REGULATORY IMPACT STATEMENT

PROPOSED POLLUTION CONTROL REGULATION 1998

EPA NSW

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Symbols, Abbreviations and Acronyms

ADI	Acceptable Daily Intake
BC	British Columbia
BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
GWh	Gigawatt hours
kg	kilogram
M	Mega (million)
N	Nitrogen
NFR	Non-Filtrable Residue
NO_x	Nitrogen oxides
O_3	Ozone
P	Phosphorus
pa	per annum
PAH	Polycyclic Aromatic Hydrocarbons
Pb	Lead
PM	Particulate Matter
PM_{10}	Particulate Matter less than 10 microns (respirable particles)
ppb	parts per billion
VOCs	Volatile Organic Compounds

ABARE	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
AMC	Australian Manufacturing Council
ANZECC	Australian & New Zealand Environment & Conservation Council
ANZSIC	Australian & New Zealand Standard Industry Code
AQMP	Air Quality Management Plan
ARMCANZ	Agriculture & Resource Management Council of Australia & New Zealand
BAT	Best Available Technology
BATEA	Best Available Technology Economically Achievable
BMP	Best Management Practice
BPEM	Best Practice Environmental Management
CAPCOA	California Air Pollution Control Officers Association
CRC	Cooperative Research Centre
CRCWMPC	Cooperative Research Centre for Waste Minimisation & Pollution Control
DLWC	Department of Land Water Conservation
EPA	NSW Environment Protection Authority (other EPAs named by State)
ESD	Ecological Sustainable Development
GOS	Gross Operating Surplus
HWC	Hunter Water Corporation
IT	Information Technology
LARP	Local Approvals Review Process

LBL	Load Based Licensing
LCIA	Life Cycle Impact Assessment
LGA	Local Government Area
MAQS	Metropolitan Air Quality Study
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NPI	National Pollutant Inventory
NSW	New South Wales
NWQMS	National Water Quality Management Strategy
OECD	Organisation for Economic Cooperation and Development
PCA	*Pollution Control Act 1970*
POCP	Photochemical Ozone Creation Potential
POEO	*Protection of the Environment Operations Act 1997*
PPP	Polluter-pays principle
PRP	Pollution Reduction Program
RAC	Resource Assessment Commission
RIS	Regulatory Impact Statement
RTA	NSW Roads & Traffic Authority
SETC	Society of Environmental Toxicology
SOE	State of the Environment
SOx	Sulfur oxides
STP	Sewage Treatment Plant
SWC	Sydney Water Corporation
UK	United Kingdom
US or USA	United States of America
USEPA	United States Environmental Protection Agency
VAT	Value Added Tax
VicEPA	Victorian Environment Protection Authority
WHO	World Health Organisation
WQO	Water Quality Objectives

EXECUTIVE SUMMARY

Background

In November 1997 the NSW Parliament passed the Pollution Control Amendment (Load Based Licensing) Bill to provide for implementation of a Load Based Licensing (LBL) Scheme (also referred to as 'the Scheme). In December 1997, Parliament also passed the Protection of the Environment Operations Bill (POEO Bill), which is intended ultimately to replace the *Pollution Control Act 1970*.

The Environment Protection Authority (EPA) has prepared the draft Pollution Control Regulation 1998 to give effect to Parliament's intention to start the LBL Scheme. The draft Regulation has been structured so that it can readily be carried forward with minimum disruption to operate under the POEO once that Act is implemented. This Regulatory Impact Statement (RIS) evaluates the draft Regulation as required by the *Subordinate Legislation Act 1989*.

The Scheme has been in preparation for over three years and has involved extensive consultation and collaborative development with a wide range of stakeholders. In June 1996 a Draft Operational Plan, which set out the proposed strategic framework for the Scheme, was widely circulated for comment. Respondents overwhelmingly endorsed the proposed framework as the preferred strategy for enhancing the effectiveness and fairness of NSW's environment protection licensing system. Respondents also requested that the EPA carefully investigate the impacts of fee levels to be proposed and suggested refinements of some of the technical elements of the proposal.

The EPA has completed its revision of the Scheme in response to stakeholders' suggestions and now presents the complete details of the LBL Scheme in the draft Regulation and this RIS for the purpose of a Final Review of the LBL Scheme. In order to facilitate the review, the EPA will be conducting an extensive program of further consultation. In addition to the distribution of this RIS and draft Regulation and presentation of a series of regional seminars to explain the proposal, there will also be opportunities for all interested parties to meet individually with EPA officers to examine the details of the Scheme as it affects particular industry classifications. The details of these arrangements are set out in the attached invitation and reply sheet.

Written comments should be sent to:

The Director
Economics and Environmental Reporting
NSW EPA
PO Box 1135
Chatswood
NSW 2067

The closing date for comments is 30 April 1998.

The Scheme

The LBL Scheme is a major overhaul of NSW's environment protection licensing system, involving two key programs.
First, the primary measure and limit tool for licensed discharges will be the annual pollutant load (or mass emitted) instead of the concentration of pollutants contained in discharges. This new approach will provide a stronger outcomes-based focus for the licensing system, and thus greater assurance of environment protection. It is also intended to provide greater flexibility for licensees to find cost-effective and innovative options for meeting environmental requirements.

Secondly, a new type of pollution load licence fee will provide ongoing incentives for pollutant load reductions. The fee will be based on the quantity and type of pollutants discharged, with adjustments for the manner of discharge and the condition of each receiving environment. This contrasts with the current system, where fees are mainly based on the scale and type of the licensed activity, or the maximum allowable volume of wastewater permitted to be discharged.

The first program will mainly be implemented through administrative changes in the way that the EPA exercises its licensing powers under the Pollution Control Act. The draft Regulation, however, will give effect to the new incentive fee system. Although the changes to licensing administration are not required to be evaluated in this RIS, the combined program is presented to help stakeholders to evaluate the LBL Scheme.

This RIS evaluates the merits of a wide range of options for licensing that are possible under the Act. These include the use of fixed or individually negotiated standards, tradeable permits and price-based instruments. It concludes that a hybrid scheme drawing on the strengths of each approach is preferred. The approach of the draft Regulation is a practical implementation of the polluter-pays principle, consistent with the recommendations of the OECD.

The new incentive fees will initially apply to about 1000 of the current 3400 licences, with others being progressively introduced as suitable load calculation techniques are finalised. The draft Regulation also proposes a new schedule of administrative fees to recover the Government's licensing administrative costs more fairly.

Quantum of Fees

The proposed fee levels are low compared with rates payable under similar schemes in other jurisdictions. They are also significantly less than would be payable if the polluter-pays principle were fully implemented, having regard to the likely costs of pollution impacts on human health and the environment. Instead of immediate implementation of full polluter-pays or rates already applicable elsewhere, however, a conservative approach of incremental increases over three years has been adopted. This reflects a commitment by the Government to minimise transitional costs and to ensure that the Scheme supports increasing integration of economic development and environmental improvement over time. A review of the fees will take place in the third year of the Scheme, in order to determine the efficacy of the fee structure. Average fees for key pollutants at the end of the three-year phase-in are listed below.

Proposed Year 3 LBL Fees

Pollutant	% of Total Weighted Discharges	$A/tonne Emitted (Average)
Nitrogen oxides (air)	24%	$68
Phosphorus (non-marine waters)	15%	$6,250
Fine particulates (air)	11%	$310
Undifferentiated particulates (air)	8%	$117
Suspended solids (non-marine waters)	7%	$380
Volatile organic compounds (air)	5%	$175
Suspended solids (marine waters)	5%	$53
Sulfur dioxide (air)	4%	$6
Lead (air)	3%	$64,000

The table below compares proposed average maximum NSW fees with fees payable under comparable international schemes.

International Fee Comparisons

Fees for Sulfur Dioxide	$A/tonne	Fees for Nitrogen Oxides	$A/tonne
NSW EPA (av.)	$6	US (Minnesota)	$24
US (Minnesota)	$23	France	$33
France	$33	Czech Republic	$33
US (California)	$238–$576	*NSW EPA (av.)*	$68
Japan	$258–$2,322	Poland	$76
Norway	$3,148	US (California)	$195–$479
Sweden	$5,778	China (proposed)	$350
		Sweden	$7,859

Economic & Environmental Impacts

The principal anticipated economic benefits of the Scheme are reductions in harmful discharges in priority areas, increases in regulatory efficiency and consequential reductions in compliance costs for licensed sources.

This RIS provides some indicative values drawn from a wide range of studies for likely cost savings arising from discharge reductions for some key pollutants. It is estimated that the benefit of a 25% reduction of just three pollutants (NO_x, suspended particulates in air, and VOCs) from licensed sources would exceed $79m a year. The difficulties in accurately predicting actual discharge reductions are discussed below. This estimate of cost is narrow and conservative and it excludes many key impacts that are very important to many members of the community. Exclusions include the medical costs of treating morbidity, lost productivity, changes to property values associated with industrial pollution, and the satisfaction that people derive from their own good health and from living in a clean environment. The benefits of reductions in

fine particulate matter discharges are also evaluated based on specific NSW data. The estimate suggests that a 25% reduction would result in benefits of $135m each year.

The following table presents a summary of the anticipated performance of the draft Regulation in relation to accepted regulatory efficiency criteria.

Summary of Regulatory Efficiency Evaluation

Regulatory Efficiency Criteria	Features of Proposed Approach	Benefits
Assurance of environment protection	• Annual load limits to control cumulative impacts • Continuous concentration limits to control acute and chronic impacts	• Prevents 'creeping background' increases in discharges • Clearly defines essential required outcomes
Transparency	• Regulation developed with extensive public consultation and stakeholder input • Fee structure based on objective techniques and fully documented • Creates a public reporting system for discharges	• Opportunity to optimise regulatory efficiency based on input from all stakeholders • Incentive fees proportional to explicit environmental priorities • All stakeholders can track environmental performance and comment on outcomes and equity
Cost effectiveness in achieving environmental goals	• Performance-based approach; licensee free to select compliance method • Incentives increase where environment improvement needs are greatest • Gradually implements fee consistency among and within industry sectors • Uses load as primary measurement of harm	• Harnesses market forces to stimulate innovation. Active encouragement of lowest cost solutions • Helps focus abatement efforts where most beneficial • Corrects existing distortions • Creates potential for trading schemes to further reduce overall compliance cost
Minimisation of administration fees	• Administrative fees are part of load incentive fee, not additional • Provides for use of low-cost load estimation techniques (discharge factors) • Rationalisation of reporting requirements • Scheme complements forthcoming National Pollutant Inventory	• Minimises economic 'deadweight'of administrative fees • Reduced administrative costs via process streamlining and IT upgrade
Efficient recovery of administrative costs	• Moves to equitable recovery of administrative costs over 3 years	• Implements 'polluter-pays' to enhance equity and economic efficiency.
Regulatory certainty	• Fees set for 3 years; review scheduled	• Reasonable certainty provided. Clear signal of strategic direction and future intentions.
Capacity to review efficiency of regulator	• Load reporting allows quantitative evaluation of changes in discharges and resulting ambient outcomes	• Provides mechanism to check 'value for money' of regulatory approach and ensure regulatory activities are targeted in priority areas.

To the extent that public sector expenditure confers equal benefits on the State as does private sector expenditure, the payment of fees is a transfer rather than an economic cost. Economic costs can arise, however, in administering LBL, where licensees choose to incur pollution reduction expenditure, or where production is reduced due to any loss of competitiveness arising from higher production costs.

A key pre-requisite to estimating the extent of these costs is therefore the capacity to predict licensees' abatement responses. Because there is a wide range of affected industries and a lack of data concerning their pollution abatement costs, this cannot be accurately determined. A further obstacle is the need to model the first and subsequent round impacts of positive and negative changes induced by the Scheme. Unfortunately, no available economic model is sufficiently detailed to support a complete investigation of these types of impacts.

Although likely to overstate true impacts, this RIS provides a full financial impact analysis. The analysis is based on a maximum impact assumption that all licensees choose not to reduce discharges and therefore merely pay the increased fees. The analysis shows that the overall scale of the Scheme is modest and unlikely to have the capacity to cause significant negative impacts.

Total maximum fees are anticipated to increase from the current $30m a year to $58.1m a year as shown in the table below. Future reductions in discharge will result in fee increases being lower than shown.

Resulting Maximum Licence Fees ($million)

	97/98 (current)	**98/99**	**99/00**	**00/01**	**01/02**
Total fees	30.2	22.3	31.6	42.7	58.1
Change compared to present	–	-7.9	1.4	12.5	27.9

To place the proposed fees in perspective, the maximum proposed increase is approximately equal to:

- 0.06% of turnover of licensed industries
- 0.2% of gross operating surplus of licensed industries
- 0.016% of gross State product
- 0.8% of current State payroll taxes.

Sydney Water Corporation currently pays approximately 75% of current total fees. Correction of this inequality will inevitably see fees for most other licensees increase. These increases are essential if licensees are to meet the real cost of pollution licensing activities and for the Scheme to provide genuine incentives for discharge reductions. The impacts of these increases on individual industries are quantified and evaluated in sections 4 to 7 of this RIS.

Although there are considerable uncertainties associated with quantifying many of the costs and benefits of the draft Regulation, the analysis concludes that the approach of the new draft Regulation is consistent with international best regulatory practice, and is indisputably preferable to any other feasible approach.

1. INTRODUCTION

1.1 Purpose and Content of this Document

The Environment Protection Authority (EPA) is proposing to replace the current Pollution Control Regulation 1985 with a new draft Regulation, with the principal object of implementing a Load Based Licensing (LBL) scheme. Under the requirements of the Subordinate Legislation Act, the EPA is required to prepare a Regulatory Impact Statement (RIS) to assess the economic, social and environmental costs and benefits of the proposal and its alternatives. The purpose of the analysis is to ensure that the proposed draft Regulation provides the greatest net benefit or the least net cost to the community compared with its alternatives.

Section 2 of this RIS sets out the environmental objectives and context of the Draft Regulation. Section 3 outlines the scope and features of the current licensing system, including existing licence fee arrangements. Sections 4, 5 and 6 provide an assessment of the options available for an improved system of licensing and the details of the proposed Scheme. The assessment evaluates the costs and benefits of each option. Section 7 investigates the impacts of the proposed Scheme, and compares the Scheme with those operating in other jurisdictions. Sections 8 and 9 assess the remaining elements of the draft Regulation, while the final section sets out details about the implementation of the Scheme that are separate from the draft Regulation itself.

The RIS has been prepared mainly by staff of the EPA's Economics and Environmental Reporting Branch. Assistance was provided by the Centre for International Economics in assessing the economic impacts of the Scheme.

1.2 Statutory Context

In December 1997, Parliament passed *the Protection of the Environment Operations Act 1997* (POEO). Once the Act starts, its provisions will significantly alter the environment protection licensing system in NSW. Currently, however, the principal features of the licensing system are set out in the *Pollution Control Act 1970* (PCA). The PCA provides the EPA with powers and duties to issue licences and approvals in relation to requirements and matters provided for by the *Clean Air Act 1961* (CAA), the *Clean Waters Act 1970* (CWA) and the *Noise Control Act 1975* (NCA).

The PCA was amended by Parliament in November 1997 specifically to provide for the implementation of the LBL Scheme. This amendment was considered necessary to ensure that the LBL Scheme could be implemented without being delayed by the many steps that remain to be completed before the POEO starts operating. These steps include preparation of several other major new regulations, which are at an earlier stage of development than the LBL Scheme.

The new draft Regulation has therefore been prepared to operate under the current licensing scheme provided for by the amended PCA, as well as being suitable (with

minor changes) to be carried over to operate under the POEO once that Act starts. It is possible that the LBL Scheme will be first implemented under the POEO should the prerequisites to its commencement under that Act be completed in time. In either case, however, there will be only two significant operational differences for licensees.

First, under POEO, licences will no longer require annual renewal. This change will slightly reduce administrative obligations, while increasing regulatory certainty for all licensees. Secondly, POEO changes the criteria for determining the need to hold a licence. Some activities will no longer require licensing, and accordingly regulatory impacts for those activities will be reduced. On the other hand, some activities will require licensing for the first time. Proposed fees for these activities have been included in the draft Regulation so that potential future licensees can participate in the consultation program for the draft Regulation.

1.3 The Role of Licensing

The EPA uses licences to prevent or minimise pollution by requiring licence holders to comply with limit, operating, monitoring, reporting and other specific conditions. In granting licences, the PCA requires that the EPA consider the whole of the pollution caused (or likely to be caused) by the activity, the impact on the environment and the practical measures that can be taken to prevent, control, abate or mitigate that pollution and the harm, as well as to protect the environment from defacement, defilement or deterioration as a result of the pollution. The Act also provides the power for the Governor to make Regulations under the Act; the Regulations contain details of how licences and approvals are to be issued, and the levels of fees. These provisions are largely duplicated in the POEO.

The most significant change to licensing proposed in the Regulation is the introduction of a Load Based Licensing (LBL) Scheme. There are two main changes to the licensing system associated with this Scheme. First, load based licensing will shift the primary focus of the licensing system from controlling the **concentration** of pollutants in discharges to air, water and land to controlling the **loads** (that is, total mass) of pollutants discharged. Secondly, licence fees will be restructured so that they provide ongoing incentives for reduction of pollutant loads.

The objects of the LBL Scheme are:

- to provide incentives to reduce discharges of pollutants based on the polluter pays principle and to apply them within an equitable framework
- to give industry incentives for ongoing improvements in environmental performance and the adoption of cleaner technologies,
- to provide incentives that are complementary to existing regulation and reduction programs for environment protection

1.4 Consultation and Development of the Scheme

Development of the LBL Scheme has been overseen by a steering committee chaired by the EPA and comprising representatives of Australian Business Limited (formerly the Chamber of Manufactures of NSW), the Total Environment Centre, Sydney Water and NSW Treasury. There has also been ongoing consultation with industry, local government and environmental groups during the development of the draft Scheme.

A Draft Operational Plan was released in June 1996 to facilitate public consultation and elicit public input for further developing the Scheme. Over 3500 copies of the draft plan were distributed and over 600 people attended nine regional workshops to discuss the plan. The EPA received 107 written submissions in response. (A summary of the responses is shown in Appendix A.) These showed consistent support for the application of the principles underlying the Scheme, qualified by the need to see all the details before the Scheme could be endorsed. The submissions also provided detailed input suggesting further development of certain elements of the Scheme. The draft Regulation has been prepared based on revisions and refinements suggested in the comments.

It is important to note that the scope of the Scheme is limited to licensed activities. Further, only a subset of those activities will pay load based fees under the proposed draft Regulation. The EPA expects that the draft Regulation will be amended over time to require more licensed activities to pay load based fees once load calculation protocols are developed for those activities. These are listed in the Regulation and discussed in Section 5.1 below. Waste management, land degradation (unrelated to waste waters) and resource depletion are not generally intended to be included, as these are beyond the scope of the current form of the Scheme.

1.5 Consultation Regarding the Draft Regulation

Notwithstanding the extensive consultation undertaken to date (see above and Appendix A), the EPA intends to provide a further range of opportunities for all stakeholders to comment on the draft Regulation. Planned consultation activities will include:

distributing the draft Regulation and RIS to all current licence holders, approximately 1400 other stakeholders who have already asked to receive it, other key consumer, environment and industry representative organisations, all local Councils, catchment management committees and other Government Agencies and Departments.

a series of workshops to be held in metropolitan and regional centres to present the contents of the draft Regulation and RIS to interested persons. These will also be used by the EPA to elicit feedback from stakeholders and to identify any further improvements that can be made to the Scheme.

providing an opportunity for any interested person to discuss particular details of the Scheme. It is expected that this will be particularly useful for licence holders who might wish to investigate or discuss their particular circumstances and their expected fee level. The EPA will also use these discussions to check that the fine

details of the Scheme will be effective and practical in as many individual cases as possible.

The EPA is committed to these consultation activities, in order to ensure that every person's views are heard and taken into account as the final details of the draft Regulation are prepared. Feedback is viewed as the best source of new information on how to ensure that the Scheme will actually achieve its objectives once implemented.

Written comments should be sent to:

The Director
Economics and Environmental Reporting
NSW EPA
PO Box 1135
Chatswood
NSW 2067

The closing date for comments is 30 April 1998.

2. ENVIRONMENTAL OBJECTIVES & REGULATORY CONTEXT

Section 6 (1) of the *Protection of the Environment Administration Act 1991* sets out the objectives of the Environment Protection Authority.

Section 6(1)(a) relevantly provides:

(a) to protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development; and

(b) to reduce the risks to human health and prevent the degradation of the environment, by means such as the following:
   – promoting pollution prevention;
   – adopting the principle of reducing to harmless levels the discharge into the air, water or land of substances likely to cause harm to the environment;…

The Act (5.6(2)) also states that ecologically sustainable development (ESD) 'requires the effective integration of economic and environmental considerations into decision-making processes' and that ESD can be achieved through the implementation of principles such as the precautionary principle, intergenerational equity, conservation of biological diversity and improved calculation and pricing of environmental resources. These principles underpin the NSW EPA's approach to environment protection.

Section 4 discusses the detailed range of licensing strategies available to the EPA and outlines the EPA's preferred approach. In the broader context, however, the EPA is engaged in:

monitoring and reporting on the state of the environment

contributing to goal setting for NSW air and waters

implementing cost effective mechanisms to achieve the goals, consistent with its legislative mandate.

2.1 Impacts of Pollution on the NSW Environment

As required by Parliament, the NSW EPA publishes a comprehensive State of the Environment Report for NSW (the SOE Report)[1]. The Report presents the best available information on air and water quality, land degradation, sustainability of land use, biodiversity and other key environmental attributes. Some of the data used in the report is from the EPA's own monitoring programs (for example, Metropolitan Air Quality Study, Monitoring River Health Initiative), with the balance from other Government Departments or monitoring conducted by private industry. The priorities of the LBL Scheme have been developed consistent with the data underlying the SOE Report.

[1] NSW EPA 1997(b)—currently every two years. Under POEO this will move to be every three years.

Air Pollution
Air pollution can have detrimental impacts on human health and can reduce agricultural yield and damage buildings and infrastructure. The quality of air in the metropolitan regions of NSW is under pressure from increased economic activity and motor vehicle use as a result of population growth and urban expansion. At the regional level the main issues in NSW are photochemical smog (ground-level ozone), and fine particle and nitrogen oxide pollution. At the local level the main issues are carbon monoxide, sulfur dioxide, lead and other airborne toxic substances. By mass, some of the major sources of air pollutants are motor vehicles, industrial production of metals, coal-fired power generators, oil refineries and other large industrial and extractive activities.

Water Pollution
The quality of water is critical to the health of the environment and the economy of NSW. Water quality has a major bearing on human activities, including domestic, irrigation and industrial water supply, commercial fishing, recreation and tourism. Water resources are ultimately linked to the state of the catchments they drain, and the health and diversity of the ecosystems. Fresh waters in NSW are under particular pressure due to their more sensitive nature compared with marine waters. Historically, the multiple use of waterways has led to difficulties in setting management priorities. These difficulties can be expected to intensify in the future due to economic development, population growth and rising community expectations for improved water quality. Some of the major sources of pollutants discharged to waters in NSW are sewage treatment plants, metal and chemical works, agricultural activities, stormwater and other diffuse sources. The main pollutants of concern are nutrients, salts, organic materials, trace metals, organic chemicals and pathogens.

Costs of Pollution
Air and water pollution imposes a range of costs on the community. Examples include increased morbidity and mortality, reduced quality of life, direct health expenditures, lost earnings, reduced productivity for a range of industries, reduced recreational opportunities, preventive expenditures, reduced biodiversity and ecological damage. A number of different methods have been used to value these costs. The EPA's environmental valuation database, ENVALUE, is a collection of valuation estimates that provides information on each area of valuation and guidance in using the estimates in decision-making.

While significant progress has been made in measuring the costs resulting from degradation of both use and non-use values of the environment, a comprehensive assessment of the aggregate costs of environmental damage across the State is not possible at this stage.

In order to provide an indication of the magnitude of these costs a case study of one of the pollutants to be included in the Scheme has been compiled. Appendix B derives an estimate of the average costs of each tonne of fine particles emitted in NSW. The reduced health and visibility costs of discharges of fine particles are estimated at about $18,500 per tonne. The EPA estimates that discharges from licensed sources currently total about 23 000 tonnes, implying a total cost to the community exceeding $425m for this one pollutant alone.

2.2 Setting Environmental Goals for NSW

Air Quality Objectives
A key part of effective strategies for environment protection is setting measurable goals for environmental outcomes. In the past, air quality goals for pollutants of concern in NSW have generally been based on the goals developed by the National Health and Medical Research Council. Currently, however, the National Environment Protection Council (NEPC) has released a draft National Environment Protection Measure (NEPM) to specify ambient goals for six primary air pollutants to apply across Australia. The EPA is actively contributing to the development of the air quality NEPM.

Objectives for Waters
The EPA is currently coordinating a process that will set interim water quality and river flow objectives for all waters in the State. This activity is part of the Government's water reform package. Objectives will be set via an extensive process of community consultation, based on the principles and standards contained in the National Water Quality Management Strategy. For some catchments, the Healthy Rivers Commission will undertake more detailed investigations and establish further sets of goals that will supersede the EPA's interim goals.

2.3 EPA Strategies for Environment Protection

Strategies for Air Quality
The forthcoming Air Quality Management Plan (AQMP) will outline the EPA's strategic approach to achieving air quality goals for NSW[2]. The plan is being developed in collaboration with government, industry, community and local government organisations to address all the major air quality issues facing the State. The AQMP will provide a holistic approach to the protection of air quality and will help develop new policies and objectives for air quality in the greater Sydney region. Key issues will be addressed by specific integrated plans, including the Smog Action Plan, Brown Haze Action Plan and the Lead Action Plan. Options for managing discharges in each plan will be assessed according to their effectiveness in reducing discharges, costs, time frames and social and economic impacts.

Strategies for Water Quality
Current strategies for improving water quality include a mix of regulation, education and economic mechanisms. Activities with major individual impacts are licensed by the EPA (further discussed in sections 3 and 4). In the past, the regulatory and licensing framework had not been applied to non-point sources. The EPA has now begun to issue licences for diffuse sources, such as forestry operations, and is preparing to licence major sewage reticulation systems. Other (non-licensing) methods of reducing water pollution from diffuse sources include development of environmental management guidelines (for example, for urban stormwater

[2] NSW Government 1996 (b)

management). The guidelines are performance based and provide a framework for limiting discharges in the most cost-effective manner. The Government has also recently provided significant additional funding to help stormwater managers reduce the impacts of stormwater discharges.

The EPA has also been identifying opportunities for using economic instruments to improve water quality. Examples include the Hunter River Salinity Trading Scheme[3] and the Hawkesbury–Nepean bubble licence for Sydney Water[4]. In the future, the EPA will be seeking opportunities where discharge-trading schemes could achieve environmental goals at reduced costs. These could include both point and non-point sources and existing and proposed new developments.

2.4 Community Expectations

Over the past decade there has been a significant shift in community expectations regarding the quality of the environment in which we live. The environment has significantly increased in importance for the community. A survey commissioned by the EPA in 1997 showed that the people of NSW hold significant concerns about environmental problems, ranking the environment as the second most important issue for attention by the State Government both now and in ten years (unemployment was first). This placed the environment ahead of the health system, education or crime.[5]

Residents recognised the relatively high quality of their local environment and the Australian environment. They thought that significant improvements in air and water quality had been made. but they continued to be concerned about water and air pollution.

2.5 Polluter-pays Principle

The polluter-pays principle (PPP) means ensuring that polluters pay the full cost of their polluting activities. The principle is based on both equity and economic efficiency grounds. PPP started out as an economic principle adopted by OECD and many other countries in the 1970s. It was aimed primarily at the non-subsidisation of pollution control costs and was later extended to include the payment of government's administrative costs by polluters.

In 1991 OECD countries formally agreed that not only pollution prevention and control costs, but also pollution damage costs, should be borne by the polluter. PPP has evolved into an environmental economic principle and is now generally accepted to mean the full internalisation of all external effects of pollution[6].

The NSW Government is committed to implementing the polluter-pays principle in NSW. One key method for implementing this principle recommended by the OECD is by the use of economic instruments, including Load Based Licensing. Economic

[3] NSW EPA, 1995 (b)
[4] NSW EPA, 1996 (b)
[5] NSW EPA (1997 (c)
[6] OECD 1996 (c)

instruments aim to ensure that environmental costs are quantified so that they play a part in production and consumption decisions, in order to optimise those decisions. For example, if polluters do not have to pay to discharge wastes, they will ignore the pollution costs imposed on the community by their operations. Not only will this result in non-optimal production and discharge decisions—it will place any competitors who choose not to generate harmful discharges at a competitive disadvantage. Both the LBL Scheme and the polluter-pays principle are intended to provide ongoing incentives for reductions in harmful discharges.

2.6 Regulatory Strategic Context

Significant progress in environmental protection in developed nations has been achieved over the past 20 years using what are now called 'command and control' techniques. The traditional approach has concentrated largely on secondary industry and sewage treatment and has had a technology focus, requiring application of best available technology (BAT) or one of its many 'derivatives' (for example, best available technology economically achievable—BATEA). This focus proved to be effective, especially considering the primary sources of pollution at the time and the need for significant improvements in the pollution abatement and control technologies used by these sources.

However, as major point sources of pollution are increasingly being controlled and reduced, the nature of the environmental challenge changes. It is becoming increasingly costly to achieve additional discharge reductions for point sources. Non-point sources of pollution, which are difficult to deal with through traditional regulatory approaches, are also causing greater concern. In addition, the technology approach has focused primarily on concentration targets without limits on the total load of pollutants entering receiving environments; with economic growth, some pollutant loads have risen. It is becoming clear that reliance on traditional approaches to regulation alone will not allow environmental goals to be achieved.

In 1991, OECD Environment Ministers agreed that better-integrated economic and environmental decision-making was a key environmental challenge for governments in the 1990s. The use of economic instruments to contribute to that integration continues to expand in OECD countries. New economic and new regulatory approaches are emerging that are more flexible, more cost-effective and more explicitly linked to quantitative environmental goals. The emphasis is increasingly on finding suitable combinations of economic and regulatory instruments[7].

The 1989, 1994 and 1995, OECD surveys showed that environmental charges are a major category of economic instruments in terms of both impact and frequency of application. Between 1989 and 1994 there was a significant increase in the number of economic instruments being used and the number designed for an incentive effect. In developing LBL, the EPA has identified 42 countries currently operating fiscal incentive charges on air and/or water discharges (listed in Appendix C). A comparison of some of the fees charged is shown in Section 7.4.

[7] OECD 1996 (c)

2.7 Summary of Objectives of the Draft Regulation

In summary, therefore, the objective of the draft Pollution Control Regulation is to facilitate the establishment of a licensing system that:

is consistent with the spirit and letter of the EPA's statutory objectives and the Government's policy platform

is likely to make the greatest possible contribution to the achievement of the Government's and national environmental objectives

supports and encourages the use of least-cost and timely strategies to achieve the discharge reductions integral to achieving (b).

3. THE CURRENT LICENSING SYSTEM AND THE NEED FOR REFORM

There are approximately 3400 licences currently issued under the Pollution Control Act. Licences variously impose a range of conditions that:

specify discharge limits

require, control or prohibit listed operational activities

stipulate monitoring of discharges and/or receiving environments by licensees

list reporting requirements.

The EPA is already moving to implement performance- or outcome-based licence conditions where these approaches are consistent with the continuing assurance of environmental protection. Performance-based licences specify the required outcome to be achieved and then offer maximum flexibility for licensees to find the most cost effective way to comply. The LBL Scheme is a further extension of this approach.

3.1 Limit Conditions

The potential for acute impacts from discharges is currently controlled by setting absolute concentration limits on discharges; these limits may never be exceeded. At present, the EPA controls chronic and cumulative impacts using percentile concentration limits, which permit only specified proportions of monitoring samples to exceed more restrictive limits. For example, for discharges of suspended solids an absolute limit might be 50 mg/L, whereas only 10% of samples might be allowed to exceed 40 mg/L and 50% of samples must be less than 30 mg/L. In the past, these types of limits were used to ensure that previously approved discharge control equipment was operated efficiently. That is, the impacts of a licence holder's proposed discharges and his/her proposed abatement measures were assessed and authorised at the time of the original issue of a Pollution Control Approval and/or Licence. The licence limits remained to ensure that the licensee's subsequent discharges did not vary from the original terms.

Over time, the EPA has sought to keep limit conditions aligned with currently desired environmental outcomes by negotiating Pollution Reduction Programs (PRP) with licensees. PRPs are binding agreements that require licensees to reduce harmful impacts by agreed future dates. Generally, they allow licence holders to implement improvements at the most appropriate points in their investment cycle and thus minimise compliance costs.

Licences covering discharges to water also place a daily maximum limit on the volume of effluent that can be discharged. These limits are negotiated with licensees consistently with environment protection goals and efficient use of previously approved pollution control equipment. Wherever both concentration and volume limits are specified in licence conditions there is an implicit limit on load. However, because maximum discharge volume limits are set to accommodate the discharger's

maximum expected discharge, these implicit load limits are generally non-binding constraints. Although some licences do specify limits on the mass of individual pollutants discharged to water, these do not represent a significant proportion of total licences. A further feature of current licences is that separate limits apply to each discharge point, rather than to discharges from the whole of the licensed activity or premise. In some cases there is potential for these conditions to add to environmental management costs without significant environmental benefit.

3.2 The Limitations of the Current Approach

As already stated, the existing licensing system focuses primarily on controlling the concentration of pollutants in discharges. This is effective in controlling acute impacts. However, many pollutants are persistent and can have serious impacts on the environment that become apparent only in the longer term. Some environments might be able to withstand short-term stresses from pollutant loads but can become increasingly degraded if these are maintained over a longer time period. In some cases irreversible damage can occur.

There are a number of additional problems with the current approach.

- Cumulative increases in total pollution can also arise from increasing numbers of sources of pollutant loads due to economic expansion, even though all licensees might comply with their technology based concentration limits
- Concentration-based licences do not encourage conservation or re-use of water. On the contrary, by themselves, they can even encourage wastage of water for dilution purposes.
- Although it is strong in defending a ‘bottom line’, the current the system is weak in stimulating ongoing improvement in environmental performance beyond mere compliance with the required minimum level of performance.

3.3 The Need to Shift to Load Based Licences

In order to address the limitations of the current approach, the EPA is proposing to change the licensing system to focus primarily on load. Concentration limits will nevertheless be retained for most pollutants, as required, to prevent acute impacts. Licences will be progressively reviewed, with the pollutant load as the key focus of the licence limits.

Under the LBL Scheme, chronic and cumulative impacts will be controlled by absolute maximum load limits. Absolute concentration limits will remain where needed to prevent acute impacts on the environment. Licence fees will be used to encourage ongoing improvement beyond the ‘bottom-line’. The EPA believes that these changes will provide a more effective instrument for protecting the environment, by focusing on minimising loads, ensuring there are safeguards against acute impacts and providing greater flexibility for licensees to adopt cost-effective compliance strategies.

Load limits will be set to prevent deterioration of current ambient conditions. In general this will mean that most initial load limits will be based on current licence, approval or development consent conditions as applicable. The limits will prevent non-approved increases in current discharges, although this does not mean that aggregate discharges are to be capped without reference to applicable environmental goals and conditions.

In the case of new activities or significant expansion of existing activities, proposed pollutant loads will be scrutinised as part of the normal assessment process. Where projects are approved, load limits will be set for the activity based on the results of the assessment.

Within the constraint of the load limits, licensees will generally be free to select a discharge management strategy that balances the cost of licence fees with pollution reduction measures. The EPA will retain the discretion to require environmental improvement by licensees at any time, in cases where there is a pressing environmental need to do so¨

More detail on how the EPA intends to use its licensing powers to implement load based limits is provided in section 10 below.

The main advantage of the shift to load based licences is in providing a framework for managing cumulative impacts. It will be much simpler to compare licensees' performances and impacts based on load information. The EPA also intends to use LBL as an administrative platform to implement emissions trading schemes. Trading schemes are intended to provide greater assurance of overall environmental outcomes, and to reduce overall environmental compliance costs (see Chapter 4).

3.4 Current Licence Fees

The Pollution Control Regulation 1985 sets out the annual licence fees payable for each premises and item of equipment that is scheduled or that might otherwise be licensed under the Pollution Control Act. The licence fees collected by the EPA are paid to the NSW Treasury. This reflects current policy that the regulator should not be funded directly by regulated activities, in order to prevent distortion of regulatory behaviour.

The purpose of the current fee system is to recover the costs associated with the administration, monitoring and enforcement of the licensing system. Fee levels broadly reflect the potential to pollute, although there are considerable inequities across licensees, with some premises paying significantly more compared with others with comparable environmental impacts. The current fee system does not generally operate as a disincentive to pollute.

Premises scheduled under the Clean Air Act are divided into seven categories for the purpose of setting fees. The base fee for various categories is determined on a broad assessment of the relative quantity and hazard of discharges to the environment. Within each category there are a number of fee increments based on the throughput or production of certain materials or products. Throughput or production is used as an

indicator of the resources likely to be required to administer the licence. Thus the licence fees are not directly linked to actual discharges, and so do not provide incentives to reduce discharges. Fees under the Noise Control Act are similarly structured.

For licences that might come under the Clean Waters Act, the fee generally depends on the maximum daily volume of effluent permitted to be discharged (that is, the gross volume of discharge) from each discharge point. As the water fees relate to the maximum volume of effluent permitted to be discharged (that is, on the peak day), rather than actual quantities of pollutants discharged in the effluent, they are only weakly linked to pollutant loads and do not provide significant incentives for pollution reduction. In the case of discharge of untreated or primary treated sewage effluent, much higher per-unit fees apply. The structure of these fees, however, is similarly insufficient to provide anti-pollution incentives.

The current licence fee system does not provide any significant financial incentives to reduce pollution beyond the licence requirements, either in terms of concentration or load. Further, because the fees are a fixed and unavoidable cost to industry, there is little incentive for licence holders to track or manage licence fees as they do with other business costs. The fees are not directly linked to pollutant loads and are very small compared to the costs of abating pollution. The consequences are that:

- good environmental performers are disadvantaged to the extent that they commit more resources to abatement measures than their competitors
- the cost of environmental harm caused by pollution is currently borne by the wider community, and there is no attempt to internalise the costs of polluting activities.

There are also various anomalies in the existing system that are inequitable. For example, 75% of the fees are levied on Sydney Water's five primary treated effluent discharges. This means that the average fee for the remaining 3400 pollution licences is only $2,200 a year.

The current low fee rates and the structural weaknesses of the current system identified above, mean that the current fee system does not generally provide any incentives for improved environmental performance.

4. ASSESSING OPTIONS FOR LICENSING

This section discusses the range of licensing options that have been considered in developing the draft Regulation, consistent with the objectives listed in section 2.7. Each option is premised on the basis that the shift from concentration based limits to load based limits should occur in any case, for the reasons outlined in section 3.3. Each assumes that it must, with reference to applicable environmental goals, have the capacity to:

- prevent increases in discharges unless judged to be acceptable through the various applicable planning, assessment and approval processes
- cost effectively deliver discharge reductions where required.

Only options that could be implemented with the powers available, or proposed, for the EPA are considered. The analysis concludes that a mix of tools is most beneficial. The proposed mix is outlined at the end of this section.

The PCA requires that applications for licences be accompanied 'by the prescribed fee' (section 17B(1)). Indeed, the predominant purpose of the current and new draft Pollution Control Regulation is to prescribe licence fees. From a narrow perspective, therefore, this RIS could examine only those aspects of the EPA's approach to licensing that were contained in the draft Regulation (that is, the fees and supporting administrative details). Indeed, this approach would suffice if continuation of the existing arrangements were proposed.

In contrast to the current approach, however, the EPA is proposing to incorporate the licence fee system as one of its core environment protection tools. (Under the current approach, fees simply recover administrative costs.) Accordingly, this RIS provides a broader evaluation of the licensing approaches that are open to the EPA, in order to select an approach that will provide maximum environmental and economic value from the licensing process. In other words, because some licensing options include the use of fees to reduce pollution, all licensing strategies that could be used to reduce pollution are compared and contrasted below.

4.1 Option 1 No Regulation

Both the current Pollution Control Acts and the POEO establish a requirement for licences to be issued by the EPA for certain activities. The requirements include specification of the classes of activities that require licences and the factors that the EPA is to take into account when setting the conditions of licences. Therefore, a 'no licensing' option is not permissible.

Since both Acts require licences to be issued, a 'no Regulation' option would essentially, therefore, be a 'no fee' option. Because it is inconsistent with the 'polluter-pays' principle (see section 2.5) and the Government's policy platform, the application of a 'no fee' option will not be considered further.

4.2 Option 2 Legislating Targets

Under this option, the EPA would stipulate uniform discharge limits for each class of licensed industry type or emitting equipment, perhaps varying for specified geographical areas. This approach is similar to some aspects of the existing Clean Air Regulation 1964. The limits in the draft Regulation would be based on the EPA's knowledge of:

the environmental impacts of typical discharge patterns

the performance of available abatement technologies

the relative costs and benefits of each.

In cases where improvements in ambient outcomes are required, the draft Regulation could either require uniform reductions across all licensed sources (or particular groups of licensed sources) or stipulate more stringent standards for new licences, with a given time period for existing sources to 'catch up'. This approach is often referred to in the literature as 'BATEA' (best available technology economically achievable) or similar (as discussed in section 2.6 above).

This option is particularly strong under the following circumstances:

where a potential pollutant is considered so harmful that it must be prohibited or phased out; or

where there is only one or a handful of emitters to a particular receiving environment and:

- the impacts of potential discharges are known, understood and acceptable
- the environment and the economic climate are stable (that is, there is a low probability of additional new sources of discharges being established)
- abatement costs are uniform and there is little potential for innovation to lead to cost reductions in abatement over time
- administrative costs of other options are higher than potential benefits.

In many other cases, however, there is potential for significant economic loss under this option. The disadvantages of this option are:

specifying uniform standards can result in 'under' or 'over' abatement compared to optimal. For example, a higher level of abatement is appropriate for NO_x discharges in Sydney (where there are serious regional air quality problems caused by excess NO_x discharges) than in rural NSW (where NO_x discharges are not known to cause similar impacts). A fixed standard for both circumstances would be either inadequate in Sydney or an inefficient use of finite resources in rural NSW

specifying uniform reduction targets can make achieving equivalent environmental outcomes more expensive than otherwise possible. For example, it might be that two licensed emitters face very different abatement costs. If each were required to reduce discharges by 10%, the total cost could be much greater than if the lower cost abater implemented a 20% reduction, partly funded by the higher cost abater

in practice, BATEA can favour incumbent emitters at the expense of new development, thus reducing competition and overall welfare. This is because progressively more stringent standards are applied as total discharges increase. Where ambient environmental outcomes are already of concern, the technology requirements for new proposals can become so expensive as to be prohibitive, thus causing the loss of the economic benefits of new developments. For example, it could easily be that a new development with only 'routine' levels of discharge control would provide far greater economic benefit to the State for only a fraction of the discharges from an existing industry with poor discharge technology

there is no incentive for emitters to move below their mandated limits and targets

technology-based standards can discourage innovation in pollution prevention and waste minimisation that could have reduced the costs or increased the effectiveness of environmental protection

fixed uniform reduction targets for existing emitters might not coincide with the investment cycles of licensees, causing considerable additional disruption and cost.

Therefore, this option is not considered sufficient as a primary approach. Mandated minimum standards will nevertheless continue to play an essential role in preventing manifestly inadequate performance across NSW.

4.3 Option 3 Negotiated Case-by-case Limits

Under this option, a regulation would require the EPA to set site-specific limits and targets. This approach is also known as 'negotiated limits'. The EPA's current licensing approach often draws on the strengths of this option, particularly in the case of negotiating future reductions in discharges through Pollution Reduction Programs. This option overcomes some of the disadvantages of option 2, in that, at least in theory, an optimal abatement effort can be mandated for each licensee.

If the EPA had perfect knowledge of the environment, discharge impacts and abatement costs, it could require a pattern of limits and targets that would result in least-cost pollution control in NSW to achieve optimal environmental outcomes[8]. Implementing this option across all licences and discharges would be analogous to the former planned economies in Eastern Europe. Clearly, obtaining the required information is very expensive and often impossible. Furthermore, even a perfectly planned set of limits and targets would require constant revision to allow for changing information, economic activity and environmental outcomes. It also requires a high level of intervention by the EPA in the affairs of licence holders.

Although this option is more flexible than uniform standards, it could also suffer from a lack of transparency and consistency. It also shares many of the disadvantages of option 2, especially relating to dynamic inefficiency and technology based standards. Further, it creates opportunities for licensees to direct their resources into 'winning'

[8] 'Optimal' in the sense that the discharges would be permitted only to the extent that the economic benefits of production did not exceed the associated environmental costs.

the negotiations with the EPA instead of implementing actual environmental improvements.

4.4 Option 4 Pollution Charges

Under this option, control over discharges would be achieved by assigning a fee to each discharge. This approach is increasingly being used throughout the world (see section 7.5 of this RIS and Appendix C). The ideal fee arrangement would be for the draft Regulation to prescribe a suite of fees that would be exactly sufficient to achieve the same optimal pattern as proposed under option 3. Since it would be cheaper for emitters to reduce their loads than pay fees, it could be expected that optimal discharges would eventually occur.

This option overcomes some of the problems of the first two options in several ways:

- fees provide an automatic incentive for licensees to reduce their pollution loads below any mandated limits and to develop innovative, cost- effective abatement techniques
- licensing is more transparent and predictable than for option 3, with no need for potentially expensive and time consuming negotiations between the EPA and licensees
- the costs of environmental degradation are at least partly transferred back to the polluter (instead of being borne by the wider community). This 'internalisation' of 'external' costs could be expected to lead to greater overall wealth for NSW because it reduces existing distorting subsidies. Subsidising certain activities by granting polluters 'free' access to environmental goods (i.e. by failing to charge pollution fees) encourages inefficient consumption and over-exploitation of natural resources.

To achieve these gains in practice, however, requires the same body of information as for option 3 (which is not practically available). If the fees are set too low, there will be insufficient abatement effort to achieve desired environmental goals. If the fees are set too high, unnecessary economic disruption and non-optimal discharges could result.

Another difficulty with reliance on discharge charges is the heterogeneity of pollutants and receiving environments. In the literature, the case for pollution charges is often based on an analogy to a non-spatial single commodity market. In the case of pollution control in NSW, there are many harmful substances to be considered, and a reduction in discharges in one receiving environment is generally not a substitute for reduction in another.

Finally, charges on their own (that is, without any absolute discharge limits) could allow for unacceptable increases in discharges (or discharges of unacceptable pollutants) where a polluter preferred to pay the fee rather than abate.

These difficulties suggest that although discharge charges have many advantages over options 1, 2 and 3, they are also not a sufficient tool on their own.

4.5 Option 5 Tradeable Permits

Under this option, the EPA would establish quotas or release entitlements for polluting substances. The total number of entitlements would be set to achieve desired environmental goals, either immediately or over time. Licence holders would need to obtain sufficient entitlements to match their quantity of discharge. If they chose to reduce their discharges below the amount of their holdings, they could sell their excess entitlements to other licensees. Licensees with a deficit of entitlements could either reduce their discharges or purchase additional entitlements.

This approach has already been successfully trialled by the EPA for control of saline discharges in the Hunter Valley[9] and has been used for over five years in the United States for managing regional environmental impacts from the discharges of sulfur dioxide and (more recently) nitrogen oxides[10].

This option has a number of strengths:

- the Regulation would provide a high level of assurance that quantitative discharge goals could be met because the EPA would control the number of permits
- tradeable permits would ensure the lowest overall abatement cost to achieve a given objective, given an efficient permit market
- the EPA would not require such detailed knowledge about abatement technology and compliance costs and industry's desired discharge quantum.

There are, however, a number of impediments to the immediate State-wide adoption of a tradeable permit system as the principal method for licensing under the Pollution Control Act:

- the number of polluting substances to be controlled means that it would be unlikely that an efficient trading market could develop, and compliance costs could offset potential gains of trading. For example, a large and complex industry might require the correct quantity of permits for up to 30 substances.
- the geographical separation between licensed emitters means that the gains from trading could be undesirably distributed. For example, a reduction of phosphorus discharged in one river catchment will not assist in achieving ambient goals in another
- there is potential that some markets could be dominated by large organisations to the detriment of smaller industries.

[9] NSW EPA 1995 (b) and 1996 (b) .

[10] Industry estimates of the price of SOx permits (that is, cost of abatement) were initially US$1,500. In practice, prices have continued to fall as cost effective solutions were implemented. The current price in US$68/tonne (Chicago Board of Trade). This shows that desired emission reductions were achieved for about 5% of industry's anticipated cost.

4.6 Option 6 Combination Option (Preferred Option)

As can be seen from the discussion above, there is no one strategy that is superior on all counts. Accordingly, the preferred option is based on using the best parts of each. This finding is consistent with the recommendations of the OECD as cited previously in section 2.5.

An outline of the proposed mix of measures appears below. Not all of the elements of the proposed mix, however, are related to the contents of the draft Regulation. Some are based on current and proposed new licensing administration practises, based on duties and powers already provided in the Pollution Control Act and the POEO once it starts. The outline of the full picture below is therefore provided to set the contents of the draft Regulation in their proposed context. Thereafter, this impact statement turns to examine the contents of the draft Regulation. More detail about the related licensing policy proposals is provided in section 10.

The preferred option draws on the strengths of each of the above options.

Where proposed discharges are likely to threaten human health or cause serious environmental harm due to their nature or quantity they will continue to be controlled with mandatory limits. This will be achieved individually or State-wide via licences, notices, chemical control orders or other regulations.

For all discharges that are permitted to occur in licences, the primary limit tool will be annual load limits. These limits will apply to the whole of each premise rather than separately to each discharge point, thus reducing compliance costs for industry without compromising environmental outcomes. Exceeding these limits will constitute a breach of the licence and will be considered for prosecution in accordance with the EPA's prosecution guidelines. Concentration based limits will remain as required to prevent acute impacts on human health or the natural environment.

Disincentive fees will be payable on the loads actually emitted from licensed sources. The full details of the proposed fees are set out in the draft Regulation and are discussed below. Instead of being a fixed cost as at present, the fees will form an active part of the EPA's work in encouraging reductions in harmful discharges.

Based on the load based measurements used to establish licence compliance and fees, and the powers provided in the Government's new legislation, the EPA intends to investigate a range of trading based schemes. The objective of these schemes will be to increase the efficiency of pollution control expenditures over time. The schemes could provide for trading between licensed emitters, potential future licensed emitters, other non-licensed point sources or diffuse sources of pollutants.

The RIS now turns to examine in detail the options for the structure and charge rate of load based disincentive fees.

5. OPTIONS FOR THE FEE STRUCTURE OF LBL

This section outlines the options for possible fee systems as well as describing the benefits of the preferred option as proposed in the draft Regulation. Rather than considering the large number of possible permutations as separate options, this section sequentially evaluates the options in relation to each issue. A summary of the set of preferred options is presented in the final part of this section.

5.1 Selection of Participating Industries and Assessable Pollutants

The Pollution Control Acts[11] currently determine which activities must be licensed in NSW. Other activities conducted that include the pollution of waters might also be the subject of a licence. The list of licensed activities will change with the introduction of the POEO. All currently licensed activities and those to be newly licensed were initially considered for inclusion in the Scheme. It is not, however, currently feasible to apply load based limits and fees to all harmful impacts from these activities. The criteria for exclusion of a class of licensed activity from the first stage of LBL were that:

- satisfactory load calculation techniques are not yet readily available; or
- the nature of environmental harm caused is considered incompatible with the load based approach; or
- the activity is likely to cease being licensed by the EPA when POEO commences.

Application of these criteria resulted in a division of all current licences into three groups. The first group is proposed to be subject to load based fees via the draft Regulation. The second are expected to be included in the Scheme by the end of 1999. No date has currently been finalised for the third group. The table below lists the activity types included in each group.

For the purpose of the Regulation, a definition has been prepared for each activity type. These provide for integrated activity definitions, rather than separate classification of each licence under water, air and/or noise pollution classifications. This approach is consistent with the recent amendments of the Pollution Control Act and the future operation of Schedule 1 of the POEO. This means there will be minimal differences in the operation of the Regulation when implemented either under the Pollution Control Act or POEO.

[11] See ‘References’ for a full list of Pollution Control Acts.

Division of Activities by Proposed Date of Inclusion in LBL

Group 1 At commencement	Group 2 By end of 1999	Group3 Date to be finalised—unlikely before 2000
Agricultural Fertiliser Production	Aquaculture or Mariculture	Beneficial Application of Biosolids
Animal Slaughtering	Battery Production	Concrete Batching
Biomedical Waste Incineration	Beer or Distilled Alcohol Production	Contaminated Soil Treatment
Cement or Quicklime Production and Handling	Bitumen Pre-Mix or Hot-Mix Production	Electricity Generation (other than coal or gas)
Ceramics Production (excluding glass)	Bulk Cargo Handling	Freeway or Tollway Construction
Chemical Storage (Fuel terminal)	Chemical Storage (other than fuel terminals)	Logging Operations
Coal Loading	Crushing Grinding or Separating Works	Miscellaneous Licensed Discharging to Waters (at any time)
Coal Mining	Dairying	Miscellaneous Licensed Discharging to Waters (wet weather only)
Coke Production	Dredging	Mooring and Boat Storage
Electricity Generation (coal or gas)	Drum or Container Reconditioning	Railway Activities
Fish Processing	Explosive or Pyrotechnics Production	Vessel Construction & Maintenance using Dry or Floating Docks
Glass Production	Feedlot Production	Other Licensed Activities
Hard-Rock Gravel Quarrying	Irrigated Agriculture	
Mining (other than coal)	Metal Plating or Coating Works	
Municipal Solid Waste Incineration	Milk Processing	
Paint Production	Land-based Extractive (other than hardrock quarrying)	
Paper Production	Pesticides Production	
Petrochemical Production	Pharmaceutical or Veterinary Products Production	
Petroleum Refining	Pig Production	
Plastics Production	Poultry Production	
Primary Aluminium Production	Rubber Production	
Primary Iron or Steel Production	Saleyards	
Primary Non-Ferrous Production (excluding Aluminium)	Scrap Metal Recovery	
Rendering or Fat Extraction	Soap or Detergent Production	
Secondary Aluminium Production	Wine or Spirit Processing	
Secondary Iron or Steel Production	Wood or Timber Milling	
Secondary Non-Ferrous Production (excluding Aluminium)	Wood Preservation	
Sewage Treatment		
Tanning or Fellmongery		
Waste Oil Recovery		
Wool Scouring		

For each industry category initially included in LBL, assessable pollutants have been identified. These are the substances to which licence load limits and load based fees will apply. The selection criteria for the industry/pollutant combinations were:

- the potential of the pollutant to cause serious environmental harm is known and well understood,[12] and
- robust pollutant measurement techniques are available, and
- the industry is known to have significant discharges of the pollutant.

In applying these criteria, the EPA has sought to strike a balance between breadth of coverage and administrative simplicity. The average number of pollutants per industry classification in the draft Regulation is five. The draft Regulation has been structured such that pollutant/industry combinations can be changed by simple amendment on the basis of new information. For example, it could be that after one year's reporting of a particular pollutant, it might become clear that an industry's discharges of a particular pollutant are always negligible. In this case, the EPA would give consideration to deleting the pollutant from that industry's assessable pollutant list.

The selected categories of activity and the proposed assessable pollutants are listed in Appendix 1 of the draft Regulation. The EPA proposes to include additional activities and pollutants over time as suitable load calculation techniques can be finalised. These additions will be the subject of subsequent amendments to the draft Regulation.

5.2 Pollutant Weightings

Some pollutants are much more harmful than others. Further, some pollutants are of more or less concern in NSW due to the quantity of their discharge or the particular nature of NSW receiving environments. The draft Regulation provides for the weighting of pollutants to ensure that their relative harm is adequately reflected in the fees.

Initial pollutant weightings were presented for comment in the draft Operational Plan for LBL. Those weightings were developed using an iterative Delphi technique, based on experts' knowledge. Comments from some stakeholders criticised reliance on this non-repeatable technique, while others reported that use of the weightings resulted in incentives inconsistent with EPA's stated environmental priorities for their operations.

The EPA accepts these stakeholders' concerns and is appreciative of the contribution that stakeholders have made to ensure the LBL Scheme matches world best practice. A new approach to develop pollutant weightings has been developed through a joint study with the CRC for Waste Management and Pollution Control. The new methodology and resulting weighting values have been developed based on internationally accepted Life Cycle Impact Assessment (LCA) methodology. The broad principles of LCA methodology are set out in ISO14040–Life cycle Assessment, with the detailed steps for impact analysis in the draft ISO14042.

[12] See Appendix A for list of pollutants and their potential impacts

The new pollutant weighting process involved a number of steps:

⇒ *Step 1*
First, relevant impact categories were selected from the established international list as shown in the table below.

International Impact Categories[13]		**Extra Categories**
Selected for use in LBL	Not selected for use in LBL	(devised by EPA)
• human toxicity (air) • human toxicity (water) • aquatic ecotoxicity • photochemical ozone creation potential • acidification (airborne) • nutrification (water) • malodorous air	• abiotic depletion • biotic depletion • greenhouse effect • ozone depletion • human toxicity (soil) • terrestrial ecotoxicity • noise • damage • victims	• utility and nuisance

The reasons for omitting some categories were that they related to:

issues other than pollution control (that is, beyond the statutory mandate of the draft Regulation)

pollutants that are not emitted by the activities that will be subject to the draft Regulation

impacts that are being addressed through measures other than licensing or that would not be effectively addressed by LBL.

An additional category—'utility and nuisance'—was added to capture significant impacts not adequately accounted for in the selected categories (see Appendix E for further discussion regarding this category).

⇒ *Step 2*
Each pollutant was then evaluated for relative harmfulness under each selected impact category using LCA techniques. Wherever possible, Australian guidelines or standards were used in lieu of European or American standards for the weighting process (for example, ANZECC or NHMRC).

The most common method for scoring pollutants is the 'critical volume' approach. This is based on the use of established ambient concentration goals. The process takes the inverse of the desired maximum ambient concentration as a measure of the relative harmfulness of the substance in relation to the impact category under consideration. For example, if substance A is considered safe at 1 mg/L and substance B is considered safe at 10 mg/L, A is considered to be 10 times more harmful than B. Generally, therefore, a reduction of 1 kg of A would be of equal environmental

[13] Society of Environmental Toxicology and Chemistry 1993.

benefit to a 10 kg reduction of B in relation to the impact category under consideration[14].

Details of other methods used for evaluating each pollutant are shown in Appendix E.

⇒ *Step 3*
The relative scores under each impact category were then numerically normalised to enable scoring of individual pollutants across impact categories. This is done by setting the highest score under each impact category to '1000' and multiplying the remaining values by a constant in order to maintain their proportions within each impact category (that is, one constant per category). The result is that the range of pollutant scores is 0–1,000 under each impact category. The relativity between pollutants within each category is, however, unchanged.

⇒ *Step 4*
A weighting value reflecting the relative 'seriousness' of each impact category was then selected by a panel of EPA scientific and policy experts. The consensus of the experts' views was expressed as an allocation of 100 'points' across the impact categories. The following criteria were the basis for assigning the weightings:

'distance-to-target'—in some categories ambient goals might already have been exceeded, whereas in others environmental quality might currently be within the acceptable range

licensed discharges' share of total discharges—licensed sources might account for differing shares of total discharges in their categories. Although an impact category might be considered important, the relative contribution of licensed sources must be recognised when weighting the importance of that category in the LBL Scheme. Thus, if two impact categories are considered of equal significance, weightings should be higher where licensed loads account for a greater portion of total discharges

relative significance of the category—some impact categories are more 'important' or serious than others, that is, broader scale in occurrence or more costly or disruptive in impact.

The values selected by the experts are shown in Appendix E. The values are intended quantitatively to reflect the EPA's priorities for reductions of harm caused by discharges from licensed sources that will be included in LBL.

⇒ *Step 5*
Preliminary pollutant weightings were calculated by multiplying the experts' impact category weights by each pollutant's normalised score under each category. The resulting values were then multiplied by a coefficient (derived using an optimisation algorithm) such that the preliminary weightings for each pollutant were consistent with the experts' impact category weightings. The use of the coefficients ensured that

[14] In order to prevent distortions in the final weightings, only pollutants present in significant quantities and from numbers of sources were evaluated under particular impact categories. This was to prevent the overweighting, in relation to any one impact category, of a pollutant that is not present in sufficient quantity (compared with the quantities of other pollutants assessed under that category) for its reduction to significantly contribute to the reduction of the relevant impact. Pollutants excluded in this way were assigned weightings by 'anchoring' them to similar, more abundant, substances using consistent linking ratios.

impact categories where a higher number of pollutants were relevant were not overweighted.

The results of step 5 are shown in Appendix E.

⇒ *Step 6*

Final pollutant weightings were calculated by dividing the preliminary weight of each pollutant calculated in step 5, by the estimated total licensed discharges of that pollutant (kg/annum). This means that when licensees multiply their pollutant loads by the final pollutant weightings, the resulting incentives for the whole NSW licensed pollutant load will reflect the environmental priorities selected for the impact categories by the expert panel[15]. It is intended that the final pollutant weightings will be recalculated before the Scheme starts. This will be to incorporate more exact pollution load data that are expected to be obtained from key licensees during the consultation program. This may result in slight changes in weighting values for some pollutants compared with the values shown in the draft Regulation.

It is important to note that the final pollutant weightings are not intended to be a reflection of the inherent relative harmfulness of each pollutant[16]. Instead, they are values that, when applied to current LBL discharges, are expected to produce a set of incentives that reflect the EPA's current policy priorities for discharge reductions from LBL sources. Thus, when major review of the draft Regulation occurs, it will be preferable to re-weight the pollutants based on the group of licensed industries, their discharges and the consequent environmental impacts applicable at the time.

5.3 Options for Location-based Weightings

In some particular areas and catchments in NSW, there is a greater 'distance-to-target' (that is, the gap between current ambient outcomes and environmental goals) and therefore greater abatement efforts are required. To give effect to this principle, the draft Regulation provides for a weighting factor to be applied to discharges of listed pollutants located in 'critical zones'.

Critical excesses of particular pollutants can often arise where there is a high density of licensed and other sources of pollutants in a particular receiving environment. For example, NO_x discharges in the Sydney basin have been shown by the MAQS[17] study to be a major contributor to poor air quality in western Sydney. The study shows that reductions in discharges are required if health goals are to be achieved.

In preparing the draft Regulation, the EPA has investigated a number of options for location-specific weightings. Ideally, a specific weighting could be developed for each pollutant in each location. The EPA found that the data set required to separately weight each region in relation to each pollutant is not available. Nevertheless, this has not been considered a sufficient justification to exclude well-established regional

[15] Subject to the variance between estimated and actual discharges

[16] The earlier pollutant weightings proposed in the Draft Operational Plan have been revised on the basis of comments received. In particular, some respondents stated that when applied to their pollutant loads, the old set of weightings did not provide incentives consistent with current EPA environmental priorities for their activities.

[17] NSW Government 1996.(b)

impacts from appropriate fee calculations. To do so would diminish the equity and early effectiveness of the Scheme.

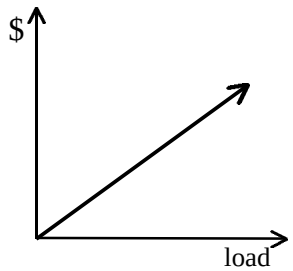
The draft Regulation therefore proposes critical zone weightings where there is a solid foundation of knowledge relating discharges to unacceptable environmental outcomes in specific geographical areas. A factor of '3' has been selected for the weighting value after scenario analysis and reference to overseas practice. Although this value is believed to be less than the theoretically 'optimal' weighting, no higher value was considered appropriate given the lack of case-specific data. Comparable ranges for zone weightings in other countries include China (1:1.8 proposed) and Japan (1:9).

The draft Regulation has been structured such that as more information becomes available, critical zones can be modified or extended. The EPA will be closely reviewing the effectiveness of the critical zones to identify any need for modification. Likely early sources of new information are expected to include:

- the Government's water quality and river flow objective setting process
- forthcoming national ambient air quality goals
- further reports from air and water quality monitoring programs
- the pollutant load data generated by LBL and the implementation of the National Pollutant Inventory.

5.4 Options for Differential Fees Based on Industries' Environmental Performance Capabilities

If LBL was operated analogous to a 'normal' market, the fee for a given pollutant load in a given location would be the same, irrespective of which industry emitted it. This would provide appropriate incentives to optimise society's resource use and production patterns. It would be a practical application of the polluter-pays principle, as shown in fig 5.4.1. Note that the figure below relates to the case of one pollutant only.



Option 1: Straight-line fee curve—equal per unit of discharge fee, regardless of quantity emitted or class of activity of emitter (for discharge of given pollutant in same location).

Figure 5.4.1

To complete an immediate transition to such a situation would, however, be a significant and potentially costly shift from current pollution control arrangements. Although the EPA has been moving towards this change for a number of years, existing discharge entitlements are nevertheless the result of historical negotiations,

the differing 'inherent' polluting nature of each industry and the application of available abatement technologies. The result is that industries could be operating with widely differing discharge requirements (in terms of allowable discharges per value of production).

The immediate application of a straight-line fee curve (as shown above) would probably lead to:

- some industries facing greatly increased incentives where no short-term response (other than cessation of activity) is currently available
- other industries receiving no incentive to adopt even inexpensive abatement methods that could result in valuable environmental improvements.

The overall result would be much lower actual environmental improvement in the short term than otherwise possible, albeit (significantly) at the expense of equity and long term economic efficiency and environment protection.

In developing the Draft Operational Plan for LBL (June 1995), the EPA proposed the use of what were then called 'discharge' targets. The intention of the targets was to focus incentives in the achievable range of abatement (explained below). Responses from industry indicated that the targets were interpreted as site-based environment goals, and that licensees who did not achieve these 'goals' would be 'bad' performers. Responses also suggested a number of additional problems with the discharge targets as proposed. The EPA reviewed the 'targets' in the light of the issues raised by stakeholders. The options developed and the proposed changes are outlined below.

In order to prevent any misconstruction of their function, 'targets' were renamed 'fee rate thresholds'. The function of the thresholds is to mark a change in the fee rate per unit of discharge such that the per-unit charge is highest in the range of discharges that can most cheaply be addressed by licensees in the short run. Threshold values are calculated for each licence by multiplying the 'threshold factors' (listed in Appendix 1 of the draft Regulation) by the licensee's quantity of economic activity. This ensures that thresholds are adjusted for the scale of each enterprise. The factors are expressed as kg of discharge per unit of economic activity.

The merits of using one or more than one threshold in the fee calculation formula were then evaluated, as illustrated in figs. 5.4.1, 5.4.2 and 5.4.3.

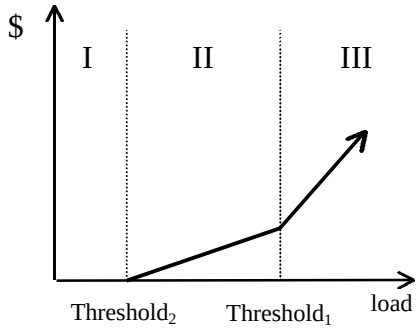


Figure 5.4.2
Option 2: two thresholds

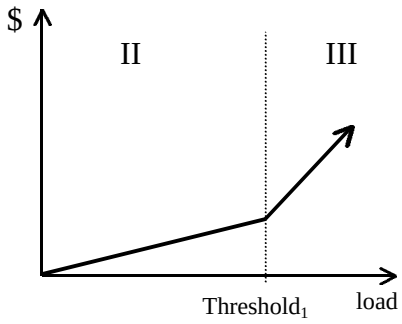
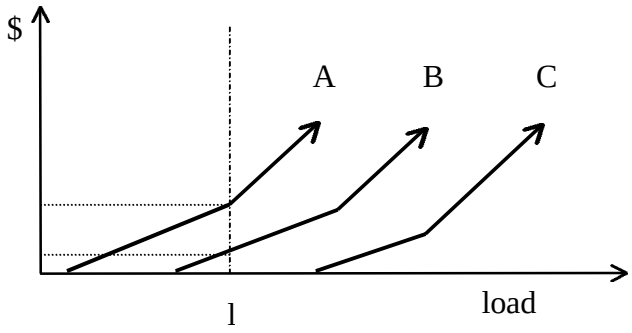


Figure 5.4.3
Option 3: one threshold

The two-threshold option 2 (Fig 5.4.2) creates three fee zones (I, II, III). Zero fee is charged below the lower threshold (zone I), a low rate of fee is charged between the threshold (zone II), and the highest rate is charged for discharges above the upper threshold (zone III). Under this option, the upper threshold would be set at a level that is already achievable for Australian firms using commonly available technology, while the lower threshold would be set at a level currently unattainable but expected to be achievable in the longer term. This option is analogous to the proposal in the Draft Operational Plan.

As pointed out by stakeholders in their comments, there are a number of difficulties with this option:

- there is a high level of uncertainty in selecting the values for the lower threshold, since what may be achievable in the long term is not known
- the approach perpetuates an inequitable and potentially inefficient technology based approach to regulation (that is, each industry is given an equal incentive to apply best available technology, rather than an equal incentive based on actual discharges for all industries). The EPA's preferred approach is to focus on required outcomes because this provides greater flexibility for licensees to find their own cost effective compliance methods
- the option can also result in widely differing fees being payable by different industries for equivalent discharges, even to the extent that some industries pay nothing while others face significant fees (see figure 5.4.4).



Option 2 repeated showing relative treatment of different industries or technologies for a single pollutant. For equal discharges (at load 'l')
—activity type 'A' pays a high fee
—activity type 'B' pays a low fee
—activity type 'C' pays no fee

Figure 5.4.4

Option 3 (the single threshold option in Figure 5.4.3) is a compromise option, which progressively implements the desirable attributes of a straight-line fee function (as in figure 5.4.1) over time. This option has the advantages that:

- fees will provide an immediate incentive for achievable improvements
- inequities between industries are moderated compared with the two-step option and progressively eliminated
- the potentially significant transition costs of moving straight to the no-step option are avoided.

Figure 5.4.5 below shows how these benefits will occur.

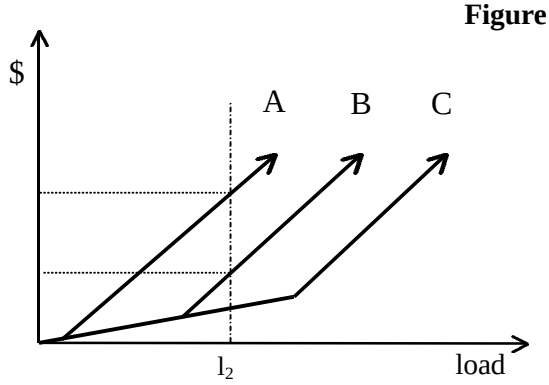


Figure 5.4.5 Option 3 repeated showing relative treatment of different industries at commencement of scheme. For equal discharges (at load l_2):
—activity type 'A' pays a high fee
—activity type 'B' pays a medium fee
—activity type 'C' pays a low fee
Over time, as industries reduce their discharges, firms move down to the common 'no-step' part of the curve and fees are equalised per unit of load.

Option 3 (single threshold) is therefore preferred, and is as proposed in the draft Regulation.

5.5 Methods for Selecting Threshold Factors

The values selected for the thresholds in the Draft Operational Plan were developed based on the EPA's knowledge of achievable discharges, sourced from NSW and other constituencies. The role of thresholds has changed as discussed above, but the task of selecting values for threshold factors for each industry for each pollutant remains.

Some responses from stakeholders requested greater detail on the source of the EPA's nominated values. In preparing its response, the EPA resolved that equity and transparency could be increased if the method of selecting values was modified. Rather than setting thresholds equal to best reported performance, the values proposed in the draft Regulation have been drawn from published regulations or rules from other jurisdictions wherever available. The source of each value can therefore be explicitly documented, and interested parties could refer to all the existing documentation supporting the original making of the rule. It is also believed that this approach will be more equitable across industry sectors.

The published threshold factors now represent the lowest (that is, most rigorous) performance standard specification that has been adopted by a major pollution control authority or advisory body (where one is available). Standards that have been subject to rigorous scrutiny and impact analysis have been preferred. Principal sources located by the EPA include the USEPA's new source performance standards and other US Federal Regulations, World Health Organisation guidelines and statutory rules from individual US states or European nations. The proposed values are listed for each industry in Appendix 1 of the draft Regulation. In cases where no published

standard could be identified, reputable reports of actual discharges have been adopted (values have been selected from the lower ranges of reported values). Full details of the sources of each value are available on request from the EPA.

5.6 Phasing-in Arrangements

The objective of the Scheme is to reduce harmful discharges as quickly as possible. In most cases, however, implementing pollution reduction measures takes time. Therefore, immediate implementation of the full fees as proposed could result in significant unnecessary disruption and cost. In order to minimise this, the draft Regulation provides for the phasing in of the fees over time.

As foreshadowed in the Draft Operational Plan, the EPA intends that fees will be phased in over five years. The draft Regulation, however, includes fees only for the first 3 years of the Scheme. This is because the EPA proposes to conduct a review of the effectiveness of the fees in reducing pollution after two year's experience, in order to determine the appropriate extent of further increases in fees. This is further discussed in section 6. It should be noted that the EPA's intention to implement a load based licensing scheme has already been widely known for a number of years.

Part of the phasing-in arrangement involves a special provision for Sydney Water's primary-treatment ocean-outfall plants. Under the current Regulation, there is a separate fee category for these licences that sees Sydney Water Corporation (SWC) pay approximately 75% of the total of $30m of fees. In order to smooth the phasing-in of the Scheme, the draft Regulation provides for the existing special handling of SWC's fees to be progressively unwound over the first three years. After this time, the special arrangements for SWC's licences will end.

5.7 Load Reduction Agreements and Fee Rebates

A further feature to increase the effectiveness of the Scheme has been retained based on positive comments from stakeholders. Fee rebates for Load Reduction Agreements are an additional measure provided to help licensees to implement load reduction measures. The effect of the rebates is to free up licensees' resources for implementation of actual pollution reduction, rather than paying fees.

Where licensees commit to reducing their discharges by an agreed future date, a partial rebate of fees is provided. The rebate is provided by allowing licensees to pay fees based on a weighted average of their current and their agreed future load. The calculation formula provides higher rebates for agreements with shorter time frames, thus encouraging early implementation of load reductions.

For example, say that a firm enters into a two-year agreement to reduce its load from 100 tonnes to 50 tonnes. In this case the firm would then pay pollution load fees on the basis that the load had already been reduced to 75 tonnes, until the load actually fell to 50 tonnes as agreed.

The draft Regulation limits rebates to those agreements expected to result in load reductions of an assessable pollutant of 10% or greater. This is considered the smallest amount likely to reliably provide useful help to licensees to reduce their pollution loads. If the licence holder fails to achieve the agreed load reductions without prior approval from the EPA, the rebates will need to be repaid with interest. Repayment with interest is considered essential to prevent unwarranted exploitation of the features of the rebate scheme.

5.8 Weighting of Loads

As stated above, the EPA intends to provide maximum flexibility for licensees to develop innovative, low-cost methods of reducing environmental harm. Some of these methods will not necessarily reduce the total pollutant loads, even though they greatly reduce environmental harm. Examples include:

- the sustainable re-use of waste waters
- discharge only during high flows in receiving waters
- participation in the Hunter Salinity Trading Scheme.

It is also proposed that under a limited number of circumstances, licensees would only pay for 'net' discharges. This would provide for the discounting of portions of pollutant loads brought on to the premises from ambient sources (for example, in process water drawn from upstream).

Some of the harm reduction measures are already approved for use in EPA licences, and the EPA believes that these and other suitable methods of harm reduction should be recognised and encouraged in the fee system. To this end, the draft Regulation provides for the EPA to issue load-weighting protocols that result in fee reductions of up to 100%. An initial set of load-weighting protocols is currently being developed in consultation with stakeholders, as part of the development of load calculation protocols (see 8.1 below for further details).

5.9 Options for Recovering Administrative Costs

Consistent with the polluter-pays principle and the Government's policy platform, the draft Regulation provides for the recovery of the costs of administering the licensing system from licensees rather than the general community.

Although the EPA actively embraces its obligation to maximise the efficiency of its licensing service[18], the scale of the service currently provided is determined by the Government as part of its budgeting process. Current total costs of administering the pollution licensing system are approximately $30m a year, being 38% of the total 1995–96 EPA budget of $79m (total includes capital but excludes grants, subsidies and Government costs such as special inquiries and Minister's Office). A full

[18] The EPA is continuously pursuing efficiency improvements. Improvements are being implemented in optimising both the range of tasks that are undertaken and the manner of their completion. Current initiatives include developing 'smarter' regulations, using alternatives to licensing where cost-effective, use of model licences, restructuring licensing function work areas, upgrading IT and administrative systems and contracting out tasks where cost-effective.

breakdown of licensing costs and activities is shown in Appendix F. The most significant activities include preparing and issuing licences, compliance assurance (including audit and enforcement, responding to incidents and complaints), ongoing reform including developing 'smarter' approaches to regulation, and maintenance of adequate scientific expertise to support all of the above.

The EPA has investigated a number of options for the method of recovering administrative costs. The principal issues are:

- determining the best method to distribute cost recovery obligations across licence holders
- optimising the relationship between load fees and administrative fees so as to maximise environmental gains.

Distribution of Administrative Cost Obligations

There are currently approximately 3400 licences. Licensed premises range in complexity, for example, from small sewage package treatment plants serving 20 people, to primary metal production plants employing thousands of staff across a wide range of potentially hazardous activities. Options for setting cost recovery fees across such a diverse range of activities all involve trade-offs between equity, simplicity and cost-effectiveness in administration.

The main options considered were:

1. Individual fees based on the actual resources expended servicing each licence.

2. Individual fees based on pollutant load as a proxy for likely overall environmental impact (that is, effectively eliminating any separate administrative fee).

3. A scale of fixed fees based on the type and scale of each licensed activity (as a proxy for the resources likely to be required for licensing).

Setting individual fees as proposed in option 1 has the strength of greatest apparent equity. Each licence's fee would be calculated from EPA time sheets and other suitable records.

Unfortunately, it would be difficult to cost-effectively attribute the costs of activities such as preparing guidelines, test methods and scientific research to individual licences. A potentially more significant problem with this option arises because the EPA's licensing service is fundamentally provided to the community rather than licensees. This means that the usual efficiency benefits of user-pays arrangements could not arise. That is, because the licensee is not a 'customer' who can select the service proportional to its subjective value, the profit maximising behaviour of licensees could not be harnessed to improve the efficiency of the service, as is the usual case. In fact, such a system could be manipulated by vexatious complainants to the unfair disadvantage of individual licensees. Accordingly other methods of allocating cost recovery obligations are required.

Option 2 proposes using pollution load as a proxy for environmental impact and hence required licensing resources. Although there will be positive relationship between

loads emitted and required resources for licensing, there are three reasons why option 2 is not appropriate:

1. Over 2000 licences will not initially be subject to load based fees
2. Not all pollutants will be assessable (for example, faecal contamination, noise, heat)
3. A large part of licensing activity does not directly relate to load discharges (for example, short-term incidents, complaints, compliance checking, policy development and prosecution).

The EPA's preferred approach is therefore option 3.

Experience to date indicates that the resources required for licensing an activity depend on the:

scale, nature, typical level of technology and complexity of the activity

frequency of inspections required (that is, the probability of non-compliance and the scale of environmental risks should non-compliance occur)

number and type of complaints received (itself a function of the inherent nature and location of each licensed activity and the skills, resources and past performance of each licensee)

need for the development of new knowledge and techniques (changing industries, scientific knowledge and impacts in relation to newly defined environmental goals).

The EPA believes the type and scale of activities are robust and readily verifiable data that can be used to establish a proxy scale for all of the above. Therefore the draft Regulation contains a proposed Schedule of administrative fees based on option 3, prepared using the best available information. The scale is essentially unchanged from the scale proposed in the Draft Operational Plan, updated only to reflect new information provided to the EPA in responses from stakeholders.

For the purpose of defining activity 'type' the draft Regulation defines the classifications of activity in an Appendix as well as the means for determining the scale of the activity conducted. The criterion for determining activity 'scale' is usually the 'capacity' available to the licensee to undertake the activity. This criterion has been selected because the applicable value can be accurately determined by the time that the licence administration fee instalment must be paid. It also matches similar language used in the Schedules to both the Environmental Planning and Assessment Act and the Protection of the Environment (Operations) Act.

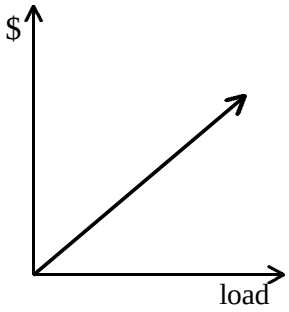
The concept of 'capacity' to produce (for example, in relation to Petrochemical Production (A.17) 10–30 kT a year) is not specifically defined. Its natural meaning, however, is the ability to produce that specified amount per year, taking into account all relevant physical and legal constraints. Such constraints could include the size of the installed plant and equipment used to conduct the activity, the expected time required for essential maintenance of that plant during the relevant period, the conditions of any relevant development consent controlling production (including the allowable operating hours), and the scope of any existing-use rights. However, it does not include any

subjective intention of the licensee to operate installed plant or equipment at levels below its technical capacity.

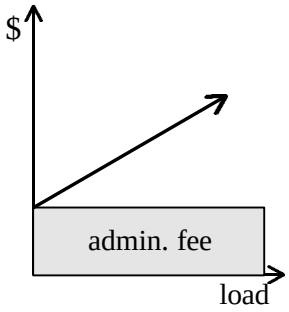
The Relationship Between Administrative Fees and Load Fees
Twenty-one per cent of responses to the Draft Operational Plan suggested that the administrative component of fees should be minimised as a proportion of total fees. Because load fees provide incentives for discharge reductions while administrative fees are unavoidable, the EPA generally supports this suggestion.

A number of structures for administrative fees were evaluated for those licences subject to load fees. These are shown below. In selecting a preferred option, the EPA sought to:

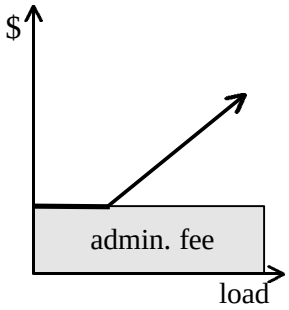
- maximise incentives to reduce pollutant loads
- ensure that administrative costs are equitably recovered, having regard to the full range of licensing activities provided as described above and in Appendix F.



Option 1: no separate administration fee—costs recovered through load fees only



Option 2: full separate administration cost recovery. Load fee in addition to administration fee.



Option 3: combined administration and load fee

Option 1 maximises the incentive force of the Scheme. It means, however, that should a licensee reduce assessable discharges to 'zero'[19], no contribution towards administrative costs would be payable. This is inequitable because:

- the EPA's licensing activities relate to more than controlling annual loads of assessable pollutants (for example, incidents, noise, temperature, faecal contamination, visual amenity)
- there is still a licensing service cost in providing public assurance about actual discharges (for example, compliance auditing, responding to complaints, reporting on performance issuing licences)
- more than 2000 licensees will not initially be subject to load based fees.

Option 2 offers administrative simplicity but reduces the likely effectiveness of the Scheme in reducing discharges. For any total fee level, the fee per unit of discharge is

[19] Note that the load weighting procedures that might be provided in the scheme could result in a 'zero' assessable load, even where actual discharges are taking place, for example, where licensees are re-using effluent or where they have been allowed to count net discharges (discounting pollutant imported from ambient sources).

reduced because part of the total fee is consumed in the fixed administrative component. This is illustrated by the flatter fee curve in the option 2 figure above. Where the total of administrative cost is a significant portion of the total fees, this could significantly diminish the effectiveness of the Scheme

Option 3 is the preferred option and is included in the draft Regulation. It combines the strengths of the other options by requiring licensees to pay only load fees, but subject to a minimum administrative fee. Option 3 retains the steeper fee curve (that is, higher per unit load fee) of option 2 while ensuring that all licensees pay their fair share of administrative costs (as in option 1).

The main difference between options 2 and 3 is that option 3 provides a higher per unit fee (and thus marginal inducement to abate) to the licensee for the part of his/her load that is above the level where an administrative fee is payable. Provided that the scale of the administrative fee is such that licensees' discharges imply a load fee greater than the administrative fee, option 3 will always provide a more powerful incentive for further discharge reduction.

The EPA's analysis indicates that for a small number of premises, proposed load fees will not exceed the administrative fees payable at the outset of the Scheme. For this reason, the EPA proposes that administrative fees be discounted below full cost recovery, in order to increase the incentive force of the Scheme. The proposed 50% discount is further discussed in section 6.

5.10 Summary of the Merits of the Preferred Structure

The above discussion has evaluated options for a number of fee structure issues. Each subsection concludes by recommending a preferred option. The table below summarises the features and benefits of the composite of each of the preferred options. It therefore presents the licence fee structure believed to result in the greatest net benefit, and is accordingly the structure proposed in the draft Regulation.

Summary of the Development of the Proposed Licence Fee Structure

Fee Structure Issue	Preferred Option or Required Approach	Basis for Selection
Selection of industries and pollutants	• only industries already licensed • only those industries/pollutants meeting selection criteria	• Licences required by Pollution Control Acts and consistent with proposed integrated schedule • discharges known, measurable and amenable to load based licensing
Weighting of pollutants	• methodology based on international standard for life-cycle assessment	• best method available • transparency of process
Location-based weighting	• simple scheme, weighting only for listed pollutants in listed areas	• limited data means less than complete scheme inevitable • ignoring locational factors inequitable and inefficient • to be reviewed based on forthcoming data
Differential fees based on industry performance	• single fee rate threshold, doubles per unit fees where ready reduction measures already available	• increased incentive for short-term pollution reduction • reduces inequalities between different industry types • reduces costs of transition to full performance based approach
Selection of values for fee rate thresholds	• values are lowest of adopted performance standards of major economies, or reported discharges if former unavailable	• greater transparency • more equitable between different industries
Load reduction agreements and fee rebates	• commitment to reduce future loads leads to fee reductions	• increases incentives for early load reductions • frees up licensees' resources for implementing pollution reduction
Weighting of loads	• provision for weighting of loads	• recognises harm reduction measures that don't reduce pollutant loads • maximises flexibility for low cost environment protection
Recovery of administrative costs	• fixed administration fees based on type and scale of activity	• fixed scale simplest, fairest and cheapest
Relationship between administration fees and load fees	• administration fees are minimum payment for LBL licences, not additional to load fees • 50% discount on administration fees for licence subject to load fees	• ensures administration costs fairly allocated • increase incentives for load reduction and minimised 'deadweight' fixed component

6. OPTIONS FOR SETTING FEE LEVELS

The EPA has evaluated a range of methods for determining the optimal rate of fees to be charged under the LBL Scheme. These are discussed below.

6.1 Application of the Polluter-pays Principle

One method that could be used to determine the appropriate level of pollution licence fees is to fully implement the polluter-pays principle. As outlined by the OECD,[20] economic efficiency will be enhanced if external pollution costs are borne by polluters, and not the general community. These costs include abatement costs, licence administration costs and external pollution costs (that is, the costs of environmental damage resulting from discharges).

Abatement Costs
Generally in NSW, licence holders already pay their own pollution abatement costs (although some State subsidies remain for municipal and State-owned providers of sewage treatment services).

Licence Administration Costs
Licence administration costs currently total approximately $30m a year (see sections 3.4, 5.9 and Appendix F). Therefore, no fee option should be adopted that results in total fees of less than $30m a year.

External Costs
Although the total external costs arising from environmental damage caused by pollution cannot yet be accurately calculated for NSW, indications are that these amounts are substantial. The case study in Appendix B indicates that the costs arising from the discharge of fine particulates from industrial sources alone exceeds $540m[21] each year.

Because external costs cannot yet be calculated accurately, immediate application of the full polluter-pays principle is not presently a feasible method of determining the appropriate level of fees, although recovery of administrative cost must clearly form part of any satisfactory option.

6.2 Maximising Net Benefits

A principal objective of implementing the LBL Scheme is to ensure the adoption of the licensing approach that has the maximum net benefit to the community. Setting fee levels using a quantitative net benefit approach involves calculating the fee level that would result in the greatest positive difference between expected costs and expected benefits. Completing this approach involves calculation of:

[20] OECD, 1996 (c)
[21] that is, $20,015 per tonne x 27,000 tonnes per year.

- the impacts of proposed fees and the costs and benefits of those impacts
- licensees' abatement response to fees, resulting environmental improvements and the valuation of those improvements.

In order to estimate the financial, economic and environmental costs and benefits of the LBL Scheme, the EPA developed an LBL spreadsheet model. The model inputs included the average pollutant loads of each group or subgroup of licence holders, a breakdown of locations according to critical zones, and values for the parameters of the Scheme, including pollutant weightings, fee steps, activity levels and base fee levels. It also includes an estimate of abatement cost/kg of abatement for each class of licence holder and pollutant. The model outputs included estimates of the maximum fees payable, collated by both industry and by pollutant.

Rigorous estimates of the environmental impacts of the Scheme could not be derived due to the inadequacy of the data on costs of abating pollution and therefore the likely response of licence holders to the LBL fees. The main difficulties relate to:

- a lack of data regarding the specific production technologies currently utilised by NSW licensees (and consequently feasible abatement options)
- the extent to which generic cost data is applicable to NSW firms
- the opportunities for combined solutions to deal with more than one pollutant
- the inability to quantify options for low-cost 'cleaner production' approaches to discharge reduction.

Thus, although estimates of licence fees have been calculated and their impacts investigated, current capacity to predict likely abatement responses to licence fees is inadequate. Further, as has already been discussed, the valuation of environmental benefits arising from discharge reduction across the State is also subject to uncertainty (see section 2.1 and also Appendix B). Accordingly, calculation of net benefit is not considered to be a sufficiently robust basis for determining the fee level for the Scheme.

6.3 Establishing Targets for Pollutant Load Reductions

In developing the draft Regulation, the EPA has sought to align the incentives of the Scheme as closely as possible with current environmental priorities. For example, fees will be higher for more harmful pollutants in areas where there are critical excesses of those pollutants. An extension of this approach could be to set fees expected to result in desired discharge reductions in relation to established ambient goals for each receiving environment and pollutant.

This approach is really a refinement of the maximum net benefit approach, except that for the purpose of this RIS, the environmental goals would be accepted as given, rather than being included in the cost/benefit analysis.

Unfortunately, this option is also not yet feasible, due to the same difficulties in predicting abatement response and cost as described above.

6.4 Comparison with Other Jurisdictions

Worldwide, the use of fee incentives to reduce pollutant discharges is increasing rapidly. One option for setting fee levels in NSW is to refer to fees set in other jurisdictions that operate discharge reduction incentive schemes. The EPA has located mass-based (or similar) pollution incentive charging systems for air and/or water discharges in operation in 42 other nations (listed in Appendix C). These include major industrial nations such as the US, France and Germany, northern European nations such as Sweden, Finland and Norway, former centrally planned economies such as China, Poland, Lithuania and the Czech Republic, and industrialised Asian nations including Japan, South Korea and Singapore. A summary case study of the Chinese scheme is included in the next Chapter.

Of course, the level of sophistication and fee rates charged vary widely. Many countries have multiple schemes for different types of discharges and sources, and different rules and fees in sub-national jurisdictions. Although it is difficult to make direct comparisons due to the large number of special features in each country, it is clear that there is no one national scheme that could provide a basis for setting fee levels in NSW. This is to be expected, because each nation has different environmental issues and priorities. Therefore this option is also not a suitable basis for determining fees in NSW. The comparison does, however, place the proposed LBL fees in an international context. Details are shown in section 7.4.

6.5 Conservative Incremental Approach (Preferred Approach)

As a general economic principle, if fees are too low, licensees will not implement discharge reduction measures. If they are too high, they will reduce discharges more than is economically warranted, possibly at significant economic cost. This principle is based on the observation that the community is constantly making trade-offs between the benefits derived from activities that harm the environment and the costs of resulting environmental harm (for example, use of motor vehicles). The ‘correct’ fee level for LBL will therefore give economic expression to the community’s current preferences and provide incentives for the development of new environment conserving technologies that will expand the community’s range of choice regarding the production/conservative trade off.

As each of the above options for setting fee levels for LBL indicates, however, there are significant difficulties associated with accurately estimating the values needed to set the optimal fee. Given these difficulties, the EPA has proposed that a conservative approach is warranted. The approach is based on the following principles and observations:

- the Government’s costs of administering the licensing system must be fully recovered
- for any given fee level, incentive fees should be maximised in relation to administration fees

based on available abatement cost data and international experience, the current average NSW licence fee of $2,100 is manifestly inadequate to provide genuine incentives to reduce pollution

fee increases should be announced early but implemented gradually to allow time for licensees to implement load reduction measures

there needs to be a balance between regulatory certainty and flexibility to adjust fees based on experience. As far as is possible, final fee levels should be flagged to assist licensees in determining optimal abatement strategies. On the other hand fees should not be 'set-in-stone'. A review of the effectiveness of load based fees should be implemented as soon as useful data can be obtained, in order to adjust fees consistent with the objectives of the draft Regulation and the experience of licensees.

Consistent with the above, the draft Regulation gives effect to the following fee arrangements:

administrative fees will be redistributed equitably across all licensees, with the change being progressively implemented over three years

for all years, licensees subject to load fees will have their administrative fees discounted by 50%, in order to increase the relative share of their incentive fees

initial fee rates will be set so that total fees will approximately equal current fees (that is, to ensure recovery of administrative costs). These are reduced, however, by the 50% administration fee discount provided for LBL licences. This, along with the effect of the changed payment dates proposed under the new system, results in a significant short-term drop in fees payable (see section 8.3)

load based fees will increase approximately 25% a year for two years, followed by a review of pollution reductions (both achieved and planned)

the review will help determine the appropriate extent of further fee increases.

The details of the fee variables needed to calculate individual fees are contained in the draft Regulation. A summary of the proposed fees for discharge of the main pollutants is shown in the table below. The rates are for year three (that is, after the end of the phase-in period), averaged across NSW.[22]

Proposed Year 3 LBL Fees

Pollutant	% of Total Weighted Discharges	$A/tonne Emitted (Average)
Nitrogen oxides (air)	24%	$68
Phosphorus (non-marine waters)	15%	$6,250
Fine particulates (air)	11%	$310
Undifferentiated particulates (air)	8%	$117
Suspended solids (non-marine waters)	7%	$380
Volatile organic compounds (air)	5%	$175
Suspended solids (marine waters)	5%	$53

[22] Some fees are higher or lower than average where an activity is conducted in critical zones—see section 5.3. Fees for water vary for open coastal waters and enclosed waters.

Sulfur dioxide (air)	4%	$6
Lead (air)	3%	$64,000

Some international comparisons of these rates are provided in section 7.5.

If the proposed rates of fees are applied to estimated loads emitted from licensed premises in NSW, the resulting total fees are as shown below. Total fees fall in year one of the Scheme because load fees are payable in arrears, and due to the 50% discount on administrative fees provided for licences subject to load based fees. Nevertheless, even though total fees fall, correction of current fee inequalities will see fee increases for most licence holders.

Note that the fee estimates are maxima, based on the assumption that no discharge reductions occur. Overseas evidence suggests that polluters do respond to economic incentives and discharge inventory programs (often faster than 'rationally' when viewed from a short-run economic perspective) and thus that some, currently unquantified, portion of the future fees will be avoided.

Resulting Maximum Licence Fees ($million)

	97/98 (current)	**98/99**	**99/00**	**00/01**	**01/02**
Total fees	30.2	22.3	31.6	42.7	58.1
Change compared to present	–	-7.9	1.4	12.5	27.9

Data on the anticipated distribution of changes to licence fees for individual licences are shown in the table below. The data are based on EPA estimates of pollutant loads and activity types and will be checked with licence holders during the consultation period.

Anticipated Distribution of Changes to Licence Fees (%)

Current Fees Compared with Draft Regulation Rates	**Fee Falls or is Stable**	**Fee Increases**			
		up to 100%	**100%–200%**	**200%–500%**	**> 500%**
Year 1 rates	65%	12%	4%	8%	11%
Year 3 rates	20%	18%	29%	14%	19%

It should be noted that many of the largest percentage increases are from very low absolute amounts.

The anticipated impacts of these fees are evaluated in section 7 below.

7. COSTS AND BENEFITS OF THE PROPOSED SCHEME

The Subordinate Legislation Act requires that Regulatory Impact Statements include an assessment of the costs and benefits of the proposed rule (Regulation), its alternatives, and an assessment of which option provides the greatest net benefit or least net cost to the community (Sch.2, 1(c–e)). The Act further stipulates that 'the alternative option with the greatest net benefit or the least net cost to the community should normally be chosen from the range of alternative options available to achieve the objectives' (Sch.1, 3(c)). The Act also requires that 'economic and social costs, both direct and indirect are to be taken into account in a RIS' (Sch.2, 2(1)).

The scope of the costs and benefits considered by the EPA in arriving at the preferred approach include the:

- economic and environmental costs and benefits arising for the community associated with the discharge of harmful pollutants by licensees and the degradation of the natural environment
- compliance costs imposed on licensees associated with a range of licensing approaches that the EPA could implement consistent with fulfilling its responsibilities under the Pollution Control Acts (including administrative costs, payment of fees and implementation of abatement works required to be undertaken)
- costs incurred by the State in administering the licensing system.

The Act recognises that quantification of costs and benefits is not always possible, but does require that each alternative be 'presented in a way that permits a comparison of costs and benefits' (Sch.2, 2(2)). As discussed in section 2.1, it is not currently possible to quantify many of the above costs and benefits. This, however, is not considered an impediment to demonstrating the superiority of the preferred approach.

In the case of the draft Pollution Control Regulation 1998 and this RIS, a large and complex suite of options has been considered. based on the statutory power of the EPA to issue licences to certain activities and to prepare the content of those licences consistent with certain listed criteria[23]. The results of the analysis have been described in detail in sections 4, 5 and 6 of this RIS. The merits of each approach have been compared in order to identify the option with the greatest net benefit or least net cost. The provisions of the draft Regulation are wholly consistent with the identified best options.

Having established the preferred option, the remainder of this section therefore outlines the impacts of the draft Regulation.

7.1 Regulatory Efficiency

[23] See section 2

As described in sections 4 and 6, a 'no-licensing' or a 'no licence fee' option is not feasible (or desirable). Pollution control licensing is used in almost all nations because it is a practical and demonstrably effective method of controlling harmful, damaging, and costly discharges.

From the perspective of regulatory efficiency and economic benefit, therefore, the question is: 'What type of feasible licensing system would be best for NSW?' The analysis in sections 4 and 5 (and the advice of the OECD[24]) shows that a mix of possible approaches is most beneficial. The following table presents a summary of the anticipated performance of the draft Regulation in relation to accepted regulatory efficiency criteria. The table indicates that if the draft Regulation is implemented effectively, there will be significant economic benefits to NSW and its licensees.

Summary of Regulatory Efficiency Evaluation

Regulatory Efficiency Criteria	Features of Proposed Approach	Benefits
Assurance of environment protection	• Annual load limits to control cumulative impacts • Continuous concentration limits to control acute and chronic impacts	• Prevents 'creeping background' increases in discharges • Clearly defines essential required outcomes
Transparency	• Regulation developed with extensive public consultation and stakeholder input • Fee structure based on objective techniques and fully documented • Creates a public reporting system and register for discharges	• Opportunity to optimise regulatory efficiency based on input from all stakeholders • Incentive fees proportional to explicit environmental priorities • All stakeholders can track environmental performance and comment on outcomes and equity
Cost effectiveness in achieving environmental goals	• Performance-based approach, licensee free to select compliance method • Incentives increase where environment improvement needs are greatest • Gradually implements fee consistency between and within industry sectors • Uses pollutant load as primary measurement of harm	• Harnesses market forces to stimulate innovation. Active encouragement of lowest cost solutions • Helps focus abatement efforts where most beneficial • Corrects existing distortions • Creates potential for trading schemes to further reduce overall compliance cost
Minimisation of administration fees	• Administration fees are part of load based incentive fee, not additional. • Provides for use of low-cost load estimation techniques (discharge factors) • Rationalisation of reporting requirements • Scheme complements forthcoming National Pollutant Inventory	• Minimises economic 'deadweight' of administrative fees • Reduced administrative costs via process streamlining and IT upgrade
Efficient recovery of administrative costs	• Moves to equitable recovery of administrative costs over 3 years	• Implements 'polluter-pays' to enhance equity and economic efficiency.
Regulatory certainty	• Fees set for 3 years, review scheduled	• Reasonable certainty provided. Clear signal of strategic direction and future intentions.
Capacity to review efficiency of	• Load reporting allows quantitative evaluation of changes in discharges	• Provides mechanism to check 'value for money' of regulatory approach

[24] OECD, 1996(c)

regulator	and resulting ambient outcomes	and ensure regulatory activities are targeted in priority areas.

7.2 Economic and Environmental Benefits

Because no robust quantitative prediction of industry's abatement response can be made (see section 6), no reliable monetary estimate of economic benefits arising from implementation of the draft Regulation is possible. To provide an indication of possibe benefits arising from discharge reductions, however, the EPA has used its ENVALUE database to extract valuation data from a broad range of economic studies. For example, from a range of 16 studies from the US and Europe included in ENVALUE, the median value of a reduction of one tonne of NO_x is $1,385 and from nine studies the median value for VOCs is $1,440. A survey study referenced in ENVALUE provides a median value of $1,810 per tonne of total particulates abated, although this value does not include health costs of the fine particulate fraction of particulate matters. Based on these values, a 25% reduction in the discharges from licensed premises of these three pollutants alone would result in economic benefits worth $79m a year.

To further investigate possible economic benefits, the EPA has prepared a case study for another pollutant, fine particulates (see Appendix B). Fine particulates are inhalable and penetrate deeply into the lungs, where they may cause respiratory illness and increased mortality. Although the analysis is conservative, the study indicates a value of $18,500 per tonne of discharge of fine particulates that are avoided. Total annual discharges from licensed sources are estimated to be about 27 000 tonnes, meaning that a 25% reduction would save an additional $135m a year.

This estimate of cost is narrow and conservative and it excludes many difficult to quantify key impacts that are very important to many members of the community. Exclusions include the medical costs of treating morbidity, lost productivity, changes to property values associated with industrial pollution, and the satisfaction that people derive from their own good health and from living in a clean environment. The specific case of improved visibility from reductions in fine particulate discharges in the Sydney area was, however, included.

The assumed mortality rates in the case study might also significantly underestimate the costs of this pollutant. A recent study by NSW Health found that more than 400 deaths in Sydney each year are directly attributable to fine particulate pollution (unpublished). The case study in Appendix B is based on only 82 deaths occurring per year. This figure was based on US studies and a conservative assumption that because ambient concentrations in Sydney are lower than in the US, only 10% of the population (such as asthmatics) would be sensitive to the pollutant.

Although the quantum of environmental benefits of the LBL Scheme will depend on the extent to which licensees respond to the Scheme, the following environmental benefits will certainly be achieved:

Wherever annual load limits are put in place (that is, at approximately 1100 of the largest licensed pollutant dischargers in NSW), increases in cumulative discharge loads cannot occur legally without a formal process of review and public

disclosure.

To the extent that fees prove high enough, there will be reductions in pollutant discharges. These are most likely to occur for the most harmful pollutants and in areas where there are the greatest environmental problems with those pollutants.

A discharge load database will be established, to record annual discharges from each load licensed activity. This will enable close monitoring of discharge reductions over time across the State. The data will be used to compare discharge patterns with ambient outcomes and objectives. This will significantly enhance the EPA's capacity to focus discharge reduction targets further and thus achieve greater environmental gains at lower cost.

The LBL Scheme will provide a platform for expanded use of trading schemes that could provide for trading with non-licensed sources to achieve greater environmental gains at a lower cost than is currently possible. The current licence administration system is not adequate for widespread use of trading schemes.

7.3 Economic Costs

The impact that the LBL Scheme will have on licensed firms, the industries in which they operate and on the broader economy will depend upon the level at which the incentive charges are set, the amount of abatement that is induced and the net cost of undertaking that abatement. As described above, the expected level of abatement (and therefore the associated costs) are key unknowns and are difficult to predict with any degree of confidence.

Assuming public sector expenditure provides similar benefits to the State as do expenditures by private companies, LBL fees paid by licensees will generate no economic costs or benefits. They are transfer payments.

Economic impacts will arise in administering LBL and where licensees choose to incur pollution abatement expenditure, and/or where production is curtailed due to any loss in competitiveness arising from higher production costs. In the latter case, the economic cost will be less than the value of lost production due to input cost savings, and will represent the loss in industry profit and consumer benefits—what economists term 'deadweight losses'. Due to the large number of industries affected by LBL and the potential for flow-on effects to associated industries (such as those providing resources and abatement technology), estimation of these costs would require economy-wide modeling. Such modelling could capture the effects of cost increases (and partly-offsetting demand increases) in individual industries across the economy. In this way the interaction effects between industries would be included in the analysis.

While the modelling capabilities exist in economy-wide models such as ORANI for undertaking such a task, there are several major impediments to employing this approach. Available national versions of the ORANI model are sufficient to allow a reasonable correspondence to be developed between the industry categories encompassed by the licensing Scheme and those specified in the model. At present, however, there is a limited capacity to conduct this kind of modelling at a state-wide, as opposed to national, level. At the State level, such models are much more highly

aggregated and fail to identify individual industries below broad categories such as mining and manufacturing. It is understood that further development work that would allow further disaggregation in the future is being undertaken by the State Treasury.

Even with further disaggregation, however, other impediments remain.
One such impediment is the difficulty in identifying abatement investment expenditures with supplier industries. The whole rationale of an abatement-related charging mechanism is that industries will make a least- cost choice between fees and abatement investment expenditures. Where the costs are expenditures on pollution abatement equipment, other firms will gain. It is difficult to determine which industries will benefit from this first round of pollution abatement expenditure. Economy-wide models are typically constructed using input–output industry classifications. Pollution abatement equipment is supplied by a range of industries depending on type of equipment employed, and only an in-depth survey of abatement expenditures would reveal how these correspond to input–output industrial categories. While the Australian Bureau of Statistics (ABS) periodically publishes pollution abatement expenditure for selected mining and manufacturing industries,[25] it has not to date identified the recipient industries.

Furthermore, an unknown proportion of this equipment is imported rather than domestically produced, and knowledge of these domestic/foreign market shares is a prerequisite for such economy-wide modelling. Where such investment goods are largely imported there will be little stimulus to domestic production. Other industries that are successful import competitors could do well. For example, most waste-water-treatment equipment currently used involves significant consumption of locally produced materials and services.

A further impediment to such modelling is created by the fact that the results of abatement expenditure will not only raise costs through investment expenditure and raise the demand for abatement equipment suppliers, but will also lower the labour costs of some industries. For example, reduced air pollution could be expected to reduce absenteeism among workers benefiting from improved air quality. Reduced activity days through illness will be a cost borne in part by industry and partly by individuals. Abatement efforts that reduce the number of reduced activity days will (apart from the obvious benefits to individuals), reduce the real labour costs of industry largely in the Sydney, Hunter and Illawarra regions. Those industries that are not subject to the licensing charges and are located in these regions will be net first-round winners from this process. Where workers are covered by industrial awards that provide sick leave, the cost of reduced activity days will fall on employers to the extent that restricted activity days do not exceed sick leave entitlements.

Both the direct and indirect effects of these benign cost influences of pollution abatement on industries should be taken into account. This, however, requires knowledge of the geographic distribution of individual industries so that the direct cost effects of reduced absenteeism can be initially distributed across industries. It is the net direct effect on industry costs of increased fees and abatement expenditures and reduced other costs (such as absenteeism) that is needed to conduct such economy-wide simulations. While locational information is available for

[25] ABS Catalogue no. 4603.0

manufacturing industry albeit at a high level of aggregation (two-digit ANZSIC), the service industries could be expected to be direct beneficiaries, and no such locational information is available for them.

If the information provided in Appendix B is taken as a guide, and assuming that 50% of reduced activity days occur for people who would otherwise be working, a 25% reduction in just one pollutant (fine particulates) would generate a benefit to industry of over $10.5m.

7.4 Financial Impacts

Notwithstanding the difficulties in establishing the economic costs of the Scheme, the results of an assessment of the financial impact on licensees are described below. It is assumed that the amount of the fees represents the maximum possible financial impact on licensees (that is, licensees will spend additional money on abatement only if this is in their financial interest).

Based on current discharge estimates and licensing information, the total estimated gross financial impact at current load levels after 2000–01 is $58.1m. The present licence fees are approximately $30m. The net effect of replacing the existing scheme with LBL is equivalent to approximately 0.84% of current total payroll receipts by the NSW Government or 0.016% of Gross State Product. Overall, LBL is clearly not capable of causing significant changes in the NSW economy.

To place the financial impacts of these charges in perspective for individual industries it is necessary to:

- establish the maximum size of any fee increases for licensed industries, and
- determine the scale of the increases and consequent impacts in relation to subject industries, their current environment protection expenditure and their turnover and profitability.

Establishing the size of affected industries

Current and consistent data on industry size, for industry groups matching the classification in the proposed draft Regulation, are not available. However, published ABS data for 1993–94 for New South Wales are available for the turnover of industries that can, in many cases, be placed in rough correspondence with the draft Regulation's classifications.[26] The 1993–94 data, from the Manufacturing Industry Census (ABS Cat. No 8221.1), is the latest available.

For non-manufacturing industries outside the scope of the ABS manufacturing census, other sources such as the ABS's Mining Industry Australia (Cat No. 8414.0) have been used. For sewage treatment plants, the revenue attributable to sewerage services collected by Sydney Water Corporation and Hunter Water Corporation in 1994–95 and an estimate of comparable figures for the various local non-metropolitan water

[26] The classifications used in the draft Regulation are based on the Schedule of licensed activities in the Protection of the Environment Operations Act, which is in turn aligned with the classifications used in the *Environmental Planning and Assessment Act 1979.*

and sewerage authorities provided by DLWC have been used. The electricity sales of Pacific Power (before the major structural changes to the industry) were used as a turnover estimate for the electricity generation sector.

Since the maximum impacts of the Scheme will occur at the end of the three-year phase-in, when the industry data will be up to seven years old, industry data have been estimated for future years based on recent ABS statistics and NSW Government budget forecasts.

The effect of LBL relative to turnover

The industries subject to the Scheme for which consistent turnover data are available are listed in Table A, along with estimates of maximum net fee increases. Table A also presents estimated maximum net fee increases relative to Gross Operating Surplus (GOS) which is a broad measure of industry profitability. The increases shown in the table are estimated maxima, calculated by subtracting the current licence fees for each industry from the maximum estimated fees payable at the end of the three-year phase-in of the Scheme (should licensees choose to continue discharges at current rates). As such, they represent that the maximum incremental cost impact of the LBL Scheme.

It is important to note that predicted impacts in this RIS make no allowance for cases where licensees are able to implement load reduction measures (or have recently already reduced loads) and thus reduce fees. Given the incentive nature of the fee structure, load reductions (and thus fee reductions) are most likely to occur in industries where impacts are predicted to be greatest. It is known that many industries already have emission reduction plans in progress; these will significantly reduce potential fee increases.

Recognition must also be given to the fact that R&D expenditures that are directed at reducing abatement costs in the long run can also have the incidental effect of reducing other process costs, lowering the overall cost structure of firms. To the extent that this occurs, the impacts reported in Table A will overstate the true impact on industries' costs.

From Table A it is evident that for most targeted industries, the estimated total financial impact of the LBL Scheme represents a small fraction of industry turnover and GOS in New South Wales. Sydney Water will enjoy significant gains under the Scheme. This reflects the progressive unwinding of the currently inequitable cross subsidy paid by Sydney Water that benefits all other licensees. Industries in which the impact of LBL appears high relative to other industries are:

- non-ferrous metal manufacture
- cement manufacture
- sewage treatment (excluding Sydney Water)

While economic efficiency dictates that load based fees should be higher for industries that discharge larger or more harmful pollutant loads (which is potentially the case for the above industries), this must be balanced against possible adverse impacts on enterprise profitability that could affect the viability of industries.

In the case of non-ferrous metal manufacturing, fee impacts are mainly associated with the discharge of lead to air. Discharge of lead from this class of industry has had significant effects on human health and the environment. Estimates of fees for lead have been based on current rates of discharge, however, which are expected to reduce over time. The EPA will work with the industry to identify planned and possible reductions in lead emissions and then further investigate the impacts of likely fee increases.
Fee increases for cement manufactures mainly arise for NO_x emissions. The industry is a major emitter of this pollutant, which is a primary contributor to photochemical smog and ozone formation in the Sydney region. The EPA will also consult closely with firms in this industry to check the scope for emission reductions and the impacts of likely fee increases.

Aside from impacts on manufacturing industries, the other salient feature of Table A is the estimated cost impact for STPs. In particular, rural STPs, with a high proportion of discharge to sensitive inland waterways and (in some cases) low levels of treatment capability, are expected to eventually incur significant increases in charges. This is partly because current fees for rural STPs are disproportionately low. It also reflects the special nature of the industry, where wastewater management comprises a much higher share of operational activity than others industries (where wastewater management is largely peripheral). While these charges are efficient in the sense that they reflect the environmental harm of discharging treated sewage to sensitive waterways, passing-on of these additional costs through higher fees, if permitted, would mainly affect non-metropolitan urban customers serviced by local councils and Hunter Water Corporation.

STP operators are, however, particularly well placed to benefit from the many features in the Scheme designed to encourage innovative management of potential environmental impacts. These include fee rebates for load reduction agreements and discounts for effluent re-use, as well as the general phasing-in program, which sees the impacts discussed above occurring only after three years. It is important to note that the Government has already committed over $25m a year to help councils upgrade their STPs; this will have the benefit of helping many councils to reduce the extent of fee increases. In addition, there are many cases where STP operators are already moving to significantly upgrade their performance; this will result in very large reductions in pollutant loads and thus fees. The EPA will consult closely with affected operators to clarify future emissions and possible impacts.

As well as direct impacts on individual licence holders, there are likely to be indirect effects on downstream industries. The flow-through effects of cost increases for these industries are likely to occur mainly in the construction sector (in the case of cement) and in the manufacturing sector in the case of non-ferrous metal manufacturing. Given the low overall level of impacts in relation to turnover and the size of the NSW economy, these impacts are expected to be modest overall. The EPA will, however, be seeking information from stakeholders to identify any anticipated significant impacts.

Because the financial impacts of LBL are spread unevenly across industries (that is, because it is linked to emissions), there is potential for impacts on the allocation of resources between industries. To the extent that load charges reflect costs to the wider

community caused by discharges, this would tend to improve overall community welfare. It would be expected that these charges might provide some incentive to divert resources to less heavily affected (and therefore ‘cleaner’) sectors. There is also potential for some contraction in favour of international or interstate competition in the case of import-competing industries or on output and returns of export oriented activities. However, given the relatively small magnitude of impacts on most industries involved, significant structural changes to the NSW economy are not anticipated. The EPA will consult closely with licensees to clarify the extent of expected impacts.

Table A: LBL charges in perspective

Industry	Change in Licence Fee by 1999–2000 ($M)	Estimated Industry Turnover ($M) for 1999–2000[1]	Fee change as % of estimated turnover	Estimated Gross Operating Surplus (GOS) for 1999–2000 ($M) [1]	Fee change as % of estimated GOS
Cement manufacture	1.338	264.1	0.51%	64.9	2.06%
Ceramics—brickworks and other	0.761	326.7	0.23%	93.1	0.82%
Ceramics—glass products	0.725	491.9	0.15%	175.7	0.41%
Chemical industries—agricultural fertilisers	0.269	144.3	0.19%	29.8	0.90%
Chemical industries—paints	0.066	613	0.01%	191.2	0.03%
Chemical industries —petrochemical	0.069	179.3	0.04%	47.7	0.14%
Chemical industries—plastics	0.347	2202.3	0.02%	547.6	0.06%
Chemical industries—soap or detergent	0.01	791.9	0.00%	333.1	0.00%
Chemical industries—rubber	0.104	298.9	0.03%	71.9	0.14%
Coal mines	2.517	5386.7	0.05%	1802.3	0.14%
Electricity generation	8.828	3562.5	0.25%	1357.7	0.65%
Livestock processing Industries—abattoirs, rendering and fat extraction	1.335	3423	0.04%	647.8	0.21%
Livestock processing—tanning	0.245	218.1	0.11%	32	0.77%
Minerals and metallurgical —aluminium smelting	0.326	1376.1	0.02%	519.4	0.06%
Mineral or metallurgical—iron foundries	0.344	356.1	0.10%	110.6	0.31%
Minerals and metallurgical —non-ferrous metal manufacture	2.084	628.5	0.33%	25.7	8.11%
Minerals and metallurgical —steelworks	7.03	6237.8	0.11%	1071.2	0.66%
Mines (metal)	0.272	570.3	0.05%	98.4	0.28%
Paper, pulp, and pulp products industries	0.855	745	0.11%	277.6	0.31%
Petroleum works—oil refining	2.133	3555.1	0.06%	632.3	0.34%
STP—Sydney Water	-14.968	735.9	-2.03%	386.8	-3.87%
STP—Hunter Water	1.602	55.5	2.89%	29.2	5.49%
STP—Local Councils	6.052	349.5	1.73%	183.6	3.30%
Sources: EPA LBL model, ABS Manufacturing Industry NSW, 1993–94 (Cat No. 8221.1), ABS					
Australian Mining Industry, 1993–94, (Cat no. 8414.0), Sydney Water Annual Report 1995,					
Pacific Power Annual Report 1995.					
[1] Values are 1992–93 values from above, adjusted for actual real GDP growth figures from ABS 1997 Year Book (Cat no. 1301.0), estimate for 1996–7 and forecasts 1997–98 to 1999–2000 obtained from NSW Budget 1997-98, Budget Paper No.2					

7.5 Proposed Fees in Context

Another way of evaluating the impact of the Scheme's fees is to compare them with fees in other jurisdictions. This can also show the extent of any impact on competitiveness of NSW licensees.

Other Australian Pollution Fees
The regulatory authorities responsible for environment protection in other Australian States and Territories, and the Commonwealth's Environment Australia, have been closely monitoring the development of the LBL Scheme in NSW. Most have informally indicated their interest in adopting features of the NSW Scheme once it is successfully implemented. The development of the LBL Scheme is a significant undertaking for any State regulatory authority, and as the largest economy in Australia, NSW is well placed to provide leadership and help for other interested States.

By international standards, pollution licence fees are generally low across Australia. Direct comparisons are difficult due to different definitions of activity and different configurations of industries in each State. For a number of years, however, Australia's highest pollution fees have been in Victoria[27] where a 'polluter-pays' scheme has operated for a number of years. For example, if NSW electricity generators were located in Victoria, estimated fees would exceed $2.2m—almost 10 times their current total fee of $0.2m in NSW. Even though the LBL Scheme's proposed fees are low by international standards, the implementation of the draft Regulation will see NSW rates generally overtake Victorian fees by 1999–00.

Although differences in fees may initially be significant in relative terms, the analysis in section 7.4 has already shown that the absolute impact of current and proposed fees is not expected to be sufficient to affect the interstate competitiveness of NSW industries significantly. The NSW EPA believes that by opening up the opportunities for market forces to stimulate innovation, NSW industries will develop new skills and technology that can, in turn, be exported to other jurisdictions. There is also a strong possibility that other States could implement parts, or all, of an LBL type scheme over the next few years.

As outlined in section 6.5, the use of pollution fee schemes similar to LBL is rapidly expanding worldwide. This applies not only in developed nations (see China case study below). A comparison of different fee rates for four common pollutants in other jurisdictions is shown below. Although the information is incomplete, the comparison clearly shows that in the global context, the proposed LBL fees are low and should not disadvantage those NSW firms that operate in global markets. In fact, the focus on loads and increased flexibility to be provided by the Scheme is likely to improve the overall competitive position of NSW industry. For example, the US and most European nations are yet to complete transitions beyond uniform technology based concentration discharge standards.

[27] excluding fees paid by five Sydney Water Corporation ocean outfalls.

It should be noted that some schemes in other jurisdictions include significant recycling of fees back to licensed industries as abatement subsidies. This partly explains some of the very high fees. In other cases, jurisdictions have restructured their taxation systems to tax environmental 'bads' in place of 'goods' such as employment and income. In Japan's case, revenues are used directly to compensate individuals affected by current and past discharges.

The EPA intends to review the adequacy of the proposed fees after two years operation of the LBL Scheme. If actual and planned discharge reductions are insufficient when compared with ambient goals, there could be a case to increase fee rates.

International Comparison of Pollution Charges[28]

Sulfur Oxides		Nitrogen Oxides	
Regulatory Jurisdiction	**Approximate Charge per tonne ($A)**	**Regulatory Jurisdiction**	**Approximate Charge per tonne ($A)**
NSW EPA (av.)	**$6**	US (Minnesota)	$24
US (Minnesota)	$23	France	$33
France	$33	Czech Republic	$33
Poland	$76	***NSW EPA (av.)***	**$68**
US (national market price)	$167	Poland	$76
China (proposed)	$220–$456	China (proposed)	$350
US (California)	$238–$576	US (California)	$195–$479
Japan	$258–$2,322	Sweden	$7,859
Norway	$3,148		
Sweden	$5,778		

[28] Many of the overseas rates are two to three years out of date, whereas the rates shown for NSW are those proposed for year 3 of the LBL scheme (that is, after the phase-in). In many cases overseas rates do not include licence administration fees, which must be paid in addition to the charge per tonne fee.

International Case Study—China's National Pollution Levy

China has operated a pollution levy system since 1978. Given the high levels of discharges in China and the current pace of economic reform and growth, the Chinese EPA (NEPA) has recognised the need for a better system of environment protection. To this end, NEPA accepted a US$1m loan from the World Bank in 1993 and has now completed a four-year study involving over 100 local and foreign researchers. The study has included a critical review of the current system as well as studies of regulatory systems and experience in most OECD nations in order to devise the best possible system for China.

Although the current system collects over A$700m from 496 000 enterprises, its very low fee rates (about 25% of average abatement cost), inconsistent administration and structural defects have meant that most enterprises have chosen to pay the fee rather than implement pollution reductions. A decision on implementation of the new system is expected from the State Council shortly. The table below compares China's current levy system, its proposed new system and the NSW LBL system.

Scheme Attribute	**Old China system**	**New China system**	**NSW LBL system**
Industry coverage	major industry, STPs	major industry, STPs, coal burning for heating, vehicles, aircraft, solid waste (hazardous and domestic)	major industry, STPs
Pollutant coverage	conventional air and water pollutants, heavy metals, noise	as for old system plus low level radioactive wastes and solid wastes	conventional air and water pollutants, heavy metals, some organics. Separate waste levy
Basis of charge	levy only on pollutants over concentration standard and only on single pollutant most in excess of standard	levy on total pollutant load of all pollutants, with double charge rate for portion of loads over standard	fee on total load of all pollutants, with double charge rate for portion of loads over achievable threshold
Pollutant differentiation	none	weightings to reflect relative harmfulness	weightings to reflect relative harmfulness
Area differentiation	none, although lower enforcement in less developed provinces means effective lower fees in those areas	weightings to reflect conditions in local environment, applicable generally	weightings to reflect conditions in local environment, applicable to specific pollutants
Differentiation for level of development	none	weightings to reflect level of development and capacity to administer and pay	none
Maximum revenue as % of GDP	0.076%	0.96%	0.033% (GSP)
Anticipated impact on price level	n/a	+2.3%	negligible
Use of revenues	funds EPAs, balance returned to dischargers as subsidies and later as loans to support abatement projects	funds EPAs, balance to be placed in special fund to be allocated to various environment projects	central consolidated fund for allocation by Govt to highest overall priorities
Assurance of environmental outcome	poor	relies on greatly increased fees to provide incentives for improvement	relies on annual load limits in licences to protect 'bottom line' with fees providing ongoing incentives for improvement

8. ADMINISTRATIVE PROVISIONS

8.1 Cost-effective Calculation of Pollutant Loads

The essential prerequisite to any load based reporting or controlling of pollutant discharges is a reliable and cost-effective method of calculating discharge loads. The draft Regulation provides for the EPA to set out the acceptable methods in load calculation 'protocols'. The EPA has already released draft protocols for each industry proposed to be included in the Scheme under the draft Regulation, and is currently consulting with licence holders and other interested parties to ensure they meet the accuracy and cost-effectiveness criteria.

Each protocol will provide the specifications for discharge monitoring programs or (in most cases) the use of discharge factors to establish loads. Discharge factors are commonly used in North America and Europe to estimate discharges from sources where monitoring would be either ineffective or excessively expensive, or where discharges are sufficiently predictable for monitoring to be considered unnecessary.

As is discussed in section 10 below, the bulk of monitoring required of licensees by the EPA is currently required via licence conditions, as provided for in the Pollution Control Act. These requirements are not technically the subject of this RIS. The EPA is, however, using the protocol development program to help review and refine these requirements. The objective is to require an integrated program of monitoring and alternative discharge calculation techniques that will provide a clear picture of total discharges. In most cases, it is expected that the implementation of the draft Regulation will ensure that there will be no ongoing significant increases in licensees' monitoring or administration costs.

The Scheme is intended to focus resources automatically on the most significant sources of discharges. This will occur because the less accurate (and cheaper) techniques will include conservative margins of error. Since licensees will be able to choose between the techniques, they will tend to choose the more accurate methods for larger loads. This is because larger reductions in fees can be obtained for greater accuracy in estimating larger loads.

The draft Regulation also provides for the establishment of a Review Panel to provide advice to the EPA to advise the EPA on the current or desirable contents of the protocols. The Review Panel will also be able to recommend the development and use of specific discharge factors applicable to individual sites and/or pollution control devices. It is expected that refinement of load calculation methods will be continuous, in order to increase their accuracy or to reduce the cost of their application. The panel will comprise six people, including two representatives from industry, one from environment groups, an independent scientific expert appointed by the EPA and two senior EPA officers. The panel has been proposed as a method of ensuring efficient, equitable and accountable access to maintenance of the protocols for all interested parties.

The EPA is also working closely with the Commonwealth to ensure that the LBL protocols are consistent with the emerging requirements of the National Pollutant Inventory (NPI)[29]. This will ensure that duplication is avoided for NSW licensees (that is, LBL returns will be combined with NPI returns so that only one return is required). The EPA also intends to work with the Commonwealth to develop and maintain a database of discharge factors suitable for Australian conditions.

8.2 The Register of Licences and Loads

The current Regulation includes provisions requiring that the EPA maintain a register of key licence particulars (cl. 44). This continues in the draft Regulation. The specified details form an essential record of licensed discharges and fees paid.

The Register will include reported certified pollutant loads advised to the EPA as a component of fee calculations. Based on overseas experience, the requirement to calculate and report on pollutant loads is expected to provide a strong additional incentive for licensees to reduce their discharges. Public disclosure of these details is consistent with the Government's commitment to 'Community Right to Know'.

8.3 Payment Administration

The calculation and reporting of pollutant loads is administratively complex and therefore potentially expensive. The EPA is committed to minimising administrative costs—both its own and those imposed on industry. The draft Regulation has therefore been structured to provide for only one payment a year, notwithstanding the significant one-off revenue losses imposed on the Government. The loss arises because (compared with the current system of payment in advance of the start of each licence) load fees are to be paid 60 days in arrears of the end of the licence period (some 15 months later).

In order to keep to one transaction a year, the administrative fee for each year must therefore be paid at the same time as the load fee for the previous year. This creates an additional one-off lag in payments of 90 days. The Government intends that both these lags should help licensees by providing adequate time to budget for any fee increases.

In order to improve its service to licensees, the EPA is currently preparing a new licence administration database. This will automate large parts of licence processing and will also provide customised documentation to help each licensee. The EPA is also investigating use of the internet for communication with licensees.

[29] The NPI is being developed as a 'measure' by the National Environment Protection Council (NEPC). It will involve the reporting of the loads of harmful discharges by all sources above a minimum size threshold. Most licensed industries are expected to exceed the threshold and will therefore have obligations under both schemes.

8.4 Enforcement Arrangements

Administration of the draft Regulation will be integrated with licensing. The system will be a continuation of the current system of audited self-monitoring and certification by licence holders. Load calculations will be required under the licence to be accompanied by a certified compliance declaration completed by the licensee or (in the case of a corporation) an approved senior officer of the licensee. False declarations will be considered a breach of licence conditions, for which both licensees and any approved signatories could currently, under the Pollution Control Act, be subject to penalties of up to $60,000 for individuals and $125,000 for corporations. Penalties are in addition to the requirement to repay any evaded fees.

The existing penalties for a false declaration by a licensee will continue, and the EPA's compliance audit program will be extended to include scrutiny of load calculations and returns. This will include various manual and computerised checks on returns received, random audits of licensees' records and full audits of licensees' compliance with all load calculation, reporting and payment obligations.

8.5 Penalty Provisions

Interest-based penalties for non-payment of fees are provided in the draft Regulation. These ensure that the State and other licensees are not disadvantaged by late payment of fees. This approach is consistent with the current overhaul of State fees and charges.

Where non-payment could affect the validity of licences, more significant penalties are provided in the draft Regulation for late licence renewal applications. These continue the current penalty arrangements, which have proved effective in ensuring that licences are renewed in a timely manner as required by the legislation. The EPA believes that these penalties are desirable because they help licensees avoid the more serious penalties prescribed in the legislation for operating without a licence.

9. OTHER PROVISIONS OF THE DRAFT REGULATION

9.1 Approval Fees

Fees for pollution control approval applications are currently based on the estimated cost of the proposed works. No structural change to the current scheme is proposed, because the whole system of Pollution Control Approvals will be significantly altered by the proposed implementation of amendment of the Environmental Planning and Assessment Act and commencement of the Protection of the Environment Operations Act. These changes mean that the current system is unlikely to be in force for long.

The scale of approval fees was last modified in 1985. Current total fees received for approvals are approximately $600,000 a year at an average rate of $917 per approval. In reviewing these fees, the EPA has sought to develop a fee schedule based on the principle of full cost recovery for completing the minimum procedures required of the EPA by the legislation.

Minimum Fee
The current minimum fee of $100 is less than minimum cost for the EPA to perform the minimum checks and activities required by the legislation, which is approximately $200. The fee schedule therefore proposes a new minimum fee of $200.

Maximum Fee
The maximum fee for an approval is currently $25,000 for works costing $88m and above. When this fee rate was first set, very few projects fell into this category. Over time, inflation and an increase in the size of the largest projects has resulted in two problems with the current maximum fee rate:

1. The current threshold of the maximum fee level results in inequitable treatment among projects above the threshold. Projects costing $100m and $200m pay the same rate. It is therefore proposed to increase the new maximum threshold to >$200m.

2. The very largest projects require lengthy and complex investigation, EIS assessment and negotiation of all pollution control requirements, dealing with public inquiries and (frequently) input to a Commission of Inquiry. The average cost of processing approvals for the largest projects is approximately $45,000. This amount is therefore proposed as the new maximum fee.

Fees Between Minimum and Maximum Fees
The intention of the current Regulation was that the fees for approval applications would increase in proportion to the expected cost of works. A stepped scale, introduced in 1985, has continued unchanged up to now. A minor change to the current scale is proposed, to provide for a smoother and therefore fairer increase in fees over the range. The options that have been considered include:

a fully proportional scale, or

a smoother proportional scale

The main drawback with a fully proportional system is that it is very hard to predict accurately the final costs of a development, and hence the correct fee, before work has started. This was the justification for the original incremental system, whereby it is more likely that actual costs fall within the predicted band of the approval scale. A fully proportional system has been used in Victoria, and there have been some problems of this type. The Victorian Auditor-General criticised the Victorian EPA, as it could not prove an applicant had paid the correct fee because the cost of works could not be precisely determined in advance. Consequently, the smoothing of the current proportional scale is recommended.

The proposed new fee scale incorporates the proposed new minimum and maximum fees as described above, and avoids the unfair large incremental steps in the current scale. The wording of the proposed new fee scale also removes current ambiguity regarding fee increments in the current Regulation.

The table below compares the current with the proposed fees, based on the set of approval applications received in the last 12 months. The table shows that the increases in fees are not large when considered in relation to the costs of the projects to which they relate.

Range of Cost of Works	**Number of Approvals**	**Total Fees Under Current Schedule** **$**	**Total Fees Payable Under Proposed Schedule** **$**	**Average Increase per Proposal** **$**
up to $0.4m	492	85,213	145,000	123
$0.4m–$2m	90	86,779	124,275	417
$2m–$10m	47	136,174	198,750	1,331
$10m–$50m	16	151,675	211,200	3,720
$50m –$200m	3	62,500	100,800	12,767
> $200m	3	75,000	135,000	20,000
TOTAL	**651**	**597,341**	**915,025**	**488**

9.2 Time Allowed to Appeal Licence Conditions

The current Regulation provides for a maximum time limit of 21 days for appeals against licence conditions. This continues unchanged in the draft Regulation. There have been only a very small number of such appeals, and no indication that the existing time limit has prevented any successful appeals.

Although the default provision for appeals that applies under the Land and Environment Court Rules (Part 17; Rule 1) is 60 days, the shorter time period provided in the draft Regulation is considered appropriate because:

Certain decisions to modify licence conditions take effect only after the appeal period has ended (section 17D(6) of the Act). There is thus potential for continuation of environmental harm from the failure to comply with one or more disputed conditions of licence while an appeal is pending.

EPA licences currently last for only one year. Consequently, the longer the delay before an appeal is required to be made, the greater the chance that the licence will actually expire before the appeal is determined.

10. ELEMENTS OF LBL TO BE IMPLEMENTED VIA LICENSING

Some parts of the LBL Scheme will be implemented via a parallel reform of the way the EPA exercises its licensing powers. Although these elements do not strictly belong in this RIS, an outline is provided below to help stakeholders participate in the public consultation program.

10.1 Annual Discharge Load Limits

1. As discussed in section 4 above, one of the most significant elements of LBL is the shift from reliance on discharge concentration limits for controlling discharges to an explicit focus on controlling total pollutant loads discharged. To this end, annual pollutant load limits will be progressively inserted into licences. Although the exact procedure for negotiating and determining these limits remains to be finalised, the following outline is provided as a guide to the EPA's current proposals.

1. Load limits will be negotiated with individual licensees once their current loads are known. Generally this will be after the first annual LBL return has been submitted to the EPA. Consequently, load limits will not be inserted in most licences until licensees have operated for at least a year under LBL.

2. Existing concentration limit conditions in a licence will not be changed in response to the introduction of LBL until load limits become effective in the licence.

3. Load limits will apply to whole premises (that is, one collective limit for all quantifiable sources of discharge) and will be included in licences for each pollutant assessable under the LBL Scheme.

4. The table on the next page outlines proposed procedures for determining load limit values in each licence. Note that these procedures would apply only to premises included in the LBL Scheme. In the table, 'Applicant' means a person who is seeking to expand or establish a potentially polluting activity, and in consequence is seeking an expanded or new licence load discharge limit.

5. As outlined in the table, the EPA's primary criterion for determining appropriate load (or other) limit values for greenfield or expansion proposals will be ensuring that satisfactory environmental outcomes are achieved. These would typically be evaluated on the basis of likely contribution of proposed discharges to the attainment of ambient environmental goals. As required by section 17BA(2) Pollution Control Act, the EPA must have regard, among other things, to the 'practical measures that can be taken to prevent, control, abate or mitigate pollution'. Accordingly, reasonable practical abatement measures will be required of all applicants. These will be important to ensure that grossly inefficient operations do not monopolise discharge opportunities and hence opportunities for future development activities.

Procedure for determining load limits

Situation of licensee/applicant	EPA Procedure
Case #1 Licensee's current Pollution Control Licence includes concentration and/or volume limits and/or Licensee is subject to discharge concentration limits in Clean Air Regulation or Clean Waters Regulation 1972.	EPA will negotiate appropriate load limits with licensee after the first year of participation in LBL. Values will be set to prevent loads exceeding those resulting from proper and efficient operation of currently approved plant, equipment and activities. Limits will ensure that licence holders will be able to continue to conduct their activities in a manner that is allowed by or provided for in their current pollution control licence or approval(s). The EPA will, however, be seeking to prevent increases in loads compared with current levels, except where current levels are not representative of approved levels. This could be, for example where: drought conditions mean that recent discharges are less than would be likely in wetter years plants are operating at less than design capacity due to lulls in demand for their products a plant is not yet constructed or operating at approved ultimate capacity.
Case #2 Applicant has obtained Pollution Control Approval or (under proposed new Planning Laws) Integrated Development Consent	EPA will set load limits consistent with terms of the Approval and/or Integrated Consent, based on the same principles as outlined above for current licence holders.
Case #3 Applicant does not have Pollution Control Approval but has obtained Development Consent under current laws	EPA will apply current procedure of negotiating limits with the applicant having regard to the: contents of the EIS or other relevant documentation terms of the development consent potential impact of discharges practical means that could be employed to avoid impacts existence of any applicable overriding policy or economic mechanism to manage impacts in the particular receiving environment. Applicants will also be encouraged to investigate opportunities for offsetting arrangements[30].
Case #4 Applicant has yet to obtain Planning Consent or Pollution Control Approval	EPA will assess applications on their merits following existing or otherwise applicable procedures, including the criteria in Case #3. Offsets will also be encouraged as described above.

[30] For example, an applicant wanting to emit additional pollutant loads in an area where those pollutants are already likely to breach ambient environmental goals might be able to support environment improvement works at a nearby site to partly or wholly offset proposed new discharges.

6. In cases where caps or reductions in discharges are needed to achieve environmental goals, the EPA intends to pursue all available opportunities for cost- effective implementation, particularly through the use of discharge trading schemes. Specific plans to cap or reduce discharges of particular pollutants in particular areas or from particular sources might be advanced by the EPA. The EPA will publicly communicate its intention to prepare such plans and consult with all stakeholders as it prepares the plans. The EPA has already announced that it intends to investigate a cap and trading scheme for NO_x discharges in the greater MAQS area.

7. Stakeholders are reminded that discharge licence limits do not constitute property rights. Allowance of discharges is a privilege granted by the State to licence holders through their licences. This privilege ceases to exist at the expiry of a licence, and may be varied or revoked by the EPA at any time.

8. The EPA retains its right and intention to negotiate or require mandatory reductions in pollutant loads through PRPs, notices or licence conditions where consistent with its environmental objectives and obligations.

10.2 Role of Concentration Limits

Once load limits are implemented, concentration limits will have a lesser role to play. Their new role will be to prevent loads being emitted in ways that could cause localised hotspots in either time or space. In some cases, less strict limit values will be required for this new function.

Many of the economic and environmental benefits of the load based licensing approach will not be realised unless concentration limits are reformed. For example, a current air discharge concentration limit for a stack discharge might be set in the Clean Air Regulation at 200 $\mu g/m^3$. Historically, this limit will have implicitly required the use and operation of a particular abatement technology. This approach was originally based on the principle that emitters should implement all practicable measures to reduce discharges, based on the age and type of their plant.

The EPA has been shifting away from this approach towards a focus on environmental outcomes for a number of years. Under this new approach, discharges are controlled as necessary to achieve specific ambient conditions. Discharge control requirements might therefore be stricter or more lax than before, depending on the gap between current and desired ambient conditions in each case. They will also therefore vary from site to site and from time to time.

Under this outcome-based approach (to continue the example), the appropriate discharge concentration limit to protect against local hotspots will be a function of discharge concentration, discharge volume, stack height, meteorology, topography and ambient concentration. That is, in relation to any given ambient goal, a uniform limit in the draft Regulation could be too ‘strict’ for a small discharge volume or not ‘strict’ enough for a large discharge volume. Further, it does not allow for an optimal mix of abatement technology, dilution, dispersion and pollution avoidance. Fixed

uniform concentration limits are thus blunt and potentially inefficient instruments. Scarce environment protection resources could be directed away from maximum environmental benefit.

The following points outline the EPA's proposed approach to concentration limits to apply once the LBL Scheme is in place:

1. Existing concentration limits for any pollutant in any licence or Regulation as it applies to that licence will not be changed in response to the start of the LBL Scheme until an annual load limit has been inserted in the licence for that pollutant.

2. In general, once an annual load limit is in place for a pollutant in a licence, all *percentile* concentration limits will be deleted for that pollutant in that licence. This will not apply if there are no absolute or other maximum licence limits in the licence that will control the potential for acute impacts in time or space.

1. 3. Licensees may ask the EPA to change an existing absolute or three day geometric mean (3DGM) maximum concentration limit when negotiating the establishment of annual load limits. Changes to these limits will be considered only if applicants can demonstrate that proposals will pass a 'satisfactory ambient outcome' test. Passing this test will require that the change will not result in any additional failures to achieve ambient goals for the concentration of the pollutant in question in local receiving environments. For the purpose of the test, the EPA will rely on the following suites of ambient goals in descending order of preference:
   - ambient standards that have been formally adopted by the EPA
   - NEPM air quality goals and Water Quality Objectives (once adopted)
   - other relevant Australian ambient standards, having regard to emerging developments in international ambient standards.

   In addition, the EPA will agree to new absolute concentration limit(s) only where this will be consistent with its legal obligations in section 17BA(2) of the Pollution Control Act. See point (5) in section 10.1 above for further explanation of how this will apply.

4. Adoption of new limits as proposed in (3) could conflict with some existing regulatory structures (for example, Regulations). The Government has already announced its intention to reform these structures with the goal of maximising the efficiency of regulation without compromising environmental outcomes. For example, the EPA is currently bound by concentration standards and classifications contained in the Regulations.

   Two cases are considered:

   Where the EPA agrees to change an absolute concentration limit that is currently contained in a licence, the EPA can and will change the licence.

   Even if the EPA agrees that a change to an absolute concentration limit would pass the 'satisfactory ambient outcome' test, it does not have authority to change a

concentration limit sourced in the Clean Air Regulation or the Clean Waters Regulation. The EPA will, however, move to prepare amendments to eliminate the use of mandatory uniform concentration limits in Regulations as soon as they are no longer required.

5. As an alternative or in addition to the use of absolute concentration limits, the EPA will investigate the use of daily, weekly or seasonal load limits in cases where this might benefit the environment or benefit licensees without affecting ambient outcomes.

6. Through its model licence program, the EPA will progressively review the list of pollutants that should be the subject of absolute concentration limits for each industry. This will be to ensure a consistent approach across NSW, having regard to the types of environmental risks that are associated with each type of licensed activity or process.

10.3 Monitoring and Reporting Requirements in Licences

The implementation of the LBL Scheme with the draft Regulation includes a requirement for the EPA to issue Load Calculation Protocols that set out, amongst other things, the acceptable methods for calculating pollutant loads (see 8.1 above). In developing draft protocols, the EPA is reviewing and refining its discharge monitoring requirements for each industry. The objective is to require robust, cost-effective techniques that provide accurate discharge data for use in reviewing industry performance, checking compliance with licences and fee calculations and providing discharge information to the public.

In preparing the Protocols, considerable negotiation is currently taking place with licence holders. The aim of the negotiation is to develop a set of monitoring requirements that is accurate and consistent between industries, while sufficiently flexible to recognise the range of circumstances applicable in each industry. The negotiations include recognition of agreements recently made with licensees regarding monitoring, such as have occurred in the application of model licences.

The EPA intends to progressively amend licences so that monitoring requirements are generally consistent with the monitoring requirements in LBL protocols. Amendments will be negotiated with licence holders at the time when a licence commences under the LBL Scheme.

In exceptional circumstances, revised discharge monitoring requirements in licences might be inconsistent with Protocol requirements due to the particular circumstances of a licensed activity. For example, a special investigative program could be required for a particular licence, or a premise might be located in a particularly sensitive receiving environment, or could have unique discharge characteristics.

10.4 Possible Shift to Common Period Reporting

At present, licences must be renewed each year. In renewing the licence, the EPA is legally obliged to reconsider the circumstances of each licence. Although the expiring licence forms the basis of the new licence, considerable resources are required to keep the licence conditions up to date. This means that it is currently in the EPA's interest to spread licence renewal dates across the year. The current practice ensures that work flow is spread over the year, and renewals are not delayed.

Under POEO, licences will no longer require renewal and the above difficulties will be avoided. Licences will remain valid until terminated, with a formal review of licence conditions occurring on a separate triennial timetable. There will still need to be an annual sequence, however, for the payment of fees and the submission of compliance certification and monitoring data where applicable. Since the processing of these returns will not hold up re-issue of licences, there could be merit in moving to a financial year or other common period reporting system.

Potential benefits include:

load data for every licence will be for common periods. This will mean, for example, that progress in reducing discharges over the years can be easily compared. It will also enable LBL data to match more easily the requirements of the National Pollutant Inventory.

calculation of load data will be easier for some licensees. This is because many discharge factors rely on operational data that is already collected in financial year periods (for example, quantity of material handled, fuel consumed, hours run). Continuation of the current system might require double counting of these statistics.

preparation of returns by licensees will be more likely to coincide with their own internal and external reporting cycles. Companies could be encouraged to juxtapose their pollution load data with their financial statistics in their shareholder and corporate annual reports. Co-preparation of EPA and other reports could also reduce costs for licensees.

load calculation protocols, standard licence conditions and licensing procedures would be simpler to maintain and easier for licensees to understand. Where changes are required, these would apply for all licence holders on the same day. With mixed renewal dates changes occur progressively through the year, meaning that inconsistent requirements coexist.

The views of stakeholders are sought regarding this possible change. It is noted that the *Pollution Control Amendment (Load Based Licensing) Act 1997* contains provision (section 17E(2)) to enable the Minister to make a Regulation in the future to enable the move to financial year licensing if desired.

APPENDIX A: SUMMARY OF RESPONSES TO DRAFT OPERATIONAL

3650 copies of the Draft Operational Plan were distributed seeking comment as follows:

Numbers of People Receiving Draft Plan	
Licensees	2,500
Posted after phone inquiries	800
Distributed at workshops	250
Minister's office	100
TOTAL	**3,650**

9 regional workshops were held to outline the contents of the plan, and to seek initial feedback. Attendance was as follows:

Location of Workshop	Numbers Attending	Location of Workshop	Numbers Attending
Newcastle	85	Sydney	131
Grafton	38	Wollongong	54
Tamworth	38	Queanbeyan	33
Wagga Wagga	59	Parramatta	131
Bathurst	41		
TOTAL			**610**

107 written submissions commenting on the Plan were received as shown.

Types of respondents	Number	Percentage
Licensees (excluding Councils)	51	48%
Licensees (Local Councils)	19	18%
Persons potentially subject to LBL	5	5%
Industry Representative Organisations	9	8%
Other Government Departments	9	8%
Environment Advocates	9	8%
Other	5	5%
TOTAL	**107**	**100%**

A total of 1411 requests to receive draft load estimation protocols have been received, as have 614 requests for draft Regulation and Regulatory Impact Statement.

Issues Raised in Submissions

Principles of the Scheme

The comments show a clear and consistent support for application of the principles underlying the Scheme. Concern about the possible level of fees was common. Many qualified their support until fees were known. There appeared to be little support for a 'no change' option.

	Agree	Not raised	**Disagree**
'It is desirable to apply the principle of 'polluter-pays' and use economic instruments such as pollution charges to reduce pollution in NSW'.	**63%**	29%	**8%**
'The same results could be achieved using the current method of licensing (i.e. no change is required)'.	**2%**	76%	**22%**
'It is difficult to make detailed comments, or endorse the Scheme when fee amounts and industry protocols are not available'.	**41%**	59%	**–**
'The Scheme needs more links to location-specific environmental goals, and recognition of the costs of achieving them'.	**25%**	75%	**–**
'The Scheme encourages innovative methods of environmental protection and better links to desired environmental outcomes'.	**21%**	77%	**2%**
'The EPA should focus more on non-licensed sources such as motor vehicles or agricultural runoff'.	**17%**	83%	**–**

Elements of the Scheme

Industry Targets	**Agree**	Not Raised	**Disagree**
'The principle of setting short and long term targets for each industry is supported'.	**8%**	91%	**1%**
'Each licensee should pay the same fee for the same discharges'.	**16%**	84%	**–**
'The discharge targets in the plan are unrealistic, not achievable or require unreasonable capital outlays in the short and/or long term'.	**39%**	60%	**1%**
'The target setting process requires further scientific justification'.	**40%**	60%	**–**
'The meanings of 'short' and 'long' term are not clearly defined'.	**5%**	95%	**–**

Load Calculation Protocols	**Agree**	Not raised	**Disagree**
'There will be difficulties in accurately calculating pollutant loads in practice (that is, respondents raised specific matters)'.	**13%**	87%	**–**

Pollutant Weightings	**Agree**	Not Raised	**Disagree**
'It is a good idea that pollutants should be weighted to reflect their different harmfulness'.	**8%**	92%	**–**
'Some of the pollutant weightings should be changed (i.e. respondents raised specific matters)'.	**26%**	74%	**–**
'Further scientific justification of the weightings is required'.	**20%**	80%	**–**

Pollutant Critical Zones	**Agree**	Not Raised	**Disagree**
'The fee system should recognise that the harm caused by discharges varies in different environments'.	**16%**	84%	**–**
'Pollutant critical zones as proposed are not sensitive enough to reflect variations in environmental conditions across a region'.	**11%**	89%	**–**
'The zones could encourage industry simply to relocate discharges instead of reducing them, and this could have undesirable economic or environmental consequences'.	**4%**	96%	**–**

Rebates for Pollution Reduction Programs	**Agree**	Not Raised	**Disagree**
'More information is needed about how rebates will work'.	**13%**	87%	**–**
'Rebates should recognise PRPs already in progress'.	**3%**	97%	**–**

Manner of Discharge Discounts (load weighting)	**Agree**	Not Raised	**Disagree**
'Discounts for effluent re-use could potentially encourage mere transfer of environmental problems from water to land'.	**11%**	88%	**1%**
'Discounts should be provided for tall stacks'.	**5%**	95%	**–**

Review Panel	**Agree**	Not Raised	**Disagree**
'Industry's representation on the panel should be increased'.	**8%**	92%	**–**
'The method for selecting panel members needs to be further specified and should be transparent'.	**3%**	97%	**–**

Administrative Arrangements	**Agree**	Not Raised	**Disagree**
'The fee calculation formula is too complex'.	**11%**	89%	**–**

Impacts and Costs

Impact on Industry	**Agree**	Not Raised	**Disagree**
'There is a need for detailed assessment of the economic impact of the Scheme on licensees'.	**23%**	77%	**–**
'The Scheme could put NSW businesses at a serious disadvantage compared with interstate or overseas competitors'.	**17%**	83%	**–**
'The Scheme could drive industry away from NSW to other jurisdictions'.	**6%**	94%	**–**

Fee Revenues	**Agree**	Not Raised	**Disagree**
'Monies collected should not go to the consolidated fund. They should be allocated to specific environmental purposes'.	**21%**	79%	**–**
'Total revenue from license fees should not increase'.	**19%**	81%	**–**

Licence Administration Fees	**Agree**	Not Raised	**Disagree**
'Administrative fees are arbitrarily determined and should be linked to service provided'.	**17%**	83%	**–**
'The administrative component of the fees should be minimised'.	**21%**	79%	**–**

Timing of implementation

	Agree	Not Raised	**Disagree**
'The implementation date of November 1996 is too early, especially because it may require extra payments within the current budget cycle'.	**10%**	90%	**–**
'The transition period is not long enough for the development of new discharge-reducing technologies'.	**5%**	92%	**3%**

Consultation process

Impact on Industry	**Agree**	Not Raised	**Disagree**
'The consultation process to date has been appreciated and worthwhile'.	**40%**	53%	**7%**
'More groups needed to be involved earlier in the consultation period'.	**15%**	85%	**–**
'More consultation is required than is currently planned'.	**33%**	67%	**–**

Other

	Agree	Not Raised	**Disagree**
'I require clarification of specific matter(s)…'.	**72%**	28%	**NA**

APPENDIX B: COSTS OF ENVIRONMENTAL DAMAGE (FINE PARTICULATES)

There is a range of potential cost impacts associated with fine particulate discharges. Considered below are costs associated with increased mortality, morbidity and reduced visibility arising from fine particulate pollution.

Benefits from reducing fine particulate pollution—health effects

Fine particulates up to 10 microns in diameter (PM_{10}) are inhalable and penetrate deeply into the lungs, where they can cause respiratory problems or be absorbed into the bloodstream. The threshold at which health effects occur is not well established. The Department of Energy and Minerals (1993) reports that recent epidemiological studies in the United States show a consistent association between particulate matter and health effects across the entire range of measured particulate levels. Consequently the study assumes that there is no safe minimum level for the health effects of fine particulates.

The 1992 Metropolitan Air Quality Study (1992) estimated a total particulate load of 100 000 tonnes from all sources in the Sydney, Hunter and Illawarra area. Based on available data it is conservatively assumed for this analysis that approximately 40 000 tonnes of this comprises PM_{10}. The mean ambient PM_{10} loading for the greater Sydney region (incorporating the Sydney, Illawarra, and Hunter regions) is approximately 23 $\mu g/m^3$ (NSW EPA 1995). Assuming a linear relationship between changes in total pollutant load and ambient conditions at the margin, then a one-tonne reduction in fine particulate loading represents a 0.000875 $\mu g/m^3$ reduction in mean ambient fine particulate loading in the Sydney region. It is assumed below that for locations outside the Sydney, Hunter and Illawarra regions, conditions are such that ambient loadings are negligible, and a one tonne reduction in fine particulate loadings has no effect on ambient levels of fine particles.

Based on the studies by Schwartz and Dockery (1992 a,b) and Schwartz (1991), the Department of Energy and Minerals study adopts a mortality effect of 0.775 deaths per 100 000 for each 1 $\mu g/m^3$ increase in average annual PM_{10}. Ambient fine particulate conditions in the greater Sydney area are lower than most cities and significantly lower than United States EPA and Californian guidelines (NSW EPA 1995). Given this, it would be expected that the majority of health impacts would occur among those most sensitive to air pollution—those with respiratory illnesses such as asthma or bronchitis. The National Health Survey conducted by the Australian Bureau of Statistics (ABS) in 1989–90 estimated that 34.4 out of every 1000 people have bronchitis and 81.5 out of every 1000 people have asthma. Allowing for some overlap between the groups, approximately 10% of the population could then be expected to be affected by fine particulate and other air pollution.

With a population of approximately 4.6 million residing in the Sydney, Hunter and Illawarra regions, approximately 460 000 people will be affected by fine particulate pollution. Given an affected population of this size, then each 1 $\mu g/m^3$ increase in annual average PM_{10} would result in 3.6 statistical deaths annually in the Sydney,

Hunter and Illawarra area. This estimate appears conservative, given the findings of a recent NSW Health study, which concluded that there are over 400 deaths in Sydney each year directly attributable for fine particulate pollution

Using the results of Kniesner and Leeth (1991) for the statistical value of life ($5.7 million in 1996) and the Schwartz and Dockery mortality rates, the mortality cost of fine particulate pollution is $20.4 million for each 1 $\mu g/m^3$ increase in annual average PM_{10}. This equates to $11,684 per tonne of fine particulate discharges. The estimated cost in other regions is assumed to be zero for fine particulate pollution.

Morbidity effects of particulate pollution are measured in terms of 'restricted activity days' (RADs). Based on US studies, the Department of Energy and Minerals (1993) estimates that fine particulate pollution causes an additional 5690 RADs per 100 000 people for each average annual change in PM_{10} of 1 ug/m^3. Given an average daily wage in NSW of $115 (ABS 1996 NSW Yearbook), and assuming that the average daily wage is an appropriate estimate of the cost of a RAD, this amounts to a cost of $650,000 per 100 000 people for each average annual change in ambient levels of PM_{10} of 1 ug/m^3. Note that this value is believed to understate significantly the actual cost of morbidity, because it ignores the health treatment costs of morbidity and subjective individual losses. Given the affected population described above, this amounts to a morbidity benefit in the greater Sydney region of $1,731 per tonne of avoided fine particulate discharges.

The total estimated health benefits (that is, mortality + morbidity) from a one-tonne reduction in fine particulate discharges is therefore $13,415 per tonne.

Benefits from reducing fine particulate pollution—visibility

Fine particles in the atmosphere affect visibility, typically causing haze events. Estimates of willingness to pay for a one per cent change in annual average visual range in US studies range from A$1.80 to A$2.40 per household (Department of Energy and Minerals 1993).

Citing Joynt (1988), the Department of Energy and Minerals (1993) notes that one relationship between visual range and fine particulate levels that has been widely used is:

$$V = 1{,}786/P$$

where V = Visual range (km) and

P = Airborne fine particulate matter ($\mu g/m^3$).

Visual effects of fine particulate pollution would be expected to affect all households in affected regions. There are approximately 1.7 million households in the greater Sydney region. Given ambient particle levels as discussed above, and the average of the willingness to pay values above, the benefits of fine particulate discharge reductions are approximately $6,600 per tonne. Because there is assumed to be no change in ambient conditions in the rest of the State, the willingness to pay elsewhere is zero.

Combining the visibility and health benefits of reducing the fine particulate pollution results in a total estimated benefit of $20,015 per tonne of avoided fine particulate discharges.

APPENDIX C: SUMMARY OF POLLUTION CHARGING SCHEMES IN OTHER JURISDICTIONS

Country	Air	Water	Comments
Argentina [d),(n)]		Y	First introduced effluent discharge fees in 1980.
Austria [d),(i)]	Y		Discharge charges for major air sources
Belguim [d),(f),(k)]	Y	Y	A suite of 'eco-taxes' was introduced in 1993.
Brazil [d),(h)]		Y	Effluent charges for BOD and heavy metals discharged. Rebates apply to firms that prove that they are cleaner than average.
Bulgaria [a]		Y	Wastewater discharge fee
Canada (BC) [f),(i)]	Y	Y	Broad-based charging scheme
Chile [d]	Y		Also uses tradeable permits to control air pollution in Santiago
China [o]	Y	Y	Levy system on air and water for over 15 years. See case study in section 7.
Columbia [h]	Y	Y	Air and water discharge charges have been set since 1982 with a new environmental law starting in 1993.
Czech Republic [a]	Y	Y	Since 1992 air charges have applied to discharges of particulates, SO_x, NO_x, and CO per tonne discharged.
Denmark [d),(g),(i)]	Y	Y	Carbon taxes have been operational since 1992.
Estonia [b),(f)]	Y	Y	Combined with waste charges, up to 50 pollutants are assessable.
Finland [d),(g),(i)]	Y	Y	Carbon taxes since 1990. Effluent charges include Nitrogen and Phosphorus.
France [b),(d),(f),(g),(i),(k)]	Y	Y	France has imposed sulfur tax since 1985. Charges also apply to NO_x, H_2S, and HCl by 1996. Water effluent charges apply to salinity, toxicity, N, P, hydrocarbons, toxic and other metals.
Germany [b),(d),(i),(k)]	Y	Y	East Germany established an air discharge charge covering 113 different air pollutants. Water effluent scheme for all Germany includes a wide range of pollutants and all sources, with discounts for achieving best practice.
Greece [d]		Y	· Discharge charges
Iceland [d]		Y	· Discharge charges
Ireland [d]		Y	· Discharge charges
Italy [d),(k)]		Y	· Discharge charges
Japan [d),(f)(k)]	Y	Y	Pollution tax on stationary and mobile sources of air pollution. SO_x charge on actual discharges to provide health damage compensation. Levies on heavy metal water pollution
Korea [d),(n)]	Y	Y	Environmental Quality Improvement Charge introduced in 1991.
Latvia [b]	Y	Y	· Charges apply to non-toxic dust, SO_2, NO_x.
Lithuania [b]	Y	Y	47 pollutants are included in scheme. 5 times rate of charge is applied if standard is exceeded.
Malaysia [n]		Y	Fee for palm oil industry discharges. Effluent control is effected through a system of licensing, discharge standards and fees.
Mexico [d),(n)]		Y	Water discharge fees apply for discharges of COD, SS, volume. No charge applies if concentration standards are met.
New Zealand [d]		Y	Discharge charges
Norway [d),(g),(i)]	Y	Y	Sulfur taxes and carbon taxes (since 1991).
Poland [a),(b),(f),(h)]	Y	Y	Extensive air and water charges have been in place since the 1970s. About 30 categories of pollutants are charged, including SO_x and NO_x. Water charges include BOD/COD.
Portugal [d),(f),(k)]	Y	Y	Discharge charges for SO_x, NO_x, and VOCs.
Romania [a]		Y	Effluent charge on wastewater since 1991 for suspended substances and oxygen consuming substances.
Russia [f),(i)]	Y	Y	300 air substances and 150 water substances regulated, gradually introduced since 1988.
Slovak Republic [a]	Y	Y	Large and medium sources are charged for discharges of particulates, SO_x, and CO since 1992.
Slovenia [a]		Y	Slovenia has had a waste water discharge charge since 1976.
Spain [d),(f),(k)]		Y	Water effluent charges

Country	Air	Water	Comments
Sweden [b],[d],[f],[g],[k]	Y		Carbon taxes introduced 1991 with imposition of VAT on energy. Also, sulfur taxes on oil, coal and peat. Discharge charges (SO_x, NO_x)
Switzerland [d]		Y	Plans to introduce charges on VOCs and a CO_2 tax.
Taiwan [d]	Y		Pollution tax, or air pollution prevention fee (includes surtax on petroleum products and discharge charge on stationary sources of air pollution)
Thailand [d]		Y	Licence and fee payment required for discharge of effluent.
The Netherlands [d],[f],[g],[i],[k]	Y	Y	Carbon taxes since 1980, water effluent charges on BOD, COD.
Turkey [d]		Y	· Wastewater charges apply
UK [d],[k]	Y	Y	Wastewater charges apply
US [a],[d],[f]	Y	Y	Mass-based air discharge fees are applied in some States with trading schemes also increasing in use.

References to Pollution Charging Schemes in Other Jurisdictions

[a] REC (Regional Environment Centre) 1994, *Use of Economic Instruments in Environmental Policy in Central and Eastern Europe: Case Studies for Bulgaria, the Czech Republic, Hungary, Poland, Romania, the Slovak Republic, and Slovenia*, REC for Central and Eastern Europe, Budapest, Hungary.

[b] REC (Regional Environment Centre) 1994, *Environmental Taxation: A Review of OECD Country Experience and Prospects for Economies in Transition* , REC for Central and Eastern Europe, REC Paper series, Number 1 Budapest, Hungary.

[c] Morris, D. 1994, *Green Taxes*, Institute for Local Self-Reliance, Washington.

[d] OECD 1994 (c), *Managing the Environment: The Role of Economic instruments*, Organisation for Economic Cooperation and Development, Paris.

[e] OECD 1994 (b), *Environment and Taxation: The Cases of the Netherlands, Sweden and the United States*, OECD Documents, Organisation for Economic Cooperation and Development, Paris.

[f] *OECD* 1994 (c), *Managing the Environment: The Role of Economic instruments*, Organisation for Economic Cooperation and Development, Paris.

[g] OECD 1995, *Environmental Taxes in OECD Countries,* Organisation for Economic Cooperation and Development, Paris.

[h] OECD 1996, *Implementation Strategies for Environmental Taxes,* Organisation for Economic Cooperation and Development, Paris.

[i] OECD 1996, *Environmental Taxes: Implementation and Environmental Effectiveness*, Environmental Economic Series, No.1, Organisation for Economic Cooperation and Development, Copenhagen, Paris.

[j] SCAQMD (South Coast Air Quality Management District) 1997, *District Regulation III – Fees, Rule 301–Permit Fees,* California.

[k] USEPA 1992, *The United States Experience with Economic Incentives to Control Environmental Pollution*, USEPA Environmental Planning and Evaluation, Washington, DC.

[l] Von Amsberg, J. 1995, *Selected Experiences with the Use of Economic Instruments for Pollution Control in non-OECD Countries,* World Bank, Washington.

[m] Waste Management Permit Fees Regulation, Waste Management Act, B.C.Reg.299/92.

[n] Winter, G. 1994, *German Environmental Law: Basic Texts and Introduction*, International Environmental Law and Policy Series, Volume 28, Martinus Nijhoff/Graham & Trotman, London.

[o] China National Environmental Protection Agency/Chinese Research Academy of Environmental Sciences 1977, *Study on Design and Implementation of China's Pollution Levy System*, China National Environmental Protection Agency/Chinese Research Academy of Environmental Sciences, Beijing.

APPENDIX D: SUMMARY OF IMPACTS OF ASSESSABLE POLLUTANTS

Assessable Air Pollutants	Potential Negative Impacts
Nitrogen oxides	• Causes significant damage to human respiratory tract, leading to increased susceptibility to and severity of respiratory infections and asthma at high concentrations. • Plant damage. • Contributes to acidification and ozone formation (see effects of ozone under VOCs).
Fine particulates	• Increased rates of respiratory illnesses and symptoms. • Increased mortality from lung and heart disease at current levels measured in Sydney. • Reduction in local visual distance.
Coarse particulates	• Increased rates of respiratory illnesses and symptoms when associated with fine particles. • Adverse effects on crop production. • Property damage/deterioration.
Sulfur oxides	• Attacks human respiratory tract leading to irritation, aggravation of pre-existing inflammatory conditions (for example, chronic bronchitis or emphysema) and increased susceptibility to respiratory tract infections. • Contributes to acidification. • Acrid odour.
Fluorides (airborne)	• Persistent exposure to low concentrations can produce chronic nasal irritation, leading to recurrent nose bleeds or chronic sinusitis (although concentrations causing these impacts are generally never experienced in Australia). • Some native plant and crop species are sensitive to fluoride.
Hydrogen sulfide	• Unpleasant odour, even at very low concentrations. • Will cause irritation to human tissues at levels well above the odour threshold.
VOCs	• Some VOCs are human carcinogens, such as benzene, others such as toluene can cause dysfunction of the central nervous system at high concentrations. • Contributes to ozone concentrations – ozone is produced from reaction between VOCs and nitrogen oxides. Highly irritating to mucous membranes, principally in lungs but can also cause eye and throat irritation and nasal congestion. A single exposure to ozone can have adverse affects. It also causes damage to materials such as rubber.
Benzene	• Carcinogenic in humans.
Polycyclic aromatic hydrocarbons (PAH)	• Of the several hundred PAHs, benzo(a)pyrene is the best known and regarded as an index of general PAH mixtures; several of these PAHs, including benzo(a)pyrene, are strongly suspected to be human carcinogens.
Arsenic	• Even very low level exposure associated with increased risk of lung cancer.

Assessable Water Pollutants	Potential Negative Impacts
Salinity	• High levels of salinity render water unfit for consumption by humans and animals. • Reduces crop yields and affects sensitive flora and fauna. • Causes damage to industrial and agricultural equipment.
Suspended solids	• Reduces the penetration of sunlight through water, limiting biological activity of aquatic organisms, smothers bottom dwelling organisms and clogs the gills of fish. • High levels can make water unsuitable for a range of human uses and environmental needs.
Biochemical oxygen demand (BOD)	• Reduced availability of oxygen in water increases environmental stress on most organisms and in extreme cases will cause death.
Chromium	• Causes digestive tract cancers via drinking water. • When irrigated, even low levels can reduce crop yields. • Bio-accumulates in aquatic organisms.
Copper	• Adds unpleasant taste to drinking water. • Causes staining of laundry and plumbing fixtures.
Selenium	• Can cause gastrointestinal disturbance, discolouration of the skin and harm teeth in high doses in drinking water. • Toxic to animals at high doses.
Cyanide	• Lethal above 50–60 mg per person; also kills other species.
Zinc	• Adds unpleasant astringent taste in drinking water. • High levels toxic to plants and microorganisms.
Phosphorus and nitrogen	• Excessive quantities promote algal and other plant growth, reducing the amount of oxygen available to other aquatic organisms. • Some algal blooms are toxic at high concentrations.
Oil and grease	• Surface slicks reduce sunlight penetration and reduce surface re-aeration of water. • Spoils water for recreational purposes. • At extreme concentrations, affects water birds which ingest it or whose plumage is coated with oil or grease.
Phenolics	• A group of substances, some proven human carcinogens, others suspected carcinogens.

Assessable Air and Water Pollutants	Potential Negative Impacts
Lead	• Effects at higher concentrations include chronic renal disease, chronic anaemia and neurological disorders. • Low level exposure can impair neurological, intellectual and psychological functioning in young children and other immature mammals.
Mercury	• Toxic effects in humans, occurring mainly on the nervous system, leading to degenerative conditions such as tremor and psychological abnormalities at high concentrations.
Cadmium	• Produces toxic effects in humans, including acute irritation of the lungs and chronic kidney disease; classified a possible human carcinogen. • Toxic to animals and plants in low concentrations.

Source: Streeton (1990), NSW EPA (1995 a) NSW EPA (1996) and ANZECC (1992).

APPENDIX E: SUPPLEMENT ON DERIVATION OF POLLUTANT WEIGHTINGS

The methodology used to derive the pollutant weightings is explained in section 5.2. The details below are referenced in 5.2 and are provided as a supplement; see also the relevant international literature and standards[31].

Discussion of Impact Categories (See Step 1 in Section 5.2)

Human Toxicity

(a) *Water Pollutants*
For water pollutants, human toxicity was scored using maximum acceptable daily intake (ADI) from NHMRC (National Health and Medical Research Council) standards where possible. In cases where there is no set Australian value, values from the Dutch National Institute of Public Health and Environment Protection (RIVM) were used. The RIVM values were adopted because they are most commonly used in the Life Cycle Impact Assessment (LCIA) literature.

(b) *Air Pollutants*
For air pollutants, harmfulness was considered separately under the sub-criteria of acute, chronic and carcinogenic impact. As there are no complete data sources for these sub-criteria, the following sources were used (in decreasing order of preference):

- National Health and Medical Research Council (NHMRC)
- Australia and New Zealand Environment Conservation Council (ANZECC)
- World Health Organisation (WHO)
- Victorian Environment Protection Authority (VicEPA)
- California Air Pollution Control Officers Association (CAPCOA)

For acute and chronic impacts, harmfulness was assessed using the critical volume approach (that is, where the relative harmfulness is proportional to the inverse of the maximum desired concentration). The unit of toxicity is thus m^3 of polluted air/kg of substance. A maximum acceptable one-hour average concentration was used to score potential for acute impact, and a 3- or 12-month average was used for chronic impacts.

For carcinogenic impact the daily intake of each substance estimated to cause one additional death per million people was used to calculate relative harmfulness (using WHO data).

[31] National Re-use of Water Research Program (NOH) 1992 (a and b).

No relevant data could be obtained for exact weightings of the relative significance of the potential for acute, chronic or carcinogenic impacts. In order to reflect the very low potential for acute impacts from air discharges from licensed sources in NSW, the acute impact sub-category was weighted at 10% of the 'chronic' and 'carcinogenic' sub-categories.

Impacts associated with excessive ozone were considered separately under 'Oxidant Formation'.

Aquatic Toxicity

Assessment of substances with an ecotoxic effect in waters was based on the ANZECC guidelines for the protection of aquatic ecosystems, using the critical volume approach. The pollutants were considered separately for marine and other waters.

For salinity and total suspended solids, the ANZECC guidelines provide only a maximum desired percentage change, rather than maximum concentration values. In the case of suspended solids, therefore, an ambient goal was selected, based on current EPA licensing procedures; for salt, a value based on ANZECC economic use-values was adopted. Salt discharged to marine waters is not considered a pollutant in LBL. Since oils and greases vary widely in composition and toxicity, and in the absence of any aquatic protection guidelines, the ANZECC value for Total PAH was selected. The 1992 ANZECC guideline does not provide goals for maximum levels of organphosphate pesticides—best available information from work in progress was therefore used instead.

Nutrification

Using the LCA methodology, the contribution of pollutants to nutrification was determined by calculating their nutrification potentials (NP). These are a measure of the capacity to form biomass relative to phosphate (PO_4^{2-}). Biomass is based on the average composition of algae.

The other assumptions used to calculate NP were that:

- only substances containing nitrogen or phosphorus are considered to be nutrifying
- total N and Total P are based on atomic N and P
- one mole of biomass requires 138 moles of O_2 for degradation (which can be measured as chemical oxygen demand (COD)
- biological oxygen demand (BOD) is half of COD.

Consistent with best available information and current EPA licensing policy, phosphorus and BOD were not included in the weightings when discharged to marine waters.

Acidification

Acidification is the potential for acid deposition on to soil and into water. The acidification potential of pollutants was expressed as H^+ equivalents, compared with sulfur dioxide, as shown below.

$$AP_i = \frac{n_i / M_i}{n_{SO_2} / M_{SO_2}}$$

where v_i is the number of equivalent H^+ ions, M_i is the molecular weight of the substance compared with sulfur dioxide.

Oxidant Formation
The category 'oxidant formation' is used to describe photochemical ozone creation potential (POCP). The current LCA approach was not adopted for LBL, because it does not quantify NO_x, which extensive local studies have shown to be a critical contributor to ozone formation in NSW.

The relationship between NO_x and VOCs is complex, with each pollutant being the limiting input to ozone formation under different conditions. The relative weighting of 4:1 used in the weighting procedure was based on the EPA's expert judgement and on the best available scientific information.

Utility and Nuisance
The selected international LCA categories do not capture a number of impacts that are of significant concern to the community or that can cause significant economic loss. Principally these relate to diminished recreational and residential amenity and the economic use of fresh waters. In order to ensure that these impacts are adequately reflected in the pollutant weightings, the 'utility and nuisance' category was added. The selected values were based on the EPA's extensive experience in investigating and responding to such community concerns.

Expert Weightings of Impact Categories (See Step 4, Section 5.2)

Impact Category		**WEIGHT (Out of 100)**
AIR	60%	
Human toxicity	12.5%	7.5
Oxidant formation	45%	27
Acidification	10%	6
Visibility impairment	22.5%	13.5
Utility and nuisance	10%	6
OPEN COASTAL WATERS	10%	
Aquatic toxicity	35%	3.5
Nutrification	10%	1
Utility and nuisance	55%	5.5
ENCLOSED WATERS	30%	
Human toxicity	5%	1.5
Aquatic toxicity	5%	1.5
Nutrification	55%	16.5
Utility and nuisance	35%	10.5

Total	**100**	100

Summary Of Preliminary Pollutant Weightings (See Step 5, Section 5.2)

Water Pollutants—Discharged to Open Coastal Waters

Oils and grease	1.0%
Suspended solids	4.6%
Nitrogen	1.0%
Total phenolics	0.0%
Pesticides & PCBs	2.1%
Total (PAH)	0.0%
Total of metals	1.3%
	10%

Water Pollutants—Discharged to Enclosed Waters

BOD	0.1%
Oils and grease	1.4%
Phosphorus	14.5%
Salinity	2.6%
Suspended solids	6.6%
Nitrogen	2.0%
All others	2.9%
	30.0%

Air Pollutants

Coarse particulates	1.0%
Fine particulates	11.1%
Undifferentiated particulates	7.6%
Fluoride	0.8%
Hydrogen sulfide	0.6%
VOCs	5.3%
Nitrogen oxides	24.1%
Sulfur oxides	3.6%
Lead, mercury & arsenic	2.9%
Benzene	0.2%
Benzo(a)pyrene (equivalent)	2.9%
	60%

The values in the table above are the weightings for the total ‘parcel’ of load of each of the pollutants discharged from licensed sources. The ‘final’ pollutant weightings in Clause 14 of the draft Regulation have been calculated by dividing the values in the table by the estimated total loads, scaled and rounded to provide convenient working integers. See Step 6 in Section 5.2 for further explanation.

APPENDIX F: COSTS OF ADMINISTERING THE POLLUTION LICENSING SYSTEM

The table below shows the resources required by the EPA to fulfil its statutory obligations or to exercise its powers under the Pollution Control Acts as they relate to pollution licensing and licensed premises.

Costs shown include the relevant proportion of corporate and administration and capital costs for 1996–97 but do not include grants and subsidies or the Government costs such as inquiries or administration of the Minister's Office. Total of resources is $31.1m.

BRANCH	SUMMARY OF ACTIVITIES RELEVANT TO POLLUTION LICENSING	% ATTRIBUTABLE TO LICENSING	RESOURCES ALLOCATED TO LICENSING
REGULATION AND AUDIT	• Regulation Administration Unit—issues pollution control licenses and renewals; processes transfers, penalty letters and related requests; provides advice to the public. • Regulation Support Unit—coordination of the model licence program, development of operational policies and procedures, Regulation development, industry-specific technical advice. • Systems Unit—maintenance and support of the licensing computer system. • Compliance Audit—implements the compliance audit program, licence reviews and compliance inspections.	42%	$2,201,910
REGIONAL OPERATIONS	• Regional offices—conduct inspections, prepare and review licences, negotiate pollution reduction programs, respond to complaints and community issues, prepare prosecutions.	75%	$16,411,160
ECONOMICS AND ENVIRONMENTAL REPORTING	• Regulatory Innovation Section—evaluates and implements economic instruments and related regulatory efficiency measures, such as load based licensing, emission trading schemes and new tools such as cleaner production initiatives, EMS and LCIA. • Economic Evaluation Section—evaluates and reviews proposed guidelines and regulations from economic perspective; prepares Regulatory Impact Statements.	29%	$993,160

LEGAL SERVICES	• Conducts investigations and litigation, provides legal advice, reviews drafting of licenses and notices, reviews and proposes improvements for pollution control legislation and regulations.	58%	$2,115,170
EDUCATION AND COMMUNITY PROGRAMS	• Receives and forwards public enquires/complaints regarding the licensed premises, manages public communications and prepares publications relating to licensing issues, policy and guidelines.	9%	$433,690
ENVIRONMENTAL POLICY	• Air Policy Unit provides technical advice for regional staff related to licensing issues, pollution reduction programs, develops licensing policies and guidelines for air issues. • Noise Policy Unit—as for air (in relation to noise issues) • Waters and Catchments policy—as for air (in relation to air issues) • Policy review—coordinates policy development	18%	$3,521,790
ENVIRONMENTAL SCIENCE	• Air Quality Studies—collates air monitoring data from licensed premises, provides technical advice on monitoring matters to regional staff, develops scientific knowledge required for licensing policy development. • Ecotoxicity Testing—toxicity characterisation of effluents, tracing sources, advice and assistance to regions (for example, spills), field work and lab testing. • Laboratories—advice to regional staff, prosecution work, comments on chemicals and methods, comments and input to guidelines, sample analysis • Science Management and Support—advices on ecological risk assessments, coordinates scientific activities, provides advice to Regional staff and legal branch for prosecutions, contributes to guideline development. • Water Studies (includes Marine Waters Unit, Coastal Catchment and Inland Catchment Units)—develops protocols for detecting impacts of licensed discharges, provides technical advice for pollution reduction programs, undertakes studies to determine extent of environmental damage from licensed premises, provides scientific input for policy development.	29%	$5,481,260

GLOSSARY OF SPECIALISED TERMS

Polluter-pays principle: see section 2.5.

Tradeable permits: See section 4, ‘Option 5’.

Bubble: Where a number of discharge sources are nominally grouped, with discharge limits applying to the group as a whole rather than individually.

Internalisation: Where polluters are required to include pollution costs caused by their discharges in their normal financial operations and decisionmaking.

Point source: Individual place of discharge, such as a discharge pipe or a chimney stack.

Non-point source: Discharges arising from multiple activities over a broad area, for example, stormwater run-off.

Community Right to Know: Part of the Government’s policy platform whereby the community is entitled to have access to relevant information about pollution discharges.

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Also see references in Appendix C

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Protection of the Environment Operations Act 1997

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Draft Regulation
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