to ascertain the effect that CDL will have on these services.

A number of anomalies exist within the legislation which mean that beverage containers are not uniformly treated. These anomalies need to be addressed to ensure manufacturers are treated equally, and that the Act applies to litter items and potential litter items.

The EPA released a Public Discussion Paper entitled *Litter! It's your choice* in March 1996, which outlines recommendations as to the future direction of litter control programmes. This encompasses a range of measures to manage litter including CDL and will form the basis of a long term litter Strategy for South Australia.



10. Forecasting

Ensure sound planning of waste management programmes by establishing a comprehensive forecasting system within the EPA

by:

- *developing integrated databases and improving data acquisition and analysis systems;*
- *requiring mandatory reporting by industry as a condition of licence;*
- *regularly reviewing and updating forecasts;*
- *developing priorities and time frames for programme implementation in conjunction with industry and local government;*
- *establishing base line information on waste management from which performance measurements can be made by*
  - a thorough assessment of the current status of waste management in South Australia
  - assessing the current local, national and international best practice standards
  - undertaking waste audits;
- *developing an EPP for long term waste management performance monitoring programmes.*

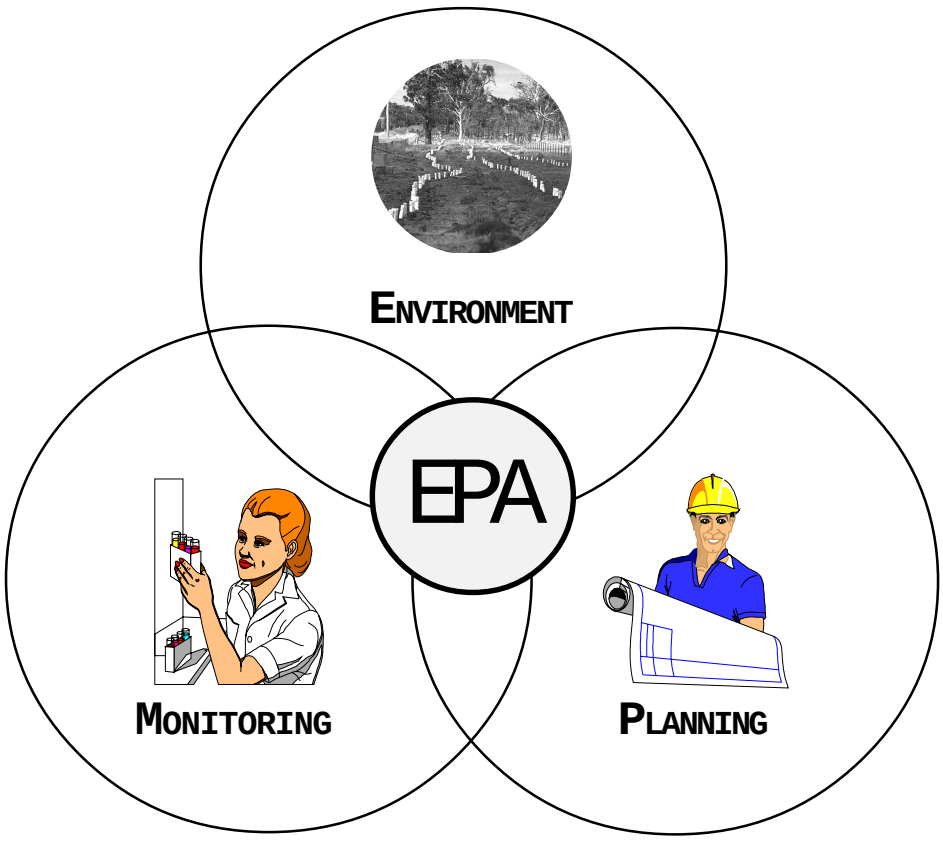
10. Forecasting

Ensure sound planning of waste management programmes by establishing a comprehensive forecasting system within the EPA

Sound planning for waste management, as in other areas of the economy, requires access to reliable data. In the past, data have been unreliable. Improvements to data collection and analysis will assist the waste management industry as well as government agencies. It is unlikely that adequate data will be available without the imposition of mandatory reporting requirements. However, it is important that industry participates in the development of programmes to improve data systems.

The development of the National Waste Database provides the opportunity for the EPA to:

- match South Australian data with the national framework;
- introduce performance monitoring based on comparative data;
- more accurately forecast future needs.

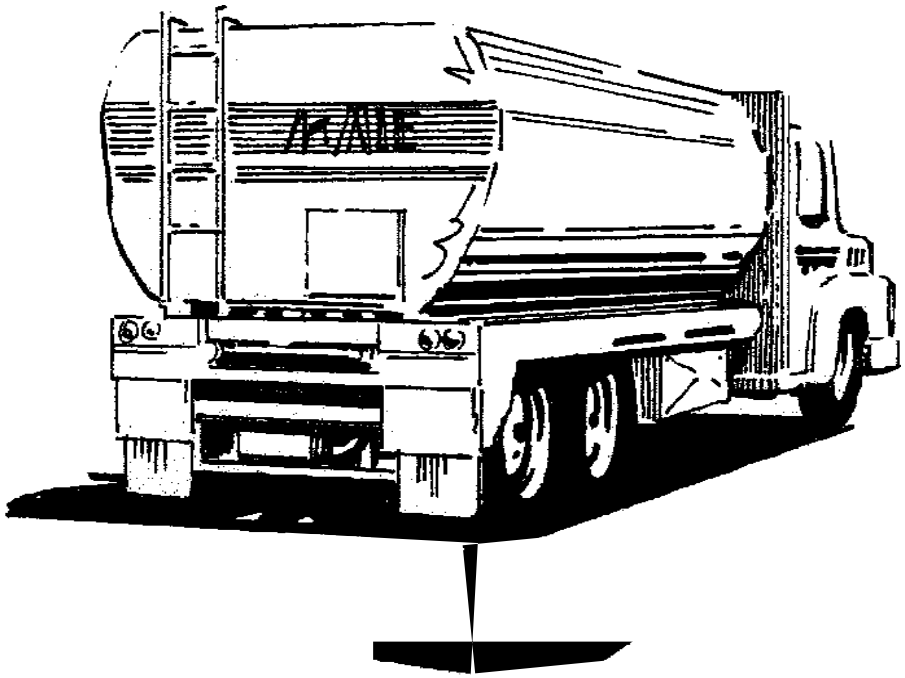


11. Listed Wastes

Ensure the safe and efficient transport of Listed Wastes to protect the community and the environment

by:

- *developing an EPP to control the collection, transport and disposal of Listed Wastes from, or by, waste generators not required to be licensed;*
- *establishing an inspection programme for vehicles used for the transport of Listed Wastes;*
- *developing and implementing training programmes for transporters of Listed Wastes;*
- *requiring all drivers who transport Listed Wastes to be registered;*
- *developing and implementing, in conjunction with industry, an EPP for the collection and transport of liquid Listed Wastes by licensed operators;*
- *introducing the locked truck system to minimise opportunities for illegal disposal during transport.*



11. Listed Wastes

Ensure the safe and efficient transport of Listed Wastes to protect the community and the environment

It is a common misconception that during the transport of waste, risks to the community and the environment are at their greatest. The number of accidents that occur during the transport of wastes in South Australia is small and most occur at the loading or unloading point. Incidents during transportation have usually been with dangerous goods and not waste. However, the collection and transport of waste is an integral part of waste management and should be completed in a safe and efficient manner with minimum effect on the community and the environment.

Companies and businesses that undertake the transporting of waste for a fee or reward are required to be licensed, and the vehicles used registered under the *Environment Protection Act 1993.*

The EPA administers a tracking system for movements of Listed Wastes within South Australia. This also links in to a national system which tracks transport across State boundaries. The system is designed to ensure that Listed Wastes are taken only to properly licensed depots and reduce opportunities for illegal disposal, with heavy penalties for breaching the law. It also provides data to enhance planning for future management.

Each vehicle used for waste transport must be constructed and maintained so that it is suitable for the waste it is carrying. The EPA will require that all vehicles used to transport Listed Wastes by licensees are subject to regular inspection, so that they remain in a safe condition and comply with relevant standards. The inspection will be arranged by the licensee and will be at the licensee's expense. In order to continue to use the vehicle, the licensee will be required to provide the EPA with a declaration that the vehicle meets all standards necessary.

Training of drivers who carry Listed Wastes is an essential element in the provision of a safe and efficient service. Minimum educational standards for drivers will be established, along with a requirement that they are all registered with the EPA. A well-trained workforce will provide many benefits to all aspects of the waste industry.

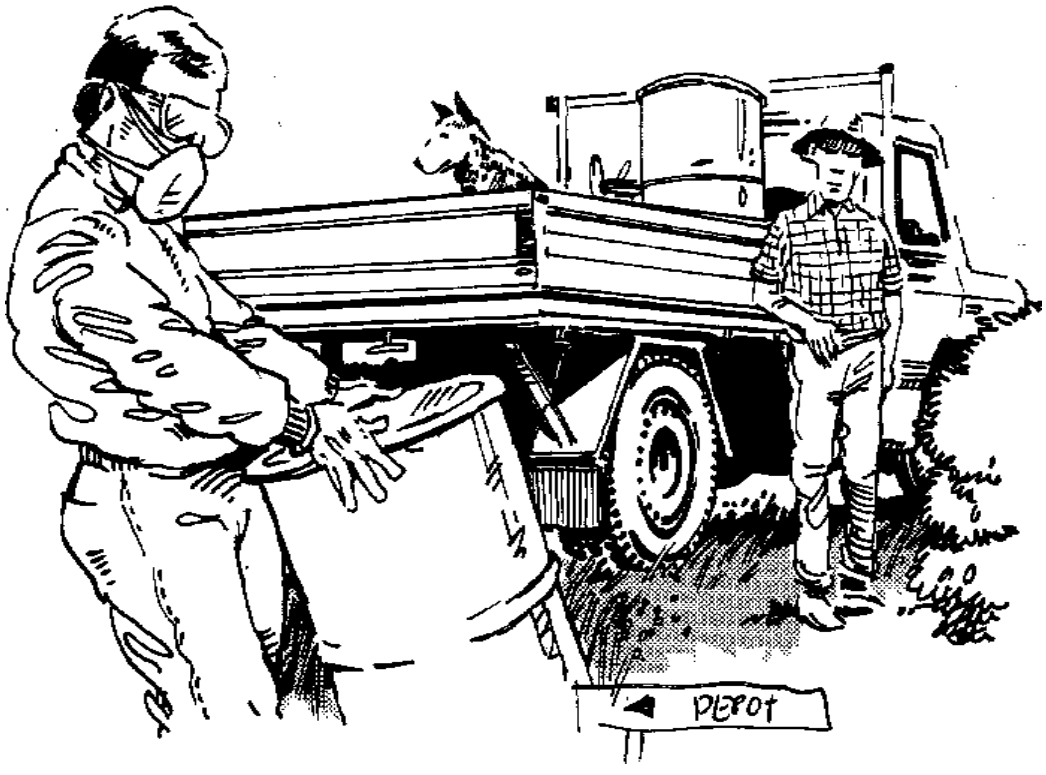
An EPP will be developed which will apply to the collection and transport of liquid Listed Wastes. This will take many of the topics referred to in this section and incorporate them into a mandatory requirement under the *Environment Protection Act 1993*.

Some activities which produce Listed Wastes are exempted from the licensing provisions of the Act. These include: domestic activities, dry cleaners, crash repairers, doctors' surgeries, veterinary practice and dental practice. The EPA will introduce an EPP that will require those involved in such activities to manage their Listed Wastes at a standard equivalent to those producing the waste under the control of a licence.

11. Listed Wastes

Promote the collection and treatment of hazardous household wastes and farm chemicals

- *promoting expansion of programmes for hazardous household wastes and farm chemicals reception, without direct charge to the individual householder or farmer;*
- *encouraging local government to contribute to collection and reception services for hazardous household and farm wastes;*
- *requiring manufacturers of industrial and farm chemicals to accept greater responsibility for the final disposal of their products.*



11. Listed Wastes

Promote the collection and treatment of hazardous household and farm chemicals

Many households have unwanted hazardous materials. The improper disposal of these materials could cause damage to the environment or conditions injurious to health and safety. They include pesticides, pharmaceuticals, paints, photographic chemicals, waste oil, pool chemicals and rechargeable batteries. Farms and other properties also have unwanted hazardous chemicals. They are usually in larger quantities and mainly consist of unwanted or banned pesticides. The EPA currently provides a free facility where members of the public and farmers may bring their unwanted hazardous wastes. As part of this service EPA accepts responsibility for the wastes, which are then treated, incinerated or stored, awaiting treatment.

However, management of such wastes is a cooperative programme, reflecting responsibility of Commonwealth, State and local governments, the agricultural and chemical manufacturing industries and the community.

The EPA will encourage local government to:

- accept and manage the less hazardous portion of this waste stream, eg waste lubricating oil, waste paint and unwanted pharmaceuticals;
- make a contribution to the treatment of the other wastes which will still be managed by the EPA.

Such cooperation would not only enable the programme to continue but would enable its expansion, in both metropolitan and rural areas of South Australia.

In addition to banned or out-of-date pesticides, the EPA facility also receives those currently in use. Whereas the agriculture and chemical manufacturing industries would not be expected to contribute to the management of banned pesticides, it is expected that they will make a financial contribution, in order to:

- reduce the amount of presently-manufactured pesticides received;
- assist in the scheme when the pesticides are brought to the EPA.

12. Sludge Management

Promote effective management and use of industrial wastewater and water treatment sludges

by:

- *encouraging research and development into*
  - environmental impacts
  - beneficial uses in building, agricultural and landscaping activities
  - sewage sludge, wool-scouring sludge and water treatment residues to establish standards for sewage sludge management;
- *prohibiting uncontrolled discharges of sewage sludge, waste treatment and water treatment residues to*
  - land
  - surface and groundwater
  - marine environments;
- *requiring that sludges containing Listed Wastes from industrial waste treatment plants are taken to a Listed Waste Management Centre.*

12. Sludge Management

Promote effective management and use of industrial wastewater and water treatment sludges

Residues in the form of solids mixed with water are the inevitable consequence of the treatment of some wastes. These include sludges produced during the treatment of sewage and water, and the scouring of wool. Development of beneficial uses for these sludges may reduce their impact on the environment.

The EPA will assist by encouraging research and development in this area. This programme will also incorporate methods to ensure sludges that cannot be used are disposed of in a controlled manner. The EPA will initially establish guidelines for the use of sewage sludge.

Further information on safe handling, disposal or re-use of sludges is contained in the recently released *South Australian Biosolids Guidelines* produced by the EPA and the South Australian Health Commission (SAHC).

Sludges from industrial waste treatment are often unsuitable for further use, even with current technology. The EPA will ensure that these sludges are stored at a Listed Waste Management Centre (on establishment) awaiting final treatment, thereby minimising their risk to the environment.

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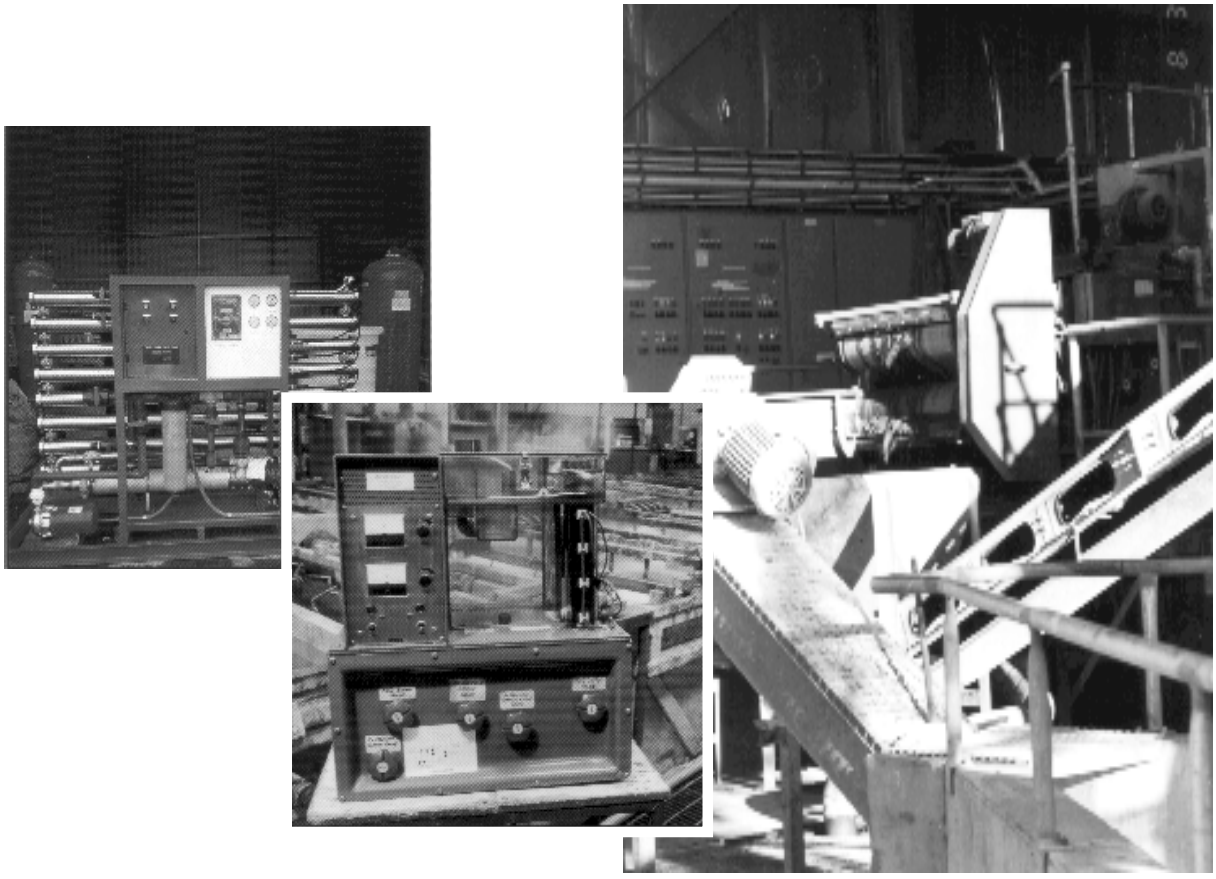
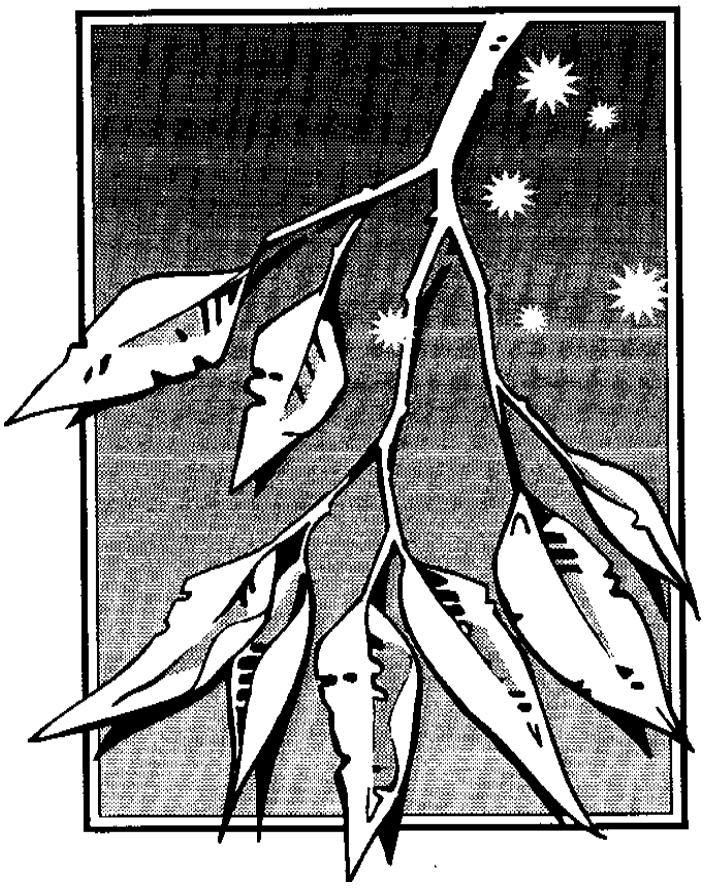


13. Green Waste Management

Encourage and promote commercial composting and other technologies as a significant component of the EPA waste minimisation Strategy

by:

- *ensuring that composted products using or derived from sewage sludge meet the National Guidelines for unrestricted use;*
- *developing and implementing a guideline to discourage disposal of bulk clean green waste to landfill by the year 2000;*
- *encouraging all levels of government to use material generated from their green waste to meet their own requirements;*
- *establishing a Composting Task Force to facilitate local government and industry cooperation and exchange of information.*



13. Green Waste Management

Encourage and promote commercial composting and other technologies as a significant component of the EPA waste minimisation Strategy

Compost is a saleable product to home gardeners, landscapers and perhaps to overseas markets.

Green waste forms a significant component of the waste stream. Composting this material may substantially reduce landfill volume requirements.

However, the effect of removing green waste from the landfill would have a significant, but as yet unknown effect on the generation of landfill gas.

The EPA therefore encourages and promotes commercial composting as a significant component of the EPA waste minimisation Strategy.

The EPA will facilitate, through Recycle 2000, the establishment of a Green Waste Task Force to allow exchange of information between local government and industry.

If councils develop green waste composting and recycling strategies, then they should be encouraged to use the material generated from green waste to meet their own requirements. This should ease the costs of bringing in soils and other garden materials and will establish an immediate market for much of the compost generated.

There are better uses for green waste than disposal to landfill, where it takes up large amounts of space. The EPA will develop an EPP which discourages the disposal of bulk uncontaminated green waste to landfill by the year 2000.

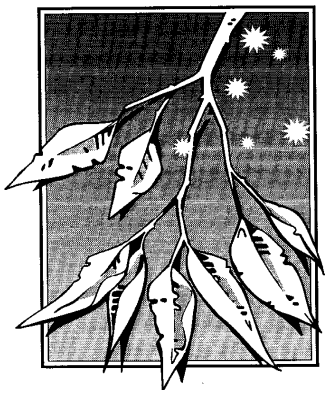
Need for further work

The task force could also:

- review research and development proposals to ensure they are industry focused;
- encourage groups of councils to pool funds and expertise to tackle green waste problems;
- address standards and technical issues as they relate to green waste recycling and management;
- address marketing and public awareness issues.

Future research will need to address the following:

- collection and composting of sewage sludge and factory food wastes;
- development of a kerbside collection programme for clean green waste;
- movement toward the composting of all urban organic waste;
- anaerobic digestion of green waste and recovery of methane;
- home composting and better ways to reduce vermin, leachate, and odour;
- putrescibles at a domestic level and in the food industry.



14. Food Waste

Minimise the contribution of food waste to the solid waste stream

by:

- *promoting investigation into the use of alternative domestic food waste disposal systems;*
- *encouraging the use of alternative food waste disposal systems in industrial and commercial applications, where appropriate.*

14. Food Waste

Minimise the contribution of food waste to the solid waste stream

Weekly domestic waste collection in Australia is generally provided due to the limited holding time for food waste before offensive odours arise from decomposition. Whilst the relative proportion of this material may be small (of the order of 20% by weight of the contents of a domestic bin) the impact of such waste is significant due to:

- rapid decomposition accompanied by offensive odours, possible discharge of liquids, the attraction of vermin and disease carrying organisms;
- subsequent contamination of more inert materials within the bin.

These factors direct the frequency of service and the implications of interruption to service. As the cost of collection is about 80% of the total cost of service, including disposal, there are opportunities for the use of technology to overcome problems and reduce costs.

Food premises require more frequent collection of waste for reasons of hygiene and health. The resources required and cost involved in providing such services justify exploring more efficient and effective alternatives.

Such innovations may include equipment for restricting the rate of decomposition of food waste (for example by cool storage or dehydration), or by alternative disposal such as in-sink food waste disposers. However, the environmental and other impacts of these systems need to be properly assessed for the Adelaide Metropolitan Area.

Successful implementation would require cost savings to be passed on to householders, and may be simpler in newer, self-contained communities rather than existing suburban areas. In the case of food premises, where waste disposal costs are more easily identified, the use of more cost effective systems will be driven by commercial considerations, especially when business is made fully aware of the options.

There may also be opportunities for recovery of food wastes through segregated collection, and processing of such wastes through composting or other biological processes. During these processes, such wastes are safely returned to the food chain rather than being allowed to decompose within a landfill where products of decomposition are often responsible for adverse impacts. These include odours, breeding of disease carrying organisms and leachate generation, all of which are difficult to effectively control.

Accordingly, attention should be given to further development of options for landfill disposal, including treatment of food wastes; particularly those options which recover a significant proportion of resources within the food waste stream.

15. Waste Tyres and Waste Lubricating Oils

Develop environmentally sound policies for the management of waste tyres and waste lubricating oils

by:

- *promoting the National Waste Tyre Policy;*
- *extending the prohibition on landfill disposal of whole waste tyres to include country areas;*
- *applying stricter controls over the use of waste tyres as an erosion control measure;*
- *promoting the use of alternatives to the use of tyres as tree guards;*
- *including waste tyres as a Listed Waste;*
- *developing an EPP for waste tyres to ensure that*
  - costs are recovered from consumers
  - high penalties apply to improper disposal;
- *developing and implementing a public education and information programme to inform consumers and industry of their responsibilities;*
- *setting tyre recycling targets for South Australia;*
- *investigating the application of a levy on the production and import of tyres as part of a national programme;*
- *developing strategies with industry for reuse and recycling of waste lubricating oils.*

15. Waste Tyres and Waste Lubricating Oils

Develop environmentally sound policies for the management of waste tyres and waste lubricating oils

In July 1993, a new policy was introduced in South Australia based on the *ANZECC Task Force Final Report* dealing with waste lubricating oil and used motor vehicle tyre recycling and reuse.

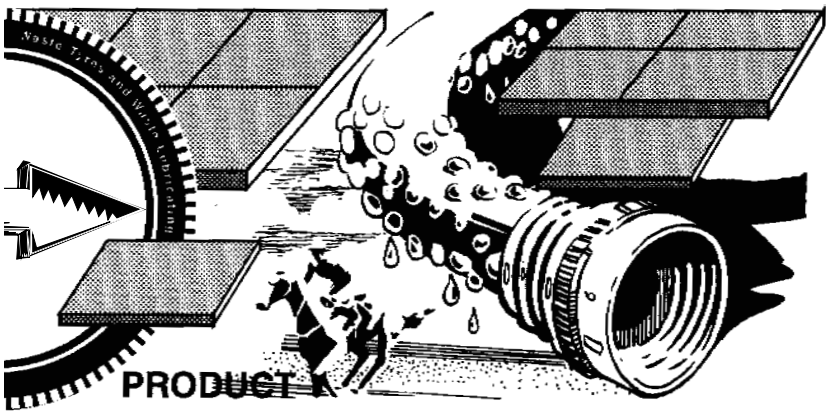
The policy requires tyres to be shredded before disposal to landfill in the metropolitan area.

Approximately 1,000,000 waste tyres are produced in South Australia each year: 250,000 are retreaded, the remainder are disposed of or reused in cement kilns, tree planting, country landfills, erosion control, silage production and other on-farm uses such as horse yards and fences.

The EPA supports a national approach to tyre disposal. Disposal methods which need to be closely monitored and controlled include:

- energy recovery and pyrolysis of tyres;
- the large number of tyres being used as tree guards and promotion by the EPA of alternatives to tyres as tree guards;
- the experimental use of tyres to control lakeshore erosion in the Meningie area where they are used under licence to control lakeshore erosion;
- underground storage of tyres for later retrieval as fuel or as raw material for recycling.

Waste lubricating oil still has useful properties which can be utilised in a range of lower grade processes. A Strategy will be developed with industry so that waste lubricating oil may be used in the most beneficial way.



16. Radioactive Waste

Promote the effective and efficient management of radioactive wastes

by:

- *continuing to communicate with the South Australian Health Commission.*

16. Radioactive Waste

Promote effective and efficient management of radioactive wastes

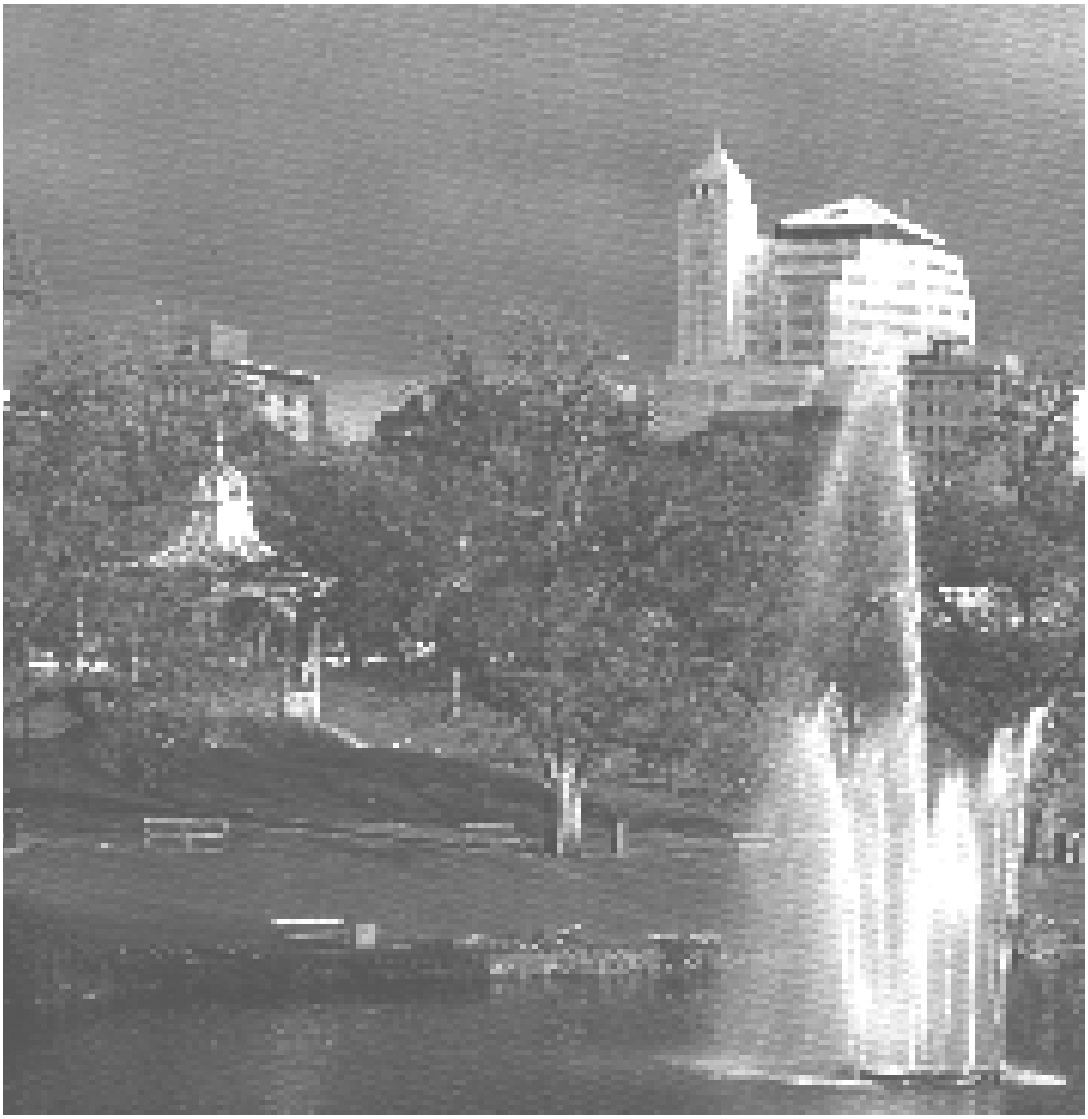
Although radioactive waste does not fall within the scope of the EPA, it is considered that its management falls within an Integrated Waste Management Strategy for the State. Radioactive waste is regulated by the Radiation Control Branch of the SAHC through the *Radiation Protection and Control Act 1982*.

The Act specifies levels of radioactivity, above which a material is classified as radioactive. It is necessary that approval be obtained from the SAHC before disposal of any radioactive material. The sources of radioactive wastes in South Australia are mainly hospitals and tertiary institutions.

The level of radioactivity in these wastes is very low and approvals for disposal are reviewed annually by the SAHC. The basis for this review is the Code of Practice for the Disposal of Radioactive Wastes issued by the National Health and Medical Research Council. Most radioactive waste is taken to licensed landfill. Some radioactive waste is required to be stored by the generator unless it is returned to the supplier.

Domestic smoke detectors may be handed in to the Radiation Control Branch of the SAHC or to the Environment Protection Authority's depot at Dry Creek.

The EPA will continue to communicate with the SAHC to ensure that radioactive wastes are managed effectively and efficiently.



Glossary

Aerobic Process: A process which occurs in the presence of air.

Anaerobic Process: A process which occurs in the absence of air

Aqueous Waste: Liquid Waste which is predominantly water and generally contains material that floats, settles or is suspended.

Best Practice Environmental Management (BPEM): The Australian Manufacturing Council (AMC) describes BPEM as "The extension of advanced manufacturing techniques into environmental management. Accordingly it is the application of "soft" and "hard" technologies to all manner of environmental issues in order to achieve maximum, continuous improvement for minimum required cost." AMC 1992, The Environmental Challenge: Best Practice Environmental Management.

Best Practice Environmental Regulation: Legislation which embodies the principles of Best Practice Environmental Management.

Buffer Zones: The separation between one land use and another (for example residential and waste disposal activities) which serves to reduce adverse impacts.

Commercial Waste: Waste material generated by commercial establishments such as office buildings, stores, markets, theatres, hotels and warehouses.

Composting: The process of using micro-organisms to convert organic material into humus for soil conditioner and low-grade fertiliser.

Decomposition: The breakdown of organic waste materials by micro-organisms.

Ecology: A branch of science concerned with the inter-relationship of animals, plants and the environment.

Ecosystem: An ecological community of organisms and their surroundings.

Emissions (Gaseous): Waste gases released into the atmosphere as the product of combustion or decomposition processes.

Energy Recovery: Resource recovery in which all or part of the waste materials going into a recovery facility are burned to produce energy for heating or the generation of electricity.

Environment: The sum of all conditions, circumstances, and influences surrounding and affecting the life and development of organisms.

Environment Improvement Programme: A programme of projects to be undertaken by a licensee to improve environmental performance to an agreed timetable.

Environment Protection Policy (EPP): A policy approved by the EPA under the Environment Protection Act 1993.

Environmental Risk Assessment: The quantitative and/or qualitative assessment of the real or potential effects of a hazardous waste on the environment.

Environmental Waste Management: Waste management systems which minimise their impact on the environment, including energy consumption, pollution of land, air and water, and loss of amenity.

External Costs: Those costs which impact on others and which the operator has no incentive to take into account because such costs are not reflected in market prices. Examples include decline in nearby property values caused by operations of a depot, cost of cleaning nearby premises as a result of dust emissions from a depot, cost of soundproofing of a nearby meeting room.

Green Waste: Vegetative matter in the waste stream from domestic and other sources, including tree prunings, lawn clippings, stumps and the like, but excluding processed timber

Glossary

products.

Groundwater: Water that occurs in a saturated subsurface geological formation of rock or soil.

Hazardous Waste: Any waste containing significant quantities of a substance which is toxic, poisonous, infectious, explosive, flammable, corrosive highly reactive or oxidising.

Industrial Waste: Waste material generated by industrial or manufacturing processes.

Inert Waste: Discarded material without active chemical or biological properties.

Inorganic Waste: Waste material coming from matter other than plants, animals and certain chemical compounds.

Inter-generational Equity: Current generations not passing on to future generations, environmental problems and costs which can be avoided by properly managing the Earth's resources now.

Internal Costs: Those costs which would normally be borne in establishing and operating a depot, including for example capital and operating costs of siteworks and equipment.

In-sink Waste Disposal System: Equipment used in domestic and commercial kitchens to pulverise food waste prior to discharge to the sewer drain.

Landfill: A waste disposal site used for the controlled deposit of solid wastes on to or into the land.

Leachate: Liquid that percolates through landfills and contains decomposed waste, bacteria and other contaminants.

Life-cycle Analysis: An examination which takes into account the environmental impacts of all phases of the life of a product or service (including extraction, manufacture, distribution, use, possible reuse, recycling and final disposal).

Listed Wastes: Those wastes included in Schedule 1, Part B of the Environment Protection Act 1993.

Locked-Truck System: A method of increasing the security of consignment of hazardous materials.

Medical Waste: Medical Waste means waste consisting of:

- a needle, syringe with needle, surgical instrument or other article that is discarded in the course of medical, dental or veterinary practice or research and has a sharp edge or point capable of inflicting a penetrating injury on a person who comes into contact with it;
- human tissue, bone, organ, body part or foetus;
- a vessel, bag or tube containing a liquid body substance;
- an animal carcass discarded in the course of medical, dental or veterinary practice or research and any material that has come into contact with such a specimen or culture;
- any other article or matter that is discarded in the course of medical, dental or veterinary practice or research and that poses a significant risk to the health of a person who comes into contact with it.

Organic Waste: Waste material made up of substances generally manufactured in the life processes of plants and animals.

Orphan Sites: Sites previously used for waste disposal (either formal or informal) and now closed or abandoned, often with no means of providing funds for remediation. Usually the cost of remediation far exceeds the potential value of the site.

Glossary

Polluter Pays: Polluters and potential polluters covering all the cost of pollution prevention, by compliance with regulations and adoption of prevention measures.

Pollution: Pollution occurs when the waste loads on water, air and the land overwhelm the natural process of assimilation of such wastes.

Precautionary Principle: Lack of data should not be used as an excuse for preventing damage to the environment where there are threats of serious or irreversible environmental damage. In applying this principle, decisions should be guided by:

- careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment;
- an assessment of risk-weighted consequences of various actions.

Putrescible: Capable of decomposition by micro-organisms.

Pyrolysis: The process of chemically decomposing an organic substance by heating in an oxygen-deficient atmosphere.

Recycling: A resource recovery method involving the collection and processing of a waste product for use as a raw material in the manufacture of the same product or a similar one.

Resource Recovery: The extraction of economically useable materials or energy from wastes. This may involve recycling or the conversion into another often unrelated use.

Reuse: The use of a waste material or product more than once.

Sludge: Dry or semi-liquid waste that is the residue from the treatment of sewage or industrial wastewater.

Source Separation: The extraction and segregation of reusable and recyclable materials at the point of waste generation.

Sustainable Development: The concept of sustainable development acknowledges the importance of economic growth.

Transfer Station: A place where materials can be taken for transfer to larger containers or to a disposal depot.

User Pays: Costs, including all operating costs of facilities, attributed to the treatment and disposal of wastes are borne by waste disposers.

Vector (Disease): A carrier of disease or infection from one organism to another (eg rodents, mosquitoes).

Waste: The Environment Protection Act 1993 defines waste as any liquid, solid or gas (or a combination thereof) that is left over, surplus or an unwanted by-product from any business or domestic activity, whether of value or not.

Waste Audit: The analysis of total waste produced by an activity or process to determine the quantity and composition of that waste.

Waste Composition Data Collection Systems: Systems developed to analyse the composition of waste samples and classify them in accordance with the National Waste Database.

Waste Depot: A depot is a place for the reception, storage, treatment or disposal of waste.

Waste Hierarchy: Waste management system

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ranking the possible methods of dealing with waste, traditionally ranging from the most preferred options (such as reduction and avoidance) down to the least preferred options (treatment and disposal).

(Integrated) Waste Management: The management of the entire process of generation, storage, collection, transportation, treatment and disposal of waste and resource recovery.

Waste Stream: A general term used to describe the total waste material generated by an area, location or a facility.

Waste to Energy: The recovery of energy from waste, utilising either combustion of unprocessed waste, direct combustion of refuse derived fuel (RDF), pyrolysis and gasification or biological processing. The energy recovered is often converted into electrical energy for ease of distribution.

Waste Minimisation: Any technique, process or activity which either avoids, eliminates or reduces a waste at its source, or allows reuse or recycling of the waste for benign purposes.

Abbreviations

ALGA: Australian Local Government Association

ANZECC: Australian and New Zealand Environment and Conservation Council

CDL: Container Deposit Legislation

EIP: Environment Improvement Programme

EPA: Environment Protection Authority

EPP: Environment Protection Policy

ESD: Ecologically Sustainable Development

IGAE: Inter Governmental Agreement on the Environment

LGA: Local Government Association

LGR WMB: Local Government Recycling and Waste Management Board Inc. (Recycle 2000)

NAWMA: Northern Adelaide Waste Management Authority

NEPC: National Environment Protection Council

OECD: Organisation for Economic Cooperation and Development

RDF: refuse derived fuel

RRRS: Recycling and Resource Recovery Scheme

SAHC: South Australian Health Commission

SAWMC: South Australian Waste Management Commission

UNCED: United Nations Conference on Environment and Development

WTE: waste to energy

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Acknowledgements

A review of waste management practices in Adelaide was initiated by the South Australian Waste Management Commission in 1993. The project was subsequently assigned to the staff of the EPA who compiled and wrote this Strategy.

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Previous Documents

Revised Public Discussion Paper

Respondents to Draft Strategy

Association of Liquidpaperboard Carton Manufacturers

MN Burford

BHP Steel

City of Burnside

Conservation Council of South Australia

Department of Housing and Urban Development

C Dunnet

G Dutton

Ecobusiness

IJ Grieg

KE Gallasch

M Haden

Highbury Environs Against Rubbish Tips

R Horridge

Inkerman Proposed Landfill Action Group

In-Sink-Erator

Keep South Australia Beautiful

Lucas Earthmovers Pty Ltd

The Leue Family

Mineral Control Instrumentation Ltd

I Modistach

Murray Lands Local Government Association

Melrose Park Residents Action Group

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