Final Report

Review of the National Pollutant Inventory

For the Department of the Environment and Heritage

In conjunction with CH Environmental and JD Court and Associates

April 2005

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Abbreviations

ABARE	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
ACSMA	Australian Chemical Specialties Manufacturers Association
AED	Aggregated Emissions Data
AFFA	Australian Government Department of Agriculture, Fisheries and Forestry
Agvets	Agricultural and Veterinary Chemicals
ANZIC	Australian and New Zealand Standard Industry Classification
APVMA	Australian Pesticides and Veterinary Medicines Authority (formerly NRA)
CDC	Centres for Disease Control and Prevention
DEH	Department of the Environment and Heritage
DNA	Designated National Authority
EPHC	Environment Protection and Heritage Council
ERIN	Environmental Resource and Information Network
FAO	Food and Agriculture Organisation of the United Nations
IWG	Implementation Working Group
MCA	Minerals Council of Australia
NEPC	The National Environment Protection Council
NEPM	National Environment Protection Measure
NGGI	National Greenhouse Gas Inventory
NHANES	National Health and Nutrition Examination Surveys
NICNAS	National Industrial Chemicals Notification and Assessment Scheme
NPI	National Pollutant Inventory (Australia)
NPRI	National Pollutant Release Inventory (Canada)
NRA	National Registration Authority for Agricultural and Veterinary Chemicals
NRS	National Registration Scheme for Agricultural and Veterinary Chemicals
OECD	Organisation for Economic Co-Operation and Development
PACIA	Plastics and Chemicals Institute of Australia
PER	Pollutant Emission Register (Netherlands)
PRTR	Pollutant Release and Transfer Register (OECD)
TAP	Technical Advisory Panel
TRI	Toxic Release Inventory
UNEP	United Nations Environment Programme
VOC	Volatile Organic Compound

Executive Summary

This review is the second review of the design and operation of the NPI since it came into effect in 1998. The earlier review by Professor Ian Rae occurred in the third reporting year and a further four years of operating experience have now been accumulated. The Rae review (2000) recommended a number of changes to the NPI, and while a number of these have been implemented, others cannot be given effect to without a variation to the NPI National Environment Protection Measure (NEPM).

The terms of reference for this review were established by the National Environment Protection Council to assist it in deciding whether, on the basis of some seven years of experience in the operation of the NPI, there is a case for initiating a variation of the NEPM.

In the request for tender, the Department of the Environment and Heritage specified the context within which the review should address the terms of reference so that this review also has looked in more depth at many NPI operational issues that provide the mechanism to achieve the overall goals and objectives of the NEPM.

In summary, this review assesses whether the NPI, as currently operating, is delivering all the benefits it might to jurisdictions, it targets areas where improvements can be made, examines operational issues, builds on earlier reviews, and considers international experience. These assessments were made through stakeholder consultation, consideration of other reviews of the NPI and critically assessing international state of knowledge and experience in operating Pollutant Release and Transfer Registers (PRTRs).

It is clear from this review, as it has been from previous reviews, that the NPI has delivered benefits to, and met the needs of a range of groups and provided information for a wide variety of purposes. The expectations for the NPI of the different groups are however quite different and depend on the specific uses for which data are required. To date, the NPI has satisfied many, but not all of the needs of most groups. The NPI does have potential to better meet these needs and deliver greater benefits to jurisdictions and their constituents than have ensued to date.

In order to achieve these will require either more efficient use of resources, a higher level of funding, or both. In this review, nothing has emerged to suggest any significant inefficiencies, and as with previous reviews, it is suggested that the level of funding needs to be higher than that of the last 4 years if substantial progress is to be made towards the longer term aim and higher benefits delivered.

This review found that the areas for priority attention are:

- The database systems which with improvements would facilitate greater and easier access to data,
- The resource material for industry and jurisdictions which would lead to greater consistency and higher data quality
- Data quality assurance programs which with improvements would increase confidence in the data leading to greater and wider variety of uses.
- Changes to NEPM parameters such as the inclusion of transfers and greenhouse gases would make the NPI more relevant and increase public awareness.
- Improvements in operational issues which would lead to more efficient and effective use of staff resources
- Public awareness programs which promote use of the NPI to a wider audience and better serve the community right to know objective.

The results of the review addressing the specific terms of reference are summarised below:

Term of Reference 1: Review the goals and objectives as set out in the NPI NEPM and recommend to the Environment Protection and Heritage Council whether they remain valid and relevant.

The available evidence indicates that the NPI goals and objectives remain relevant and appropriate for its current scope.

It would however be desirable to revise the way the goals and objectives are expressed to make it clearer that the main purpose of the NPI is as an instrument for collecting information to facilitate environmental decision making and for assessing environmental performance. Other purposes are of the NPI are meeting community right to know obligations and influencing cleaner production and waste minimisation. A suggested rewording of the goals and objectives is included.

There is a philosophical issue about the principal purpose of the NPI for the EPHC to resolve and to communicate their decision clearly. The decision for the EPHC is whether to continue to support the model of the NPI principally as an instrument of environmental management and performance assessment, or to consider it principally as a more general tool for raising public and industry awareness of emissions to our environment and the need for cleaner production and waste minimisation. The former requires a higher level of funding to generate high quality data and more extensive data sets than the latter, but its effectiveness increases over time and has much greater long term benefits. It appears to be the direction in which international systems are headed. The latter more general tool has lower data requirements, but is restricted in what it can achieve, and its effectiveness is likely to diminish over time. However, even countries such as the US and Norway that use the PRTR principally as an awareness raising instrument stress the importance of data quality (J Boshier, DEH, Personal Communication).

In relation to changing NEPM parameters and therefore modifications to the NPI NEPM goals and objectives, two key issues are the inclusion of transfers and greenhouse gases. The goal of influencing cleaner production and waste minimisation would at best be limited without the inclusion of waste transfers in the NPI, and this necessitates some minor changes to the existing wording. Including greenhouse would increase the NEPM profile and relevance, but there are other issues to consider such as integration with existing greenhouse gas reporting systems. The inclusion of greenhouse gases may also require consideration of a change of title of the NPI to National Emissions Inventory or similar.

Term of Reference 2: Assess the extent to which the goals and objectives are being met through the operation of the program and the use of the data, and whether the existing program is cost effective.

The specific goals and objectives of the NPI can be paraphrased as establishing a database that:

1. Provides information to facilitate policy formulation and decision making for environmental planning and management;
2. Contains information about emissions, sources, and location that is publicly accessible (community right to know); and
3. Promotes and facilitates waste minimisation and cleaner production

The overall evidence indicates that the first two objectives are being met. The database has been established and populated with relevant information, and is being used by governments, industry, research organisations, community organizations, financial institutions, and individuals for a range of purposes.

The third objective is not assessable at this point because there are multiple policy and regulatory influences on cleaner production decisions which cannot be apportioned without further information that is currently not available. The evidence from overseas is ambivalent but suggestive of a positive and quantifiable impact, thus the objective remains relevant.

A number of indicators suggest that the program has been cost effective.

The cost of the program to government was $2.3 million in 2003-2004. The cost per data base hit was less than $4 per hit, and the cost per unique database visitor was $37 per visit. These costs seem quite modest.

The cost to industry for reporting to the TRI in the US has been estimated at approximately US$15000 per facility, and costs to governments at approximately US $1300 per facility. The industry/government cost ratio is 11.5. The corresponding numbers for Australia are $3000, $640, and 4.7. In relative terms, the combined government industry expenditure for the NPI is estimated to be less than one fifth of the combined expenditure for the TRI which has a much narrower focus as it does not include emissions from diffuse sources.

In summary, the NPI appears to be cost effective, both comparatively, and in terms of providing a nationally needed system. Costs to industry seem reasonable. The costs to governments have been relatively low compared to the US, and benefits appear to exceed costs.

Increased expenditure for improving system access and increasing the effectiveness of the NPI in meeting its objectives appear to be warranted by the projected benefits to be achieved.

Term of Reference 3: Identify changes to the design parameters of the NPI NEPM that would improve the program's effectiveness in meeting its objectives or the broader priorities of jurisdictions, increase its efficiency and remove impediments to use of the data;

The program has been operating effectively in delivering benefits to jurisdictions and their constituents. However, available resources have not been sufficient to meet all needs and as a consequence a number of shortfalls in the NPI have been identified that that inhibit its ability to deliver greater benefits and achieve of its full potential. These are as follows:

Database Systems

The database systems are at risk of failure and require significant expenditure to provide confidence that they are sufficiently robust to support the present level of data traffic. This is a critical issue that adversely impacts a number of areas, including:

- Current and potential uses of the NPI
- NPI staff resource efficiencies
- Limitations in the ability to deliver information to the public and other users
- Ability to incorporate significant additions and changes to NEPM parameters

Resource Material and Data Quality

This is an area that has also been highlighted as an issue. Deficiencies are apparent in both the diffuse source estimates and in industry data. Many of these problems arise from the resource material (handbooks, manuals and guides) that were developed early in the NPI programme and have not, in the main, been updated to reflect seven years of valuable operational experience and newer emissions factors. Others arise from under resourcing in data validation and auditing.

While the bulk of the data are adequate, there are concerns about some which undermines the integrity of the system. Other areas where deficiencies are apparent include:

- Over reliant on American emission factors data
- Differences in interpretation and use of available information resources between jurisdictions and within industry
- Errors in data transfer arising from unclear protocols and mixtures of manual and automated reporting methods
- Suspected low capture rate of potential industry reporters, possibly around 50 % or higher of potential
- In many cases out of date diffuse source estimates and lack of uniform reporting of diffuse sources by jurisdictions.

The consequences of uncertainties with data quality include:

- Limitations in the usefulness of the data
- Lack of confidence in the data restricting the use of NPI by industry and by government agencies
- Potentially inappropriate application and erroneous conclusions in the use of NPI data by both expert and less expert data users.
- Limitations in its use for industry benchmarking or environmental priority setting.
- Reduced public confidence in the system

Public Awareness

Survey data indicates a generally low level of awareness and use of the NPI by the general community.

Possible reasons for the apparently low level of awareness include:

- Inadequate attention to and funding of awareness raising and marketing campaigns
- Complex presentation of data making it difficult for the general public to understand what it means for them
- Lack of information for relating emissions data to environmental standards, impacts and potential health implications
- Mistrust in the data by community activists which may lead to generally negative perceptions
- Limited capability to analyse the data
- The absence of greenhouse gas data and transfers

In relation to data presentation the needs of the general public and the more technical and policy users are quite different, and there is a case for two tiers of presentation. Current system capacity issues limit any substantial increases in database access.

Funding

There is a strong perception particularly within jurisdictions, but also by some industry and community groups, that the program has been under funded. DEH information indicates that annual expenditure over the last three years of the program has been half what was considered necessary by an independent assessment (ARTD, 2002) of resources needed (see table below). The shortage of resources has contributed to current system issues.

Summary of NPI Costs

Year	**2000-01**	**2001-02**	**2002-03**	**2003-04**	**2004-05****
Projected costs (ARTD, 2000)	**-**	**4.34**	**4.2**	**4.2**	**4.2*****
Total actual expenditure*	**3.2**	**2.2**	**2.3**	**2.5**	**2.5**
Commonwealth	3.2	1.2	1.5	1.5	1.5
States****	-	0.8	0.8	0.8	0.8

* Source Ministerial Budget Statements, 2000 –01 to 2004 –05

** Estimated

*** Assumed based on funding maintenance

**** Assumes matching of Commonwealth Expenditure. A number of jurisdictions believe that this underestimates state contributions significantly.

Parameter Changes

Three parameter changes are seen as important in improving the value of the NPI. These are the inclusion of greenhouse gases, transfers, and agricultural and veterinary chemicals. A number of other changes are of a relatively minor nature but will also contribute to its improvement.

The inclusion of greenhouse gases would increase the public profile of the NPI and its ability to meet community right to know obligations. However there are other processes that are exploring whether the NPI is the appropriate instrument for delivering greenhouse gas information and it is appropriate to make inclusion of greenhouse gases subject to the outcomes of these processes. Public reporting by industry is seen as an essential component of any reporting system by a number of jurisdictions.

The situation with agricultural and veterinary chemicals is similar to greenhouse. Deferring consideration pending the outcome of other processes is appropriate in this case.

Inclusion of transfer is seen as essential by a range of stakeholders if the NPI is to achieve its goal to promote cleaner production and waste minimization. Transfers should therefore be included in any NEPM variation process.

Term of Reference 4: Outline the costs of changes to the design parameters of the NPI NEPM against the benefits gained by the community, states and territories and other key stakeholders.

Costs of design changes are seen as minor in comparison to the costs of upgrading the database system and data deficiencies.

There are no hard data on which to make an assessment, but an indicative cost of changes (in the range of $0.8 to $1.0 million) is adequate for assessment purposes. By comparison, the cost of remedying database system and data deficiencies is in the order of $8 million over 4 years.

The benefits of changes cannot be quantified in numerical terms and cannot be easily separated out from the cost of the overall program. Benefits derive from the achievement of the objectives and remedying deficiencies will greatly improve the efficiency of the system and lead to large increases in benefits such as:

- Better and more efficient public access to relevant information
- Greater confidence in the data leading to increased use
- Increase in the potential uses of the data for environmental management, policy formulation and decision making
- Long-term benefits for jurisdictions in running environmental management programs
- Increased national consistency in information collection and use
- Increased relevance for existing and potential environmental accounting purposes such as financial market assessment of company value.

Additional benefits from design changes include increased public profile, improved ability to meet the NPI goals, and better alignment with international obligations.

RECOMMENDATIONS

The recommendations below are a consolidated list of the recommendations made in the report. They are reproduced here in three sections: those that recommend a variation to the NPI NEPM; those that support possible variations to NEPM clauses; and, those that relate to improving the operation of the NPI.

In the list of recommendations the report number refers to the number given to the recommendation in the body of the report. The priority assigned to each recommendation is based on the report authors' judgement. H = high priority, M = medium priority and L= low priority.

Recommendations Pertaining to Variations to NPI NEPM

Goals and Objectives	Number in report	Priority
That the EPHC undertake a review of the NEPM wording and structure to allow for recommended changes to the NEPM parameters and to reflect current policy requirements.	*1*	*H*
Transfers		
That Transfers be included in the NPI and that the NPI NEPM be varied accordingly with the following definitions: *An engineered landfill is a designed built and managed landfill incorporating placement of waste into lined discrete cells which are capped and isolated from the surrounding environment and from one another. Such a facility is purpose built and emissions to the environment are monitored and reported to NPI. The facility may be on the waste generator's land or be a separate facility.' All other landfills should be regarded as accepting material emitted to land.* *Transfers are the transfer of a substance to an identified receiving place whether in pure form or contained in other matter and whether solid liquid or gaseous. It includes transfers of a substance to a an engineered landfill, a sewage treatment plant or a tailings dam, and removal of a substance from a facility to an identified place for destruction, treatment, recycling, reprocessing recovery or purification.'*	*2*	*H*
That facilities be required to report transfers when the transfer methodology has been incorporated into the industry Emissions Estimation Technique manuals.	*6*	*H*
Greenhouse Gases		
That the NEPM variation process include the provision for including greenhouse emissions depending on the outcome of the Ministerial Council Process and the NPI trials.	*7*	*H*
That consideration be given to changing the name of the NPI to a National Emission Reporting Inventory or similar value neutral title.	*8*	*M*

Agricultural and Veterinary Chemicals

That the DEH provide an assessment of the capacity for the chemical use database program to provide public information on agvets to the EPHC.	*9*	*H*
That EPHC defer consideration of the of agvets in the NPI be pending the assessment.	*10*	

NPI Reporting Industries

That the provision requiring handbooks to be published before an industry reports to NPI be retained.	*11*	
That removal of the exemption of aquaculture from NPI be included in the variation process subject to further analysis.	*12*	*M*
That an industry specific threshold for mercury not be considered in the variation process.	*13*	*M*

Construction Industry

That NEPC defer further consideration on the inclusion of emissions from the construction industry pending the outcomes of the investigation into the relevancy of the current reporting thresholds to the industry.	*15*	*L*

Non anthropogenic sources

That emissions from non anthropogenic sources such as emissions from biogenic sources and wildfires be excluded from the main NPI database.	*16*	*M*

Specific substance list

That the Technical Advisory Panel be reconvened to review the substance lists taking into consideration recent international PRTR reviews, this review, and other relevant new information.	*19*	*M*
That the NPI NEPM be varied by adding the following clause after clause 3 *" When a facility is required to report on category 3 substance it shall also be required to report on the other category 3 substance whether or not the facility exceeds the threshold for the other category substance"*	*20*	*H*
That Schedule A, Clause 1 (f) be amended to read "the threshold for "Phenol" (CASR number 108-95-2) refers to the amount to the total amount of phenol used."	*21*	*M*
That Schedule A 1(d) be amended to read "the threshold for chlorine and compounds includes the amount of chlorine compounds used which may produce emissions of chlorine gas (Cl_2), free residual chlorine (Cl^-), hypochlorite ion (OCl^-), hypochlorous acid (HOCl) and chloramines;" and	*22*	*M*

That Schedule A 2(d) be amended to read "the amount of chlorine emitted refers to the amount of chlorine gas ($Cl_{2)}$, free residual chlorine (Cl^-), hypochlorite ion (OCl^-), hypochlorous acid (HOCl), chloramines emitted, expressed as the equivalent weight of chlorine (Cl).

The CASR number refers to the diatomic gas, ($Cl_2$7782-50-5)"

Thresholds

That the Technical Advisory Panel review the threshold for PM10.	*23*	*H*
That the Technical Advisory Panel review the appropriateness of reducing the threshold for mercury.	*24*	*M*

NPI Systems

That the NEPM define a range of reporting minimums for all substances.	*26*	*H*
That the NEPM specify that where emissions are below detectable limits consideration should be given to reporting these as zero (or "-" if feasible).	*27*	*M*
That the NEPM require dioxins and furans to be reported as Toxic Equivalents (TEQ).	*28*	*M*
That a pre-release set of NPI data be available for jurisdictional and industry review from 31 January, and public release of the data be deferred to 31 March.	*54*	*M*

NEPM Review

That the next review of the NPI NEPM occur in early 2008, and subsequent reviews occur no less frequently than once every 8 years.	*25*	*M*

Recommendations Pertaining to Issues Arising from the NEPM Review

Transfers

That the Commonwealth and the jurisdictions develop the transfer reporting form, methodologies for estimating transfers, include these in the relevant NPI resource material (handbooks and manuals as appropriate), redesign relevant databases so transfers are clearly differentiated from emissions data and develop relevant training and support materials.	*3*	*H*
That industry be consulted on the conceptual design of the database.	*4*	*H*
That efforts be made to ensure that duplicate reporting by industry reporters is minimised through integration of transfer reporting with, where possible, other required reporting systems such as the hazardous waste manifest system.	*5*	*M*

Construction Industry

That an investigation be undertaken to determine whether the current reporting thresholds apply to the construction industry.	*14*	*L*

Non anthropogenic sources

That consideration be given to including emissions from non anthropogenic sources in a separate database that provides the appropriate context when funding and sufficient data on biogenic emissions are available,	*17*	*M*
That emissions from burning for fuel reduction, forest regeneration fires, plantation forest management and agricultural burning be included in the diffuse source emissions data.	*18*	*M*

Recommendations Pertaining to NPI Operational Issues

NPI Systems and Database

That Government and industry NPI representatives work together to critically assess deficiencies in resource materials and develop priorities and a schedule for up dating and correcting these.	*29*	*H*
That a 4-5 year schedule be developed, with an annual budget allocation of $200,000 for reviewing each of the Emission Estimation Technique Manuals.	*30*	*H*
That a standard format and style be developed for the Emission Estimation Technique Manuals.	*31*	*M*
That the data transfer protocol be reviewed to allow for a web based reporting tool. The review process may include the specification, design, trialing, and implementation.	*32*	*H*
That alternative ways of delivering emission estimation techniques to users be explored.	*33*	
That the on-line NPI reporting, currently being developed, should be fast tracked and include automatic data checking and validation functions and be designed to reduce jurisdictional reporting differences and to provide useful and usable information on the waste minimisation and cleaner production measures introduced during the reporting year. The continuing need for paper- based reporting should be assessed.	*34*	*H*
That agreed targets for auditing industry returns be establish and resources provided for achieving these targets.	*35*	*M*
That the IWG or other suitable group: • *explore options to improve reporting rates where appropriate* • *prepare and distribute to all industry sectors the relevant manuals for each industry* • *review the necessity for new manuals* • *explore alternative ways of delivering emission estimation*	*36*	*M*

techniques

(These recommendations are in addition to any *others that may be undertaken by this group/s).*

That all jurisdictions agree on the relevant set of emissions that must be reported for each diffuse source category.	*37*	*H*
That manuals of diffuse source emission estimation techniques be updated and cost effective techniques for estimating emission changes in critical sources such as motor vehicles incorporated.	*38*	*H*
That airshed emissions be updated to an agreed base year.	*39*	*M*
That a set of agreed triggers for upgrading the diffuse source emissions based on parameters such as population increases, increases in vehicle registrations and vehicle turnover to new emission standards be established.	*40*	*M*
That standard methodologies, including agreed emission factors, be used to estimate diffuse source air emissions.	*41*	*H*
That the list of water catchment emission sources be standardised and rationalised.	*42*	*M*
That consideration be given to providing water catchment data on a sub-catchment level where available.	*43*	*L*
That an investigation to critically assess the number of non-reporters and significance of their emissions be undertaken	*44*	*M*
That a program for achieving a predetermined capture rate of all potential emissions be developed,funded and implemented.	*45*	*H*
That the emission estimation techniques for aggregated emissions from fuel combustion for sub-threshold facilities be improved.	*46*	*H*
That once diffuse source emission estimates are standardised consideration be given to providing historical data on the database to enable trend analysis.	*47*	*L*

Database Systems

That a critical assessment of data systems and resource requirements be undertaken, including assessment of priorities.	*48*	*H*
That the data system capabilities be urgently expanded to cater for additional data including state-wide coverage.	*49*	*H*

Public Awareness

That data presentation and analysis and interpretative tools be redesigned to meet the needs of dual audiences.	*50*	*H*
That greater data manipulation capability, for example to look at trends, be provided.	*51*	*M*
That awareness raising campaigns be undertaken when data presentation is improved.	*52*	*M*

Implementation Issues

That the jurisdictional reference group undertake a review of data ownership issues.	*53*	*L*

Performance Indicators

That a set of environmental quality measurement parameters indicative of the influence of the NPI be developed	*55*	*M*
That a suitable sample based methodology for assessing the influence of the NPI on cleaner production and emission reduction expenditures in biennial surveys be developed.	*56*	*M*
That indicators for data collection and data quality be developed that may include some or all of the following: • *Proportion of reporters that have been subject to desk audits* • *Proportion of reporters that have been subject to site audits* • *Number of complaints about data quality* • *Percentage of the jurisdictional area/population covered by diffuse emission inventories* • *Proportion of diffuse emission inventories that have not been revised for more than 5 years* • *Fraction of potential reporters actually reporting* • *Fraction of potential emissions captured on the database for a limited number of key substances.*	*57*	*H*
That biennial public surveys be undertaken to ascertain trends in awareness and use of the NPI.	*58*	*H*
That biennial surveys be undertaken, or other appropriate methods used, for assessing trends in the use of NPI data in selected sectors, e.g. government agencies, research, education, finance, industry.	*59*	*M*

Costs and benefits

That jurisdictions consider harmonising industry reporting requirements for NPI and regulatory purposes.	*60*	*H*
That funding be provided to improve the quality of NPI data and data systems so that they can be reliably be used for multiple purposes by a greater range of users.	*61*	*H*

BACKGROUND TO THE REVIEW

1. Introduction

The National Pollutant Inventory (NPI) is a National Environment Protection Measure (NEPM), which establishes a mechanism for reporting pollutant releases to the environment in a systematic and publicly accessible form. The NPI NEPM, first made in February 1998, had an initial reporting list of 36 substances for the first two years and an expanded list of 90 substances for subsequent years. A variation to the NEPM in June 2000 deferred reporting against the expanded list by one year.

The NEPM assigns specific responsibilities to governments and industry:

- Industry is required to submit an annual report about the quantities of pollutants on the reporting list released to the environment.
- State and Territory governments are required to:
  - collect the industry information,
  - estimate pollutant releases from domestic sources and from commercial and industry sources not required to report (diffuse sources)
  - provide this information to the Commonwealth government.
- The Commonwealth government is required to:
  - collate the information from the State and Territory governments
  - provide contextual information
  - disseminate the information to the community.

A memorandum of understanding between the Commonwealth and the States and Territories establishes implementation and funding arrangements. All NPI information is stored on a database which is maintained by the Commonwealth and can be accessed on the internet by the general public. The Implementation Working Group (IWG), which has representation from each of the State and Territory governments, has the role of ensuring national consistency of implementation. It also monitors the development of industry handbooks and provide interpretations of the NEPM as necessary to ensure consistent implementation of the program across all jurisdictions.

A review of the NPI by Professor Ian Rae in November 2000 during the third reporting year made a number of recommendations for improvements and for expansion of its coverage. An evaluation by ARTD (2000) concluded that NPI should be continued commenting that it is unique in that it is the only national and publicly available source of emission data. It also concluded that delivering the program through the states and territories was successful. It recommended that appropriate funding levels should continue and made several recommendations for improving its operation. A number of the recommendations for improvement have since been implemented. However, in order to give effect to many of the recommendations a variation to the NEPM is needed. This variation has not occurred. Funding constraints and the desire to allow a longer period for initial implementation problems to be assessed and for suggested improvements to be implemented could reasonably explain the delays in undertaking the variation process.

A further four years in operating experience have now been accumulated since these early reviews, and several other studies of the operation of the NPI have been undertaken during this period. The National Environment Protection Council (NEPC) at its December 2004 meeting agreed to consider whether to undertake a formal variation to the NEPM at its next meeting. The NEPC also agreed to commission a further review building on previous reviews and the now substantial operating experience with the NPI.

Environment Link working in conjunction with CH Environmental and J D Court and Associates has been commissioned to undertake this review. It has been has been undertaken by Catherine Wilson and Rob Joy of Environment Link, Jack Chiodo of CH Environmental and John Court of J D Court and Associates. The outcome of the review will be available for the NEPC Ministers at their July 2005 meeting when they consider whether a formal process to vary the NPI NEPM should be commenced and, if required, determine its scope.

Terms of Reference

The terms of reference for this review, established by the EPHC, are:

1. Review the goals and objectives as set out in the NPI NEPM and recommend to the Environment Protection and Heritage Council whether they remain valid and relevant;

2. Assess the extent to which the goals and objectives are being met through the operation of the program and the use of the data, and whether the existing program is cost effective;

3. Identify changes to the design parameters of the NPI NEPM that would improve the program's effectiveness in meeting its objectives or the broader priorities of jurisdictions, increase its efficiency and remove impediments to use of the data; and

4. Outline the costs of changes to the design parameters of the NPI NEPM against the benefits gained by the community, states and territories and other key stakeholders.

It also specified that the purpose of the review is to establish whether the program as currently operating is delivering all the benefits it might to jurisdictions. It should target the areas where improvements can be made and build on the earlier reviews, evaluating whether previous recommendations are still relevant. The review is also required to identify changes to design parameters that were not considered in the earlier reviews such as the basis for estimating emissions from non-facility sources (e.g. vehicles) plus a range of data and compliance issues. In addition it should briefly examine any appropriate international examples or developments.

Approach to the review

This review is largely a synthesis of the operating experience gained with the NPI over the six completed reporting years, and an analysis of the issues that have arisen during this period, or that could potentially arise from a variation to the NEPM. Experience derived from pollutant reporting programs overseas has also been considered.

An initial set of issues for consideration was derived from reports of the NPI reviews and studies, and discussions and briefings with the Department of the Environment and Heritage (DEH). These issues formed the basis for seeking input to the review and questionnaires were prepared for this purpose. The questionnaires were circulated to more than 130 stakeholders nominated by DEH and the NPI jurisdictional reporting teams as well as others considered by the consultants to be appropriate. Separate questionnaires were used for industry and industry groups, government agencies, and environment groups, in line with the likely interest of the groups, so as to make the length of the questionnaire manageable for participants.

Participants were asked to provide comments and information on issues listed that were of relevance to them or their organisation, as well as on non-listed issues that they consider relevant. Given the short period of time for consultation participants were given the option of completing a questionnaire or commenting on issues most relevant to their NPI interests. In addition, a number of face-to-face interviews were also held as appropriate and opportune, and two workshops were held in Canberra: one for Canberra based industry organisations and industry; and, one for Commonwealth government agencies. In addition to contacting NPI project team members in all jurisdictions, phone interviews were also held with program mangers to obtain a perspective on some of the broader policy issues. The Department of the Environment and Heritage also provided a facility on the NPI website which allowed people to provide comments which then formed part of the review.

Questionnaires are included in Appendix 1 and stakeholders who responded are listed in Appendix 2. More than 130 questionnaires were sent and there were 78 responses received of which 19 were from industry associations, 20 from individual companies, 23 from jurisdictional representatives together with responses from other Commonwealth and state government departments, business analysts, research organizations, environmental associations and private citizens.

A number of reports were considered in formulating and analysing the issues responses. The main ones are:

- A review of the NPI by Ian Rae (NEPC Service Corporation, 2002)
- An independent evaluation of the program (ARTD, 2000)
- An NPI consumer market survey (Consumer Contact, 2003)
- An evaluation of aggregated emissions data (A M Consulting, 2003)
- A survey of government agencies on the use of the NPI, (Artcraft Research, 2004)
- A study of the options for incorporating greenhouse gases in the NPI (Rae, 2004)
- Other information made available by DEH

In addition, information from overseas programs was derived from various reports obtained through a literature search and is referenced in the bibliography.

2. Key findings from previous reviews

A brief summary of the key issues from earlier reviews is presented here to provide some context for this review. These are discussed in more detail, where appropriate, in other sections of this report.

The NPI objectives, as considered in the various reviews, can be expressed as:

- Establishing an environmental database to allow informed environmental policy development and decisions
- Making the data widely available and easily accessible
- Encouraging and supporting cleaner production and waste minimisation

Previous reviews had differing purposes. For example the terms of reference for Rae's review were mainly related to determining the effectiveness of the NPI NEPM in achieving its gaols, the adequacy of the thresholds, whether transfers should be included and a review of the substance reporting list. The efficiency and effectiveness of the program were examined in more detail in management reviews by ARTD and assessments by DEH.

Although the NPI was only into its third reporting year when Rae (2000) completed his review, he concluded that there was evidence that the objectives were being met, with the first two being more fully met than the third. The ARTD (2000) efficiency and effectiveness review also concluded that the program had the potential to meet its objectives and should be continued.

On the issue of resourcing, Rae concluded that funding had been adequate, and that current levels should at least be maintained for continuing implementation, or increased if the program were expanded as recommended. The ARTD independent review also concluded that funding should continue at an annual level of around $4 million for the next 3 years 2001/2 to 2003/4. Actual expenditure on the NPI over the last 4 years has been at approximately half these levels (DEH information).

On the issue of expanding the NPI, Rae recommended that the following category of substances be added to the reporting list:

- Waste transfers
- Agricultural and veterinary chemicals
- Greenhouse gases

Assessment of how the first two categories may be included is provided in the report. Possible greenhouse implementation arrangements are discussed in more detail in the 2004 Rae report to the Victorian Government.

Two specific substances were recommended by Rae for removal, one for inclusion, and several for further consideration.

ARTD concluded that the program had developed an effective and appropriate database capable of meeting the needs of likely users, and in general, other aspects of the program had been implemented effectively. However they identified a number of critical areas for improvement in management arrangements and program implementation.

These conclusions are generally supported by other information made available through DEH, indicating that establishment of the database and making information publicly available had been successfully achieved, but assessing impacts on cleaner production was more problematical in the short term and required a longer period of operation to make a judgment.

All available information points to the desirability for improvements in a number of areas including:

- Developing better performance indicators
- Funding for upgrading database systems and infrastructure for which funding has been inadequate in the last three years
- Providing more resources for facility data collection, validation and auditing
- Strengthening communication and marketing efforts

The need for better communication and marketing is especially apparent in the results of the Consumer Contact (2003) and Artcraft (2004) surveys.

The Consumer Contact focus group survey found awareness of the NPI was limited to few people and was usually work related. An earlier Consumer Contact survey in 2002 had indicated only 6 percent of people surveyed were aware of the NPI. This contrasts with DEH data that indicated 62,256 unique visitors to the NPI database in 2003-04 (compared to 1794 in 2000-01).

The Consumer Contact focus group survey found that current users hold NPI in high regard and understand the magnitude of the effort and see multiple uses especially at the local level. The results of this report highlighted a number of attitudes and expectations, including:

- NPI information can empower people to make informed choices and take personal responsibility
- Emissions are associated with potential health impacts
- A belief that monitoring and auditing of industry reports is needed if the NPI is to have credibility
- The community has a right to know, industry the obligation to report, and governments the obligation to monitor.
- There was a need for a communication campaign to let people know about the NPI.

The results of the Artcraft survey of government agencies showed that:

- 15% of respondents had looked at the NPI, and 11% had used the data in the past year.
- 63% of those who had not looked at the data did not know about the NPI, and most of the rest did not think it relevant to their work
- Most of those who had used the data found it easy to use
- The range of uses of the data was quite diverse.

It should be noted that this survey was heavily skewed as 66% of respondents were from Commonwealth government departments and 26% from the States and Territories.

3. International experience with PRTRs

Early development of PRTRs

A Pollutant Release and Transfer Register (PRTR) is a database of chemicals released to the environment and of wastes transferred off-site. Although different nomenclatures are used in different countries (National Pollutant Inventory (NPI) in Australia, Toxic Release Inventory (TRI) in the United States, Pollutant Emission Register (PER) in the Netherlands, and National Pollutant Release Inventory (NPRI) in Canada, and some like the Australian NPI do not include transfers, they are all classed as PRTRs.

Early Pollutant Release and Transfer Registers have left a firm mark on the shape of subsequent development of this management tool. The US Toxic Release Inventory (TRI), launched in 1987, has probably had the most influence internationally. The original impetus for the US TRI legislation, buried in 'omnibus' Superfund measures and passing through a tiered legislature in its final session, was to enhance the public right to know about toxic pollution and potential pollution in its immediate environment.

TRI in its initial form required US industries selected by a relatively simple administrative 'filter' to report annually on releases of over 300 listed toxic chemicals to the environment. The filter, designed to be determined by industry with minimal effort, was:

- US Standard Industry Codes 20 through 39,
- having more than 10 full time employees,
- producing, importing or processing more than 25,000 pounds of any of the 300 plus listed toxic chemicals, or
- using more than 10,000 pounds of any of the 300 plus listed toxic chemicals.

Environmental releases included emissions to air and water and offsite transfers. Industries were not required to do additional monitoring or measurements to provide these reports. Where they did not have monitoring data, industries were to use estimation or calculation techniques to determine the extent of the releases.

A former US EPA Administrator (Browner) argues that TRI has been one of the most cost-effective measures ever devised by the Agency for reducing the release of toxic substances in the USA. The 'unencumbered' focus of TRI on toxics and its relatively simple and direct form has had several consequences. It readily caught and held the public and industry imagination. It enabled an integrated overview of releases to air, water, land and waste disposal in a way which no other EPA program had achieved. And it was comparatively easy to implement.

The TRI has now expanded to a wider circle of industries, requires reporting on over 600 toxic substances and calls for information on pollution reduction and prevention. But it retains its focus on toxic materials and does not differentiate the relative risk, reporting releases of substances of widely differing toxicities in mass quantities only (with the potential exception of dioxins which are proposed to be reported in terms of toxicity equivalence).

Much information and analysis related to this program has been available from the outset and longitudinal studies, made possible by its relative maturity, enhance its influence further. It has been widely applied to other jurisdictions, not only in mature industrial societies, but in developing countries, to estimate broad-scale impacts on the environment (eg Brandon & Ramankrutty 1993).

However, the TRI was not the first inventory or even the first comprehensive inventory. Many specific purposes inventories have been developed since the 1960s and used for research and policy development. For example, the Australia Environment Council published an *Air Emissions Inventory for Australian Cities* as early as 1976. Specialised inventories remain a

necessity for air quality modelling over large urban areas or regions or water quality modelling in catchments. The extent to which data from comprehensive, general-purpose inventories can be used for these specialised purposes depends strongly on the quality and uniformity of the data.

The development of a comprehensive, regular inventory of emissions to the environment seems to have been pioneered by the Netherlands. The Pollutant Emission Register (PER), started in an earlier form in 1974 and is therefore of even greater maturity than TRI. Its purpose is "…to support the environmental policy of the government and to monitor the progress of environmental policy." (Evers 1997) It commenced with 'criteria' pollutants for air and water and moved to include toxics at a later time. It contains industrial source and diffuse source data. Much effort is devoted by both industry and government to validation of the data, which is used for development of government policy and strategy and for scientific research. Public access to the information is a more recent feature.

The PRTR has tended to become a mainstream environmental management tool for governments from the mid 1990s to present. However, with the spread of PRTRs internationally, some tensions have emerged between the 'TRI model' and those developed to serve comprehensive environmental roles for governments, such as the Netherlands model. While the different features of these two models have tended to coalesce in most recent PRTRs (OECD 2001), the different 'philosophies' underlying them are still at the heart of debate about what is expected of these instruments.

Current status of development of PRTRs

The OECD review of PRTRs provides a useful overview of the development, functioning and current status of these instruments of environmental management (OECD 2001). One qualifier on this review is that most of the information was provided by governments operating PRTRs and usually the agency or section within those governments directly responsible for their implementation and operation. It would be unusual to expected strongly critical views to be aired in such returns. Twenty (20) PRTRs, including Australia's NPI, are mentioned in the reviewed, but eight are given more detailed consideration than the others. Table 1 of the OECD report is re-produced at Appendix 3 for convenience.

A few features warrant comment:

- The majority commenced operation in the latter half of the 1990s or early 2000s. Note that the European Union's PRTR commencing in 2001 is not included.
- The majority require reporting of releases to air, water and land.
- The majority are mandatory.
- The number of listed substances ranges from 50 to over 600.
- The majority require reporting of transfers.
- Only a minority incorporate reporting of diffuse sources.
- Only a minority provide for public dissemination of full data.
- The majority provide for dissemination of aggregated data.
- Some include reporting of greenhouse gases.

Support for almost any variation on PRTR individual functions (ie industry reporting filters, substances prescribed, dissemination of information, etc) is to be found in the growing number of these instruments operational in the various countries.

Confidentiality provisions have been a sticking point in many jurisdictions. The general response of government appears to have been to require industry to justify the need for confidentiality on a case by case basis rather than to default to the secrecy mode. The one area where this has not been followed in many jurisdictions has been the failure to report production, throughput or usage information along with the release data. This tends to frustrate efforts to more carefully characterise emission information in terms of emission factors, etc.

Goals and objectives of PRTRs

The OECD report identifies the varying goals as a key determinant of the nature and function of a PRTR in a particular jurisdiction. The key question distilled from a consideration of goals and objectives seems to be whether a PRTR is a 'rough and ready' tool for raising public and industry awareness of the need for cleaner production and waste minimisation OR is it a repository and clearing house for the best available data for all uses on releases of all types of contaminants to the environment.

When this question is answered, then subsidiary questions on whether data on releases of climate-change gases, ozone-depleting gases, fine particles, nutrients, pesticides and diffuse or aggregated (smaller domestic/commercial) sources should be included in PRTRs or on the accuracy of the data recorded in PRTRs all tend to fall into place. The first option carries the least cost for government and requires minimal effort to plan and implement. If the prime intention is to track broad progress in pollution prevention then consistent reporting over time becomes more important than the absolute accuracy of the reporting. The second option requires more input of money and effort from government to develop (ie accuracy and completeness of coverage become important), but would be more effective in the longer term. It could also offer real advantages to industry by avoiding duplicative reporting (eg for licensing, for the PRTR, for waste transfers and for other environmental information) thereby allowing only one return per facility. But this would depend upon greater uniformity being achieved across overlapping jurisdictions. The US has made many modifications to TRI, but none conceptual. It does not cover climate change gases or nutrients. On the other hand the European response, while incorporating some features of TRI, seems to generally lean towards the Netherlands model of a comprehensive data base, if not yet fully developed. The EU and UK PRTRs do incorporate greenhouse gases, but North American PRTRs do not.

Environmental stakeholders seem to line up on either one side or the other on the question of comprehensiveness and accuracy of reporting, depending on traditional attitudes and alliances. Industry by and large has resisted, at least initially, wider dissemination of information on its environmental performance. The experience with PRTRs is consonant with experience in most other areas of environmental regulation. For example, twenty to thirty years ago most industry licensing data was considered confidential, whereas now confidentiality of this information is exceptional. At the other end of the spectrum environmental groups always clamour for more and more-detailed, mandated information than is feasibly possible. The PRTR experience sits within this more general pattern of response to environmental management. It is encouraging to see industry moving to a greener stance and the 'greens' becoming more realistic in their expectations.

Cost of operating PRTRs

Real cost data in overseas jurisdictions is difficult to access at relatively short notice. Expenditure of PRTR reporting is usually only a very small part of total environmental expenditure for both industry and governments, so general published budgets do not usually have this level of detail.

The US EPA currently budgets about $US 15 million to operate the TRI program, compared to its total budget of $US 7.6 billion (US EPA 2004). Based on an agency estimate of the 8 million person hours required by respondents to complete their TRI returns (23,000 facilities filed 93,000 returns in 2002) the total cost of the program to industry would probably be between $US 300 to 400 million (US GAO 2000). Useful factors for comparison with non-US situations would therefore be 86 hours average per return or 347 hours average per facility. The split of time between professionals/consultants and operating staff would probably be about 50/50 after the reporting program had settled down. There are obviously higher costs initially in setting up estimating and reporting systems, with a greater professional/consultant input at that stage. The agency cost is $US 161 per return. This takes no account of participation by state and district agencies in the collection of the TRI returns, either directly or indirectly by virtue of requiring their own permit and statutory returns from industry. It is probably of an equivalent magnitude to the central agency's effort.

No information has yet been found on the actual or estimated cost of operating the European PRTRs.

Experience in using PRTRs

Contrary to legislative expectation, industries and governments have been the most frequent users of PRTR data (US EPA 2003). Communities seem not to have always wanted 'to know', although activist groups have found the data useful for specific purposes. A search of the peer reviewed literature on uses of PRTRs, especially TRI and Canada's NPRI, indicated that most researchers drawing on the data were interested to explore community and business responses to the data. What is the risk to a specific community, usually when some change in industrial use in the neighbourhood is proposed? What is the impact of public exposure of emissions on business performance, investor and consumer choices? The consensus has been that PRTRs have had a positive and quantifiable impact in reducing waste and pollution. There has been little research using the North American data for strictly scientific studies involving dispersion and impacts.

Examples of community usage of PRTR data have ranged from interest groups opposing existing or new industries to more active attempts to apply pressure to polluting industries. O'Rouke and Macey (2003) describe use of TRI data in several US states alongside of 'fence-line' community sampling. It would appear that there is some way to go before such activity would have any legal status, but the pressure applied to both government and industry may be more effective than any envisaged legal action.

Harrison & Antweiler (2003) in a statistical and conceptual analysis of the Canadian NPRI challenge the widely claimed effectiveness of PRTRs in reducing emissions through non-regulatory measures such as the pressure exerted by 'honour and shame' factors on industry management. They argue that direct regulatory action, or the threat thereof, relying on old-fashioned 'command and control' measures has induced much of the reduction demonstrated in the NPRI. In another analysis (Antweiler & Harrison 2003) they question the significance of 'green consumerism' as a factor motivating industries to clean up, while demonstrating that there is a small effect.

However, research by Gerde and Lodgson (2001) and Terry and Yandle (1997) indicates that PRTR data can be effective in changing business environmental behaviour, both as a result of 'reputation loss' and negative investment response. Gerde and Lodgson survey several data bases used for rating industrial performance. They point out that while TRI data has many shortcomings it is still the most widely used proxy for a firm's environmental performance in the various corporate indicators used. They suggest ways in which it could be improved, including expansion to a wider range of industries and a large set of substances.

The threat of toxic 'problems' and PRTRs tends to induce proactive rather than reactive behaviour in corporate environmental management (Khanna & Anton 2002). Other research shows that disadvantaged communities use PRTR data most effectively when their level of understanding of the information is sound (Shapiro 2005). The whole question of environmental justice, little debated hitherto in Australia, has received attention in North American studies such as those by Shapiro.

US experience in using the TRI for pollution prevention (PP) appears to be mixed (GAO 1997). The main criticisms are that the TRI data is not accurate enough, does not cover smaller industries which are significant contributors to pollution and does not track continuing developments adequately. The GAO in its review considered that most PP was carried out by big industries which took much credit for 'picking low hanging fruit' rather than making more fundamental changes for PP. The GAO believed that relatively small modifications to the TRI could make it a more effective instrument.

The quality of data in PRTRs becomes critically important if they are to be used for emission trading schemes. Existing data are generally deficient for this purpose (Saarinen 2003). The applicability of PRTR data to assessment of cleaner production has been examined using the Australian NPI data (Kolominskas & Sullivan 2004). The limitations of the data in the PRTRs

for such specific purposes is highlighted but the overall benefit of PRTRs in promoting cleaner production acknowledged.

Most PRTRs have included transfers since they cannot be realistically omitted from a system intending to measure or induce waste minimisation or cleaner production. The possibility of transferring pollution releases into equally undesirable wastes which are exported from the site without reporting seems to have convinced most jurisdictions to include transfer reporting as a requirement.

PRTRs appear to offer a relatively straightforward means of assessing industrial performance attractive to parties wishing to rate business performance across a range of factors, including the environment. While this may seem crude from a scientific perspective, it is not unreasonable given the uncertainty inherent in some other business and economic rating factors. There are many examples of this type of use (US EPA 2003, Dias-Sardinha *et al.* 2003, Grant & Jones 2003, Gerde & Lodgson 2001, Khanna & Anton 2002, Terry & Yandle 1997).

Key questions arise out of this experience: are PRTRs more effective alternative management tools for governments than conventional regulatory instruments? If financial and 'reputational' drivers are to be encouraged as more cost-effective means of achieving environmental goals for the future (Foulton *et al.* 2002), how will such means gain status and how can rational judgments be made unless the necessary data base is available and reliable? (Saarinen 2003)

Toxicity and risk

A general unease felt towards PRTRs internationally is the problem of interpreting the data, especially to non-scientifically trained users. The question of what an emission means in terms of risk is frequently raised in PRTR discussions. Toxic impact cannot be directly interpreted from the mass amounts emitted. There is even the suggestion in some research that emphasis on reducing the mass emissions to air and water may be increasing toxic emissions through waste transfers (Harrison and Antweiler 2003), a negative outcome. Most PTRTs use toxic weighting factors for dioxin and furan emissions, where this approach has become standardized, but fail to extend the practice to other toxic emissions.

An adjunct tool likely to be developed for PRTRs internationally will be the provision of means for weighting of toxic or relative impact based on raw PRTR data. This would give a better indication of likely environmental impact of releases to non-scientific users. US EPA have worked on such a project (Relative Risk-Based Environmental Indicators Project) to assist communities in better appreciating the likely risk posed by specific substance releases from specific facilities taking account of their toxicity, mode of release, meteorology and local situation (GAO 1998).

Various additional programs are being developed by both governments and environmental advocacy groups to supplement PRTR data and there is a general requirement internationally for greater attention to risk and toxicity in developing and modifying PRTR reporting lists and thresholds (OECD 2001). The level of toxicity of some persistent organic pollutants, such as polychlorinated dioxins and furans, requires a rather different set of thresholds to those adopted in earlier PRTRs.

This is a question of interpretation of data and information provided in PRTRs. There is much sensitivity on this score from industry and to a lesser extent from government. But it has not generally deterred regulators for requiring release of information. It is in the interests of researchers, both those involved in government policy development and those using the data for other purposes (eg medical impacts, financial assessments, impact studies, etc) to have raw and not interpreted data available. The capacity of environmental groups to misuse information (eg comparing emissions in the home post codes of CEOs to emission in the postcodes of their factories) and generate 'scare type' material has been generally offset by industry putting positive spins on gains made when PRTR data become available (eg claiming extensive reductions either standing alone or in comparison to competitors). Overall the

international trend has been to release more rather than hold back pollution data from PRTRs.

Overall

PRTRs are here to stay. While their form may be modified, it is not conceivable that they will be abandoned as legitimate environmental tools in pursuit of sustainability. As more countries adopt them in response to the 1992 Rio conference and Agenda 21, governments would be brave indeed to recommend that they be discontinued on the grounds of limited effectiveness.

Future emphasis is likely to be on getting better value for money and fostering other mechanisms for environmental management than 'command-and-control' measures. However, the foundation of 'command-and-control' must underlie non-regulatory measures for the latter to be effective (Harrison and Antweiler 2003). The iron fist of enforceable control must exist beneath the velvet glove of persuasion. This concept can come into all too sharp a focus in some developing-country aid programs, when enthusiasm to bypass development of effective environmental 'command-and-control' mechanisms can lead to disastrous reliance on economic instruments without the necessary enforcement backup to ensure honest reporting and dealing.

The key question to arise from consideration of international developments is how seriously PRTRs should be taken as environmental management instruments. The international consensus seems to be very seriously!

NATIONAL POLLUTANT INVENTORY NATIONAL ENVIRONMENT PROTECTION MEASURE: REVIEW ISSUES

4.1 Goals and Objectives

As stated in the previous section, a Pollutant Release and Transfer Register is a database of chemicals released to the environment and of wastes transferred off-site. Although different nomenclatures are used in different countries (National Pollutant Inventory (NPI) in Australia, Toxic Release Inventory (TRI) in the United States, Pollutant Emission Register (PER) in the Netherlands, and National Pollutant Release Inventory (NPRI) in Canada, and some like the Australian NPI do not include transfers, they are all classed as PRTRs. The goals and objectives of PRTRs differ since they reflect the purposes for their establishment and reflect the relative priorities and environmental conditions in different countries.

The main driver for establishing the NPI in Australia was the need to satisfy increasing community concerns about chemicals in the environment and demands for information about these as a right, that is the community right to know. Other drivers included the call by the OECD in 1996 for member countries to institute PRTRs, the desire for governments in Australia to have a central database of information that could be used to help in environmental planning and priority setting, and the perception that public reporting would encourage better corporate environmental behaviour and cleaner production.

The design, structure and operation of the NPI reflects the original drivers and other factors that emerged in consultation and in trials conducted during its development, and these are in turn reflected in the NPI's goals and objectives. It seems clear that the NPI is closer in concept to the PER of the Netherlands than to the TRI in the US.

The overall aim of the NPI can be stated as the development of a comprehensive data base of environmental information that is readily available to individuals and groups to assist them with choices about environmental actions and issues, and the NPI objectives point in the direction satisfying a the needs of a wide variety groups and uses,

The National Environment Protection Council Act provides the legislative basis for the NPI, and the goals and objectives need to be consistent with the NEPC legislation as well as satisfying the intended purpose. Clauses 5, 6, and 7 of the NPI NEPM deal with the goals and objectives, and are reproduced in Appendix 4.

A tiered approach is evident in the way that the goals and objectives are expressed, with the more specific ones following the broader more general ones.

At the broadest level, Clause 5 of the NPI NEPM establishes the desired environmental outcomes. These can be paraphrased as

- Maintenance and improvement of ambient air quality and ambient water quality;
- Minimisation of the environmental impacts of hazardous wastes
- An expansion in the use and recycling of used materials

The third outcome is a specific example of the broader environmental concepts of sustainability, cleaner production and waste minimisation. It appears to be out of place here, and rephrasing may be appropriate.

Clause 6 states the broader goals which can be summarised as:

a. to assist in reducing the existing and potential impacts of emissions; and
b. to assist in achieving the desired environmental outcomes.

The more specific goals or objectives in the Clause can be paraphrased as providing a basis for

c. Collecting a broad base of information on emissions to the environment; and
d. Disseminating the information.

Clause 7 is an even more specific goal:

e. Establishing a database known as the NPI.

Clause 7 also specifies the reasons for (or envisaged uses of) the database. They can be summarised as:

i. Information to facilitate policy formulation and decision making for environmental planning and management;
ii. Publicly accessible information of emissions, sources, and location (community right to know); and
iii. Promoting and facilitating waste minimisation and cleaner production

The uses can be viewed as objectives for the NPI database. How well the NPI meets these objectives is a measure of performance of the NPI.

In addressing whether changes should be made to the goals and objectives, it is appropriate to examine whether there have been any changes in public policy since its initial development, and the use of the NPI.

Indications from government agencies gathered in the course of this review generally indicates a continued support for community right to know, which was a main driver for instituting the NPI. Expansion of the NPI to include for example, transfers, is less definite. Within this context, in principal support for the right to know is tempered by concerns about resource constraints and a desire for further analysis of costs and benefits.

In relation to transfers, it is difficult to see how influencing cleaner production and waste minimisation can be legitimately expected of the NPI unless transfers are included, as discussed elsewhere in this review and stressed by in a number of questionnaire responses.

Some jurisdictions have assessed that community right to know about chemicals is important to only a small minority of people, usually environmental activists. Possible reasons include a lack of awareness of the NPI or chemicals in general, more concern about other and possibly broader environmental issues such as greenhouse gases and ecological impacts, and low concern for environmental issues in general.

The Consumer Contact 2003 focus group survey indicates that environment is in the top 3rd or 4th in a list of issues in peoples awareness, which is, in general, consistent with past ABS survey data. However the survey found that awareness of the NPI was very low (around 6% of the survey sample had heard of the NPI).

The survey also found that the NPI was seen as an awareness-raising tool about the environment, a driver for personal action for reducing environmental impacts, and for garnering support for emission reduction programs. In this context there was seen to be a need for a concerted campaign to inform the public of the NPI. Access to local area information gave a sense of direct and personal ownership.

Community right to know is generally supported by the community and also appears to be supported by industry as evidenced in company environmental reports. Support can be further gauged by the growth in industry reporting and in the number of visits to the NPI database. DEH data indicates a growth in unique[1] visits to the NPI Internet site from 1794 in 2001/02 to 62 256 in 2003/04. Jurisdictional data indicate 3618 facilities reporting in 2003/4

[1] A unique visit is defined as the first access to the web site by a computer. Further access by the same computer is not counted.

an increase of around 22% from 2001/02. Both data indicate at least a willingness to use or support the database.

The Artcraft (2004) survey of government departments provides an indication of the purposes to which the NPI has been put. The listed purposes are

- Preparation of internal and external reports
- Environmental management
- Identify pollution causes
- Policy initiation or evaluation
- Environmental education, media, and other public awareness raising activities
- Communicate with Public, NGO's academics, etc
- Integrated with other pollution programs or licensing processes
- Environmental planning
- Personal use information

The number of users was small, but the variety of uses was quite large. Two thirds of respondents were unaware of the existence of the NPI, indicating a need for further promotion. This is consistent with the Consumer Contact survey and consistent with a generally low awareness of the NPI even within government.

There is evidence of an interest in the NPI by local government for use in environment impact statements and new developments of industrial facilities, by the finance sector in profiling environmental credentials and company risk evaluation, and by environment agencies for use in load based licensing. Data quality obviously becomes very important in such cases.

Questionnaire responses indicate that the NPI is used for the variety of purposes including environmental awareness training, environmental reporting, industry comparisons, and industry reviews. Lack of awareness and lack of confidence in the data inhibit greater use of the NPI. Its limitations in comparison to more detailed information collected by jurisdictions for specific purposes are highlighted by a number of respondents in both government and industry, as is the difficulty in measuring achievement of the broader goals.

Suggestions for including specific goals of environmental awareness raising for both industry and the public, and for data quality have been made. Both could be included as specific objectives, particularly the first, but they can be dealt with appropriately in performance indicators. It has also been suggested that the goals and objectives could be made clearer by focusing on the core business of the NPI NEPM, i.e. the provision of information, and this should be considered in the variation process.

Overall, the available evidence indicates that the NPI goals and objectives remain relevant and appropriate for its current scope. If waste transfers are included, some modifications of goals a and c and objective ii. would be required as follows

In clause 6 and 6(b) alter " …emissions of substances… " to read " … emissions and transfer of substances….."

In clause 7 (b) alter " …specified emissions to the environment... " to read "…specified emissions and transfers to the environment..."

In reviewing the wording of the objectives clauses 5 (a) and (b) could be altered by adding the words "contribute to" and clause 5 (c) could be replaced with " contribute to an increase in the sustainable use of resources". A complete revision of the goals that goes beyond this minor change is however warranted to clarify the NEPM intent. One of many possible reformulations could be as follows:

Clause 5.

The desired environmental outcomes of the measure are a contribution to:
a) the maintenance and improvement of:

i. *Ambient air quality; and*
ii. *Ambient marine, estuarine, and fresh water quality;*

b) the minimisation of environmental impact associated with hazardous wastes; and
c) increasing sustainability in the use of resources

Clause 6.

The national environment protection goals established by this measure are to:
a) collect of a broad base of information on emissions and transfer of substances on the reporting list to air, land and water, and
b) disseminate the information collected to all sectors of the community in a useful, accessible, and understandable form

Clause 7

A database known as the National Pollutant Inventory will be established that contains information:
a) about specified emissions and transfer of substances to the environment, including those of a hazardous nature or involving significant impact, on a geographic basis,
b) that enhances and facilitates policy formulation and decision making for environmental planning and management;
c) about waste minimisation and cleaner production programmes in industry, government and the community and promotes and facilitates their implementation
d) is available and accessible to the public.

The wording and structure of the NEPM appears to be rather loose in places, and could be tightened. For example, a number of clauses begin with the words "Council envisages…" which could be modified given the now substantial experience in the NEPM operation. In addition, a number of requirements have now become redundant, for example the initial reporting list and dates. It is therefore suggested that it is timely and appropriate to review the wording and structure in the proposed variation process.

Recommendation

1. That the EPHC undertake a review of the NEPM wording and structure to allow for recommended changes to the NEPM parameters and to reflect current policy requirements.

4.2 Transfers

The current NPI NEPM definition of an emission states that it "includes that emission of a substance to the environment from landfill, sewage treatment plants and tailings dams but does not include:

a) Deposit of a substance to landfill; or
b) Discharge of a substance from a facility to a sewer or a tailings dam; or
c) Removal of a substance from a facility for destruction, treatment, recycling, reprocessing, recovery or purification."

In this definition it is inferred that substances from the reporting list that would probably, but not necessarily, be mixed with other materials.

The inclusion of transfers was considered when the NPI NEPM was being developed however it was decided that because a number of issues remained unresolved transfers would be reconsidered for inclusion when the NPI was reviewed. This intent was formalised in the NEPM which states:

Clause 33 (1) The Council envisages that this Measure shall be subject to a comprehensive review commencing in October 1999 which will consider:

c) the need if any, for amendment of the Measure, including:

(i) whether transfers of waste (including deposits of waste into landfill; discharge of waste to sewer; and any other removal of waste from the facility for the purpose of disposal, treatment, recycling, reprocessing, recovery or purification) should be included;

Professor Ian Rae, in his 2000 review of the NPI NEPM examined the need for inclusion of transfers in some depth with logical and well reasoned arguments. He concluded with the following recommendations:

Recommendation 3: *Movement of reportable substances to engineered landfills, either on the facility or off-site should be included in the NPI and classified as 'transfers'. They should be reported in a section of the database that is separate from that used for presenting emissions data. Transfers to landfills which cannot meet these standards should be reported as emissions to land.*

This recommendation is based on the premise that engineered landfills are long term containment sites and since containment of hazardous waste requires a manifest, the data of transfers to landfill may already exist and be easily available.

Recommendation 4: *Transfers of substances on the NPI reporting list to sewer should be included in the NPI NEPM. They should be reported in a section of the database that is separate from that used for presenting emissions data.*

Recommendation 5: *Transfers of substances on the NPI reporting list to tailings or sludge storage facilities should be included in the NPI. They should be reported in a section of the database that is separate from that used for presenting emissions data.*

This area was strongly debated during the consultation for the Rae review and similar arguments were put forward during this review as those reported by Rae. An area of particular concern during this and previous reviews is the handling of waste rock which is included under the US TRI as an emission. There already is agreement, at least at the Implementation Working Group level that:

- rock handled for mining purposes is included for threshold calculations;
- when rock is discarded i.e. becomes waste rock, then emissions to the environment from the waste rock such as substances in leachate and in dust are reportable as emissions to the environment if the relevant thresholds are exceeded;
- any substances remaining in the waste rock, that have not been changed in any way, are not emissions.

Recommendation 6: Transfers for destruction, treatment, recycling, reprocessing, recovery or purification should be included in the NPI. They should be reported in sections of the database separate from that used for presenting emissions data.

Transfers for treatment by destruction, treatment, recycling, reprocessing, recovery and purification are regarded as part of the cleaner production process.

Since Rae's 2000 review the United Kingdom have included transfers in it's Pollution Inventory.

This review had mixed support for the inclusion of transfers.

In general the jurisdictions supported the inclusion of transfers as did all other non-industry respondents although some concern was expressed about the lack of overseas evidence that inclusion of transfers could demonstrate a link between waste minimisation and the public

reporting of transfers in inventories. In addition, there is the potential for double counting of releases. The widely held view was that transfers should be included because they would:

- provide more useful and complete information about the movement and treatment of potentially harmful substances. Without them you only get half the picture. Industry that reduces its transfers e.g. trade wastes aren't getting credit.
- be a driver for waste minimisation objectives in NPI NEPM. The transfers database could become a potential resource for companies looking for materials they could utilise.
- enable the NPI to achieve the status of a Pollution Release and Transfer Register as originally designed. The OECD recommends the inclusion of transfers.
- would correct reporting anomalies where some facilities report emissions from an activity that occurs within their boundary, but the same activities occurring between facilities are not reported. An example is reusing water containing NPI substances within a facility compared to providing reused water to another facility.
- would provide better data on hazardous waste in Australia that is useful for reporting waste generation data under international conventions (e.g. Articles 13 and 16 of the Basel Convention).

Industry respondents were mixed on whether transfers should be included. The most comments came from the mining industry although within this sector there was qualified support for the inclusion of transfers in a separate database. Some industry respondents were concerned that the additional monitoring and costs of estimations could not be justified as the environmental improvements were likely to be small while others expressed the opinion that transfers are inconsistent with the general intention of the NPI as an emissions reporting tool. A further issue was the potential for misuse of the data, for example by summing emissions and transfers. Strong but qualified support was received from Sydney Water who wanted their inclusion as long as reporting duplication was minimised. The mining industry in general are concerned about the handling of waste rock and other similar materials generated by its industry.

The inclusion of transfers would require significant development time and cost. It requires:

- development of a transfer-specific reporting form,
- development of methodologies
- redesign and upgrades to the Commonwealth and the jurisdictions' databases to handle the extra data
- changes to the industry handbooks to include information on how to estimate transfers.
- providing support, training and information to reporters
- development of additional support materials for NPI database users
- notification and education of the changes (correspondence, workshops, site visits) to current NPI reporters and instructions for other stakeholders on how to use the data.

However once transfers were incorporated in the NPI database the additional ongoing costs, it is anticipated, would be low.

Transfers were included as part of the 1999 National Pollutant Inventory Kalgoorlie NPI Trial. The trial relied on reporting facilities volunteering information on the types and quantities of wastes transferred with additional estimations made by the consultants. The trial in an area where there are large-scale mining operations, found that while it is unlikely that all transfers of NPI substances were captured the quantities of waste were relatively small when compared with the emissions estimates. The consultants also attempted to determine diffuse source transfers. They concluded "*that insufficient data is available to enable reliable estimates of transfers from non-reporting facilities to be made at this time*" (Coffey, as cited in WA EPA 1999) although they suggested that methodologies could be developed to provide diffuse transfer estimates.

There appears to be general, but not uniform consensus for the inclusion of transfers. Inclusion in a separate section of the database is the preferred model by many and the only acceptable option for some industries. Some suggested that the data could included within

the NPI database in such as way that clearly differentiates transfers from emissions data. Contextual and other information to guard against misuse and misinterpretation of the data is a further industry requirement.

For the inclusion of transfers in NPI amendments to the NEPM's definitions are required as recommended by Rae:

> **An engineered landfill** is a designed built and managed landfill incorporating placement of waste into lined discrete cells which are capped and isolated from the surrounding environment and from one another. Such a facility is purpose built and emissions to the environment are monitored and reported to NPI. The facility may be on the waste generator's land or be a separate facility.' All other landfills should be regarded as accepting material emitted to land.
>
> **Transfers** are the transfer of a substance to an identified receiving place whether in pure form or contained in other matter and whether solid liquid or gaseous. It includes transfers of a substance to a an engineered landfill, a sewage treatment plant or a tailings dam, and removal of a substance from a facility to an identified place for destruction, treatment, recycling, reprocessing recovery or purification.'

Recommendations

2. *That Transfers be included in the NPI and that the NPI NEPM be varied accordingly with the following definitions:*

   ***An engineered landfill** is a designed built and managed landfill incorporating placement of waste into lined discrete cells which are capped and isolated from the surrounding environment and from one another. Such a facility is purpose built and emissions to the environment are monitored and reported to NPI. The facility may be on the waste generator's land or be a separate facility.' All other landfills should be regarded as accepting material emitted to land.*

   ***Transfers** are the transfer of a substance to an identified receiving place whether in pure form or contained in other matter and whether solid liquid or gaseous. It includes transfers of a substance to a an engineered landfill, a sewage treatment plant or a tailings dam, and removal of a substance from a facility to an identified place for destruction, treatment, recycling, reprocessing recovery or purification.'*

3. *That the Commonwealth and the jurisdictions develop the transfer reporting form, methodologies for estimating transfers, include these in the relevant NPI resource material (handbooks and manuals as appropriate), redesign relevant databases so transfers are clearly differentiated from emissions data and develop relevant training and support materials.*
4. *That industry be consulted on the conceptual design of the database.*
5. *That efforts be made to ensure that duplicate reporting by industry reporters is minimised through integration of transfer reporting with, where possible, other required reporting systems such as the hazardous waste manifest system.*
6. *That facilities be required to report transfers when the transfer methodology has been incorporated into the industry Emissions Estimation Technique manuals.*

4.3 Greenhouse Gases

There are several concurrent processes underway relating to the inclusion of Greenhouse gas emissions in the NPI.

The first process is a joint working group of Environment Protection and Heritage Council and Ministerial Council on Energy officials. This was established in September 2004 to examine the costs and benefits associated with implementation of a nationally consistent framework for greenhouse and energy reporting from Australian industry to meet government and public reporting needs. The review followed on from the 2004 White Paper on Energy Policy, and the imposition of various requirements and schemes for reporting on greenhouse gas emissions and energy in different states.

The second process is one initiated by the Victorian State Government in which funds have been provided to the Victorian EPA to conduct a pilot scheme in 2005-06 to test the feasibility of making greenhouse gas emissions reportable under the NPI. This follows on from the 2000 review of the NPI by Professor Ian Rae, which recommended the inclusion of greenhouse gases in the NPI, and a second review by Professor Rae for the Victorian Government which explored how this might be implemented.

This review is the third process and is due to report prior to either of the other two. Greenhouse gas emissions is only one of several issues being considered in this review and in doing so it is inevitable that some overlap in identifying issues will occur. Given the other processes, it is not proposed to provide a detailed analysis in this report or to draw definitive conclusions, but to provide a summary of the issues that are relevant to NPI reporting.

At the moment, certain companies report on their greenhouse gas emissions to the Australian Greenhouse Office (AGO) under Greenhouse Challenge Plus, a government-industry partnership scheme designed to achieve reductions in greenhouse gas emissions and increased energy efficiency. Some States require reporting of emissions under environmental licence conditions for example the Victorian State Environment Protection Policy on Air Quality Management. There are around 25 programmes or reporting initiatives that require greenhouse and energy data from business and industry.

Greenhouse Challenge Plus (2005), which succeeds the previous scheme (Greenhouse Challenge, launched in 1995), introduces mandatory reporting for large fuel users who wish to obtain Federal Government fuel tax credits in excess of $3 million per annum; and mandatory reporting for major energy resource development projects. Challenge Plus also incorporates Generator Efficiency Standards and Greenhouse Friendly product certification. Challenge Plus member businesses agree to provide an accurate and comprehensive report of their greenhouse gas emissions and to develop an action plan to reduce their emissions. Members report annually on progress against their action plan and total emissions, and make a public statement about these outcomes. All members are subject to independent verification on a random basis.

The Greenhouse Challenge Plus online reporting system contains only greenhouse gas emissions reported by member businesses. Nearly 800 businesses are already members, representing over 1000 operating facilities and from nearly all Australian industry sectors. The new mandatory requirements are likely to affect around 100-200 businesses, mostly in the transport, mining and resources sectors. The system is not publicly accessible.

The National Greenhouse Gas Inventory (NGGI) provides an estimation of Australia's national emissions and is submitted to meet the Australian Government's international obligations under the United Nations Framework Convention on Climate Change (UNFCCC). The national inventory is prepared by the AGO using the Australian Greenhouse Emissions Information System, which provides a centralized emissions estimation, quality control and data management system for the AGO's national and state-level emissions data. The

inventory is prepared in accordance with international guidelines and is subject to international review.

Emission estimates at the sectoral level are derived from a range of sources including published Australian Bureau of Statistics (ABS) activity data and Australian Bureau of Agricultural and Resource Economics (ABARE). Some limited data are obtained through a survey of individual companies as well as the AGO National Carbon Accounting System. NGGI national and State/Territory emissions at the sectoral level are published annually but the limited amount of company level data collected for the NGGI is commercially sensitive and not available to the public. The Australian Greenhouse Emissions Information System database (with an interactive web interface) will be launched by the AGO in May 2005.

The three major issues that have led to a push to include greenhouse gases in the NPI are:

- Current greenhouse gas databases are not publicly accessible. This means that company and site emissions data are not available, and hence community right-to-know principles are not being met. While traditionally, the right to know has been associated with location specific hazards, broader impacts such as contributions to, and impacts of climate change are also relevant.
- Greenhouse Challenge data do not include information on all industries, and no information on diffuse sources, which are covered by NGGI. This limits .the usefulness of Greenhouse Challenge.
- Reporting is not mandatory. There are thus equity and social justice issues in relation to the responsibilities of non-reporters.

The NGGI does not rely on industry reported data.

Whether Greenhouse Challenge Plus can accommodate these issues and how diffuse data can be included in a public database are being addressed in the other processes, and there is an issue with jurisdictional resources and priorities, which will also be addressed in these other processes.

The major issues for industry are:

- The multiple obligations for reporting greenhouse gases to different levels of government as well as satisfying the international reporting obligations of overseas parent companies. This is the dominant issue, and the overwhelming view is that there should be a single input and output point and single protocol for all greenhouse gas reporting.
- Mandatory reporting requirements on a site-specific basis. The view is that commercial and propriety information would be deduced by competitors. There is also a view that voluntary agreements for reductions and energy efficiency may be put at risk.
- The conceptual issue relating to classifying greenhouse gases as pollutants. The view is that there could be ramifications for the application of environmental impact assessment and related regulations potentially affecting, for example, geo-sequestration. A change in the name of the NPI to a National Emission Inventory or similar may partly allay these concerns.
- Uncertainty about the value of reporting local emissions when potential impacts are global, not local
- Increased cost of reporting

Finally there is a clear view by proponents for inclusion that including greenhouse gases in the NPI would have major benefits.

- Firstly, the profile of the NPI would be raised and its relevance for the community increased.
- Secondly, there would be a national database of very accessible environmental information at a single location. This is consistent with the NPI's role as an environmental management tool of relevance to multiple user groups and individuals.
- Finally, there are benefits in having a single reporting point for industry reporting for all emissions, not only greenhouse. This would strengthen the case for harmonising

State/Territory and Commonwealth reporting arrangements over time to the benefit of both industry and government.

The view that inclusion of greenhouse gases in the NPI would strengthen its operation and make it more relevant to the community is difficult to refute.

Recommendations

7. *That the NEPM variation process include the provision for including greenhouse emissions depending on the outcome of the Ministerial Council Process and the NPI trials.*
8. *That consideration be given to changing the name of the NPI to a National Emission Reporting Inventory or similar value neutral title.*

4.4 Agricultural and Veterinary Chemicals

There are two broad classes of chemicals in the agricultural and veterinary industries that are relevant to this review, the major fertilisers (mainly nitrogen and phosphorus), and the agricultural and veterinary chemicals (Agvets) used mainly for pest and weed control. Agricultural chemicals, and veterinary chemicals are treated as a single class in this discussion. Veterinary chemicals of relevance in this discussions are those associated with large scale food production and include pesticide sprays and dips, and growth promotants and other chemicals that could find their way into the environment in animal excreta.

The first group, fertilisers, are manufactured and applied in large quantities and their release is not contentious from commercial and human health perspectives, but could have significant environmental impacts. The major issue with nitrogen and phosphorus broad acre application is potential run-off of nutrients into waterways leading to water quality problems and impacts on water supplies and on aquatic species and organisms. Such problems are catchment specific, but effects can be widespread, e.g. potential contributions to adverse environmental impacts to the Great Barrier Reef. There are few sensitivities with commercial in confidence data for this group, and sales data on a catchment specific basis could be made available.

Farm enterprises are currently not required to report to the NPI. Hence, if data on broad acre application of fertilisers were to be included in the NPI it would need to be generated by jurisdictions. The most practical way of including such data would be via diffuse source estimates on a catchment by catchment basis using sales data and modelling. The data have applications in catchment management. It has been pointed out that total Nitrogen and Phosphorus are currently included in diffuse source emissions data, but the coverage of catchments is low, and there are some issues with displaying information. At this point in time there does not appear to be a strong imperative for generating national data.

The inclusion of the Agvets, used mostly for weed and pest control, in the NPI is much more contentious. The issue was examined in depth by the Technical Advisory Panel (TAP) when developing the priority list of substances for inclusion in the NPI (NEPC, 1999). The panel noted that the Emergency Panel Registration Program (EPRM) of the then National Registration Authority would provide a better basis for prioritising Agvets than the method used to prioritise industrial chemicals, and that this ought to be examined further. The Panel concluded that there were a number of technical and policy issues to be resolved before Agvets could be included in the NPI, including the major issue of prioritisation.

A subsequent review of the NPI by Professor Ian Rae, (Rae, 2000) noted that Agvets scored a lower priority than chemicals included in the NPI substances list, agreed that the EPRM could form the basis for prioritising these, and concluded that Agvets should be included in

the NPI. The work program for EPRM is included in Appendix 6. Final priorities would need to be based on potential exposure and approaches for determining these were suggested. The review also recommended the inclusion of "inactives" (substances such as surfactants, and solvents and powders used to carry the active ingredients) if these are listed NPI substances.

Inclusion of Agvets in the NPI would require producers to report on an individual basis, and producers already report listed substances. However, the major environmental releases of Agvets are not in the manufacturing, but in the field use by farmers who are generally not required to report. Unless the NPI is varied to require agricultural producers to report, which is unlikely, data would need to be generated by jurisdictions as diffuse sources.

One approach suggested by Rae and referred to by some respondents, is to combine crop information and the recommended application rates of specific substance, and apply diffuse modelling techniques to estimate local area data. The information would be made publicly available on a catchment basis and for classes of substance such as organophosphates and carbamates rather than for specific chemicals. This would overcome issues of confidentiality and individual reporting, particularly if reporting by class was also applied to inactives. It is understood that work along these lines has occurred in Queensland.

It has been pointed out that cropped areas and crop types vary year to year and this creates practical difficulties in updating inventories. These practicalities need investigation, but as a general rule, agricultural departments maintain detailed information on cropped areas and crop types. It should be possible to develop an inventory update tool that could use these data to automatically update inventories.

A major reason for recommending inclusion of Agvets in the NPI was the recognised need for publicly available information on the use of chemicals with large human exposure potential through a variety of exposure routes, and the perceived lack of progress in the development of a national database of chemical use.

There are well defined but quite distinct responsibilities for different organisations in the regulation of chemicals and at least in part this may have contributed to this slow progress.

The two organisations for regulating chemicals in Australia are the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) and the Australian Pesticides and Veterinary Medicines Authority (APVMA). Inactives are most likely covered by NICNAS and active components by APVMA.

NICNAS was established in 1990 and is located in the Office of Chemical Safety within the Australian Government Health and Ageing portfolio. It is the national scheme for the notification and assessment of industrial chemicals.

The APVMA is the Australian government authority responsible for the assessment and registration of pesticides and veterinary medicines and for their regulation up to and including the point of retail sale. It has the powers and functions of the Australian Agricultural and Veterinary Chemicals Council which it replaced in 1993 (as the then National Registration Authority for Agricultural and Veterinary Chemicals (NRA)) and changed its name to APVMA in 2003.

The APVMA administers the National Registration Scheme for Agricultural and Veterinary Chemicals (NRS) in partnership with the States and Territories and with the active involvement of other Australian government agencies.

There is an international treaty referred to as the Rotterdam Convention covering international trade in hazardous chemicals and pesticides to which Australia is a signatory. DEH is the lead agency for the Rotterdam Convention, and, for industrial chemicals, is also the Designated National Authority (DNA) responsible for international liaison and communication with United Nations Environment Programme (UNEP) and Food and Agriculture Organisation of the United Nations (FAO). NICNAS is responsible for implementing the obligations of the Rotterdam Convention domestically regarding industrial chemicals.

For pesticides, the Australian Government Department of Agriculture, Fisheries and Forestry (AFFA) is the DNA and is also responsible for implementing Australia's obligations under the Rotterdam Convention for chemicals with an agricultural or veterinary application.

Private interests and viewpoints for Agvets are represented by Avcare, the National Association for Crop Production and Animal Health. Avcare represents the interests of manufacturers, formulators and distributors of crop protection, animal health and biotechnology products.

Other organisations relevant for inactives include the Australian Chemical Specialties Manufacturers Association (ACSMA), the peak industry body representing manufacturers and formulators of specialty chemicals such as soaps, disinfectants, and treatment chemicals, and the Plastics and Chemicals Industries Association (PACIA), the peak body representing the plastics, chemicals, adhesives and sealants industries in Australia. Table 1 summarises the responsibilities of various organisations

Table 1 Summary of Responsibilities

Organisation	Responsibilities
NICNAS	Regulatory body for Industrial chemicals including: Notification and assessment. Implementing Rotterdam convention obligations domestically. Registration of importers and manufacturers.
APVMA (formerly the NRA)	Regulatory body for Agvets, including: Assessment and registration. Administers national registration scheme Agvets with States and Territories and other agencies.
DEH	Lead agency for the Rotterdam convention covering international trade in chemicals. DNA for reporting to FAO and UNEP on industrial chemicals.
AFFA	DNA for Agvets. Implementing Rotterdam obligations for Agvets.
Avcare	Peak industry body for Agvets.
PACIA	Peak Industry body for plastics and industrial chemicals.
ACSMA	Industry body for specialty chemicals.

The regulatory regime for Agvets and inactives is clear but complex, and hence coordinated action can be protracted, particularly when release of data is concerned. APVMA maintains data on the use and sales data for Agvets, but it is understood that these are not broken down according to state or catchment. The data are held in tight confidence, and, as reported in the Rae review of the NPI, both the Australian Academy of Technological Sciences and Engineering, and AFFA have encountered difficulties in constructing a database of Agvet chemicals use in Australia, because of constraints in obtaining data from APVMA.

The Avcare position on release of agvet use data has not changed to that advocated during the Rae review. Avcare was prepared to share its own proprietary use information with the government in a proposed new industry database, but with commercial in confidence conditions, and public access restrictions. The government would have responsibility for integrating existing industry information and regulatory requirements. There is the obvious issue of public access restrictions and what this may mean in term of providing meaningful information to the public, and it does not appear that this proposal has progressed significantly.

Department of the Environment and Heritage is currently scoping a program for the development of a “chemicals monitoring database for reporting and monitoring industrial and household chemical use, disposal, and environmental fate” with funding from the Sustainable

Cities program starting in 2005-06. Until the scope has been developed, it is unknown whether the program will include Agvets, and what restrictions to the data may apply, given current Avcare and APVMA policies.

Proponents for inclusion of Agvets in the NPI are quite definite in their views. Body burden studies and food basket surveys show residue levels of various chemicals, including Agvets, which is indicative of historical exposure. For example, the US Centers for Disease Control and Prevention (CDC) has published the results of chemicals in blood and urine samples in one of the regular National Health and Nutrition Examination Surveys (NHANES) (CDC, 2003). The CDC points out that measured levels of chemicals in blood or urine are per se not indicative of health risks and that that many other factors need to be considered. For many chemicals further research is needed to relate levels to risks, but measured levels help set research priorities.

Jurisdictions are mainly ambivalent or non-committal about Agvets inclusion, and have some concerns about resources and relative priorities, with one definite that they should not be considered for inclusion at this stage.

There is clearly a desire for public information on the use of Agvets, but equally clear resistance to public disclosure of what is seen as commercially sensitive information, and efforts to date have not been successful in establishing a publicly accessible database. It would not be practical, nor desirable, to require individual farmers to report on chemicals usage through the NPI, and unless the disclosure policies of relevant organisations change, sales data are unlikely to be available. Under these conditions, diffuse source estimates using crop data and nominal application rates remains the most feasible way if Agvets are to be included in the NPI and this task would fall to jurisdictions.

As mentioned earlier, funds have been allocated to DEH for establishing a database of chemical use including industrial and domestic chemicals. This may serve as the mechanism for obtaining actual data on the usage of Agvet chemicals, provided this is within the scope of the funded program. It would therefore be appropriate to defer consideration of Agvets in the NPI until progress with this program and its capacity for delivering public access to Agvet use data can be assessed.

Recommendations

9. *That the DEH provide an assessment on the capacity for the chemical use database program to provide public information on Agvets to the EPHC,*
10. *That EPHC defer consideration of the inclusion of Agvets in the NPI be pending the outcome of the assessment.*

4.5 NPI Reporting Industries

The NEPM as it stands requires that an industry handbook be available before an industry is required to report. There is mixed support for this reporting precondition to be retained in the NEPM. Current advice is that this precondition is met if that industry's ANZSIC code appears in any handbook, and the practical application of this is discussed in section 5.2 of this report. Given this advice, along with unlikely need for many new handbooks, it is suggested that this provision requiring handbooks to be published before an industry reports to NPI be retained.

Two industries have been specifically suggested for inclusion, aquaculture, and crematoria. There may be others for which reporting may be desirable, but this requires further analysis of work undertaken by Queensland EPA with industry classification codes.

At the moment, the NPI NEPM exempts aquaculture establishments from reporting. A number of submissions have suggested that aquaculture is in many respects similar to intensive animal industries which are required to report. They point to the potentially large nutrient loads imposed on the local environment. A related issue is the potential for impacts of nutrients, chemicals used, and fish diseases to extend beyond the farm boundaries and adversely impact surrounding waters and fish. These issues can be handled in approval and management processes, and usually involve consideration of stocking rates and capacity of the local environment.

It would still be desirable to develop an overall picture of emissions from these industries and the NPI provides a suitable mechanism. In addition a diffuse source manual exists for aquaculture and existing reporting thresholds are likely to be appropriate, so incorporation would be a relatively simple matter.

There were 873 aquaculture management units listed in the ABS business register in December 2001, but the proportion of those that would trigger reporting levels is unknown. Without further research it is not clear how many of these would trigger reporting thresholds, and what potential benefits may ensue from reporting.

Further discussion and analysis of the issue is warranted, and this can occur during the review process. It is suggested that the IWG would play an important role in collaboration with stakeholders and the project team appointed to the NEPM variation process. It is therefore be appropriate to consider removing the exemptions for aquaculture in the variation process, subject to further analysis during that process.

Crematoria do not appear to be covered by existing industry codes and thresholds but at least one jurisdiction includes these sources in the diffuse source estimates. The main issue with crematoria is mercury released during combustion. DEH estimates that based on UK mercury emission factors, nationally mercury emissions from crematoria are very significant. The main problem with mercury is its high mobility in the environment, and diffuse source estimates are an adequate indicator of the potential impacts of this industry. It is therefore also recommended that crematoria should be included in diffuse source estimates in the interim.
One approach for including crematoria is to include an industry specific mercury reporting threshold (as opposed to the current reporting protocol where crematoria triggering a threshold would be required to report). This could have ramifications for industry specific thresholds for other industries and should be further investigated. It is therefore suggested that consideration of industry reporting thresholds be deferred pending further analysis.

An assessment of industries currently covered has been compiled by the Queensland EPA.

Recommendations

11. *That the provision requiring handbooks to be published before an industry reports to NPI be retained.*
12. *That removal of the exemption of aquaculture from NPI be included in the variation process subject to further analysis.*
13. *That an industry specific threshold for mercury not be considered in the variation process.*

4.6 Construction Industry Sources

The NPI currently includes reports from a number of construction related activities including mining of construction materials, non building construction (mainly asphalt plants) and the manufacture of various materials used in the construction industry. The diffuse source data also include emissions from construction related activities such as concrete batching plants.

Emissions from the construction industry predominantly would relate to particle emissions from excavation of soil and possibly during construction but could also include other environmental emissions to waterways and during the demolition phase the generation of solid waste. While a major construction can occur over several years other construction activities are more short lived and thus are unlike other NPI reporting industries which occur at fixed sites over many years.

A small number of those consulted considered, with limited comment, that construction industry emissions should be included in the inventory. One respondent suggested that the inclusion of emissions from major road construction projects may be beneficial as their emissions may be comparable to some mining operations with significant use of non-road construction vehicles. However in consideration of the short lived nature of the work and hence the emissions it would seem that it would be more appropriate for emissions from this industry to be included in the diffuse emissions data.

Other than for mobile sources operating outside the boundaries of fixed premises, there is some ambiguity as to whether construction activity is covered if reporting thresholds are triggered.

Recommendations

14. That an investigation be undertaken to determine whether the current reporting thresholds apply to the construction industry.

15. That NEPC defer further consideration on the inclusion of emissions from the construction industry pending the outcomes of the investigation into the relevancy of the current reporting thresholds to the industry.

4.7 Non anthropogenic sources

Some of the main non anthropogenic sources of emissions such as the natural biogenic emissions from vegetation and soil and emissions from wildfires (together with emissions from forest regeneration fires and fuel reduction and agricultural burning) are included in the aggregated emissions data. However reporting on these emissions is not uniform across jurisdictions. Where these emission sources are reported they make a significant contribution to the total emissions for particular substances such as particle emissions and volatile organic compounds (VOCs). For example a database inquiry of VOC emissions from biogenic sources in Western Australia shows that biogenic sources comprise 91.7% to total VOC emissions and burning (anthropogenic and non anthropogenic i.e. fuel reduction, forest regeneration fires, wildfires and agricultural burning) generate 4.3%. While this illustrates that natural sources swamp any anthrogopenic VOC emissions it is even more dramatic when further inquiry shows that these emissions had only been estimated for the two (Pilbara and Bunbury) of the four Western Australian airsheds.

Biogenic emissions and emissions from wildfires are the background emissions. The NPI NEPM goals are to assist "in reducing the existing and potential impacts of substances and to assist government, industry and the community in achieving the desired environmental outcomes" of the NEPM. Inclusion of biogenic emissions and wildfires cannot lead to the achievement of the NEPM goals and their inclusion in the NPI may prove to be confusing for users. There is a case for emissions from fuel reduction burning, forest regeneration fires and agricultural burning to be included as these types of fires are initiated by humans. There is also a case for plantation forest management fires to be included as these contribute significant amounts of PM10 in some airsheds.

Several respondents indicated that emissions data on non anthropogenic sources are important for urban air quality management, particularly in determining background levels of photochemical precursors and products and assessing greenhouse gas emissions. While these are worthy applications the NPI is not currently designed for these applications.

Recommendations

16. *That emissions from non anthropogenic sources such as emissions from biogenic sources and wildfires be excluded from the main NPI database.*
17. *That consideration be given to including emissions from non anthropogenic sources in a separate database that provides the appropriate context when funding and sufficient data on biogenic emissions are available,*
18. *That emissions from burning for fuel reduction, forest regeneration fires, plantation forest management and agricultural burning be included in the diffuse source emissions data.*

4.8 Specific Substance List

As noted in the Rae Report there are a number of typographical errors that should be corrected in the substances listed in Schedule A of the NPI NEPM. These and others identified are:

- Benzene hexachloro – (HCB) would be better listed as Hexachlorobenzene – (HCB) and the CASR number corrected to 118-74-1
- Ethylene oxide has a CASR number of 75-21-8 (not 72-21-8)
- 4,4-Methylene bis 2,4 aniline (MOCA) should be listed as 4,4'-Methylene bis(2-chloroaniline) (MOCA)
- Trichoroethylene should be Trichloroethylene
- 1,1,2,2-Tetrachloroethane should replace 1,1,1,2-Tetrachloroethane.

In addition, while the Technical Advisory Panel listed substances in the older spelling (sulphur - as in sulphur dioxide, sulphuric acid, etc), for consistency with the terminology used in the Chemical Abstracts Service Registry Number in the Australian Inventory of Chemical Substances (AICS) and in other National Environment Protection Measures all mentions of sulphur should be changed to sulfur (sulfur dioxide, sulfuric acid, etc)

Additions to the Substance List

The United Kingdom is currently consulting on its PRTR substance list and on thresholds. The consultation document for the UK review is a timely document. The UK PRTR which also commenced in 1998 has a slightly larger substance reporting list, is configured differently and includes transfers but not diffuse source emissions. It is proposed to make the following broad changes and also change the thresholds for a number of substances. 28 of the 48 new substances proposed are due to revisions in the VOC list.

Table 2 Proposed changes to the UK PRTR

Medium	Substances			
	Current Number	**Newly Added**	**Removed**	**Total**
Air	129	46	21	154
Water/Sewer	77	31	4	104
Land	0	0 to 104	N/A	0 to 104

Source: The Environment Agency, the Scottish Environment Protection Agency and the Environment Heritage service of Northern Ireland, 2005, Consultation on proposed changes to the UK Pollutant Release and Transfer Registers (PRTRs) for 2005 to 2007, viewed at www.environment-agency.gov.uk/commondata/acrobat/uk_prtr_co ns_1012615.pdf

For this review a number of respondents nominated substances for inclusion in the NPI substance list. These are listed in the table 3. While these have not be thoroughly reviewed by the methods used by the Technical Advisory Panel some preliminary assessment is made in table 3.

Table 3 Substances nominated for inclusion

Substance nominated for inclusion	Comment	Recommendation
Acrolein	Included on US TRI, proposed for inclusion on UK PRTR	Consider for inclusion
All air toxics	All NEPM Air toxics included except benzo (a) pyrene which in the Air Toxics NEPM is a marker for PAHs Included on UK PRTR	Consider benzo (a) pyrene for inclusion
Carbon tetrachloride	Included on US TRI and UK PRTR. Information about its use is collected under other legislation (see ozone depleting substances below)	Consider for inclusion
1,2-dichloropropane	Included on US TRI Not included or proposed for UK PRTR	Not recommended for inclusion
1,3-dichloropropene	Included on US TRI Not included or proposed for UK PRTR	Not recommended for inclusion
Hydrazine	Included on US TRI Not included or proposed for UK PRTR	Not recommended for inclusion
Methylene chloride	This is also known as dichloromethane which already included in the NPI	Already included
Ozone depleting substances	Included on UK PRTR	Consider for inclusion
Poly Brominated Fire Retardants (PBFR)	Currently under review by NICNAS	
PCBs	Included on US TRI and UK PRTR (as whole and as TEQ)	Consider for inclusion
PM2.5	Proposed for inclusion on UK PRTR	Consider for inclusion
Speciation of PM10 to distinguish inerts from toxics	Not included on US TRI or UK PRTR. NPI already includes substances contained in TSP if threshold exceeded.	Consider issue based on comments from resources sector that these provide better indicator
Quinoline	Included on US TRI Not included or proposed for UK PRTR	Not recommended for inclusion
1,1,2,2-tetrachloroethane	Included on US TRI and UK PRTR	Consider for inclusion
Thallium	Included on US TRI Not included or proposed for UK PRTR	Not recommended for inclusion
TDS, BOD, pH for water	These are related to concentrations, not to masses. Not included in other PRTRs	Possibly provide through links to monitoring data

While not raised in the course of this review Professor Ian Rae in his 2000 review recommended that the following substances also be considered for inclusion on the substances list.

- Organochlorines emissions from smelting
- Possibly additional phthalate esters - the UK PRTR contains Benzyl butyl phthalate (BBP)

Deletions to the Substance List

A number of substances were recommended for deletion as follows:

- acrylamide
- aniline
- benzene hexachloro (HCB)
- 2-ethyoxy ethanol acetate
- ethyl butyl ketone
- 2-methoxyethanol
- 2-methoxyethanol acetate
- 4,4'-methylene bis(2 chloranaline) (MOCA) (CAS 101-14-4)
- nickel carbonyl.
- nickel subsulfide

The main reason given by respondents for recommended deletion is these substances are not being reported. While a number of recommendations were made to delete nickel subsulfide because there were no reports and as indicated that it cannot be reliably determined, in 2003-04 one facility operator did report nickel subsulfide and they were sure that it was a correct emission.

Other respondents suggested that not only those substances not being reported be deleted from the list, substances where small amounts (and with due consideration of the risk they pose) should also be deleted. There is also the view that substances that are not being reported remain on the substance list as they may emerge as the substances of future policy focus.

Much experience has been gained and data gathered that would indicate the NPI substance list should be reviewed in full. Some anomalies are evident with the ranking methodology, for example for agricultural and veterinary chemicals and some air toxics, however an alternative methodology does not stand out and considering altering the methodology would be counterproductive. Consideration should be given to reviewing anomalies on a case by case basis.

Recommendation

19. That the Technical Advisory Panel be reconvened to review the substance lists taking into consideration recent international PRTR reviews, this review, and other relevant new information.

Substance List and NPI NEPM Clauses

The Department of the Environment and Heritage (DEH) suggested the following amendments to NPI NEPM clauses in Schedule A (see appendix 4 for current wording):

i. Clause 1 (a) Needs to specify how to determine emissions of acids.

ii. Clause 1 (e) This is complicated as it is not always clear which metal compounds are present at a facility. DEH recommends the basis of reporting thresholds be the same as for emissions, which is only considering the metal part of the compound.
iii. Clause 1 (f) It is not clear what this means. The NPI NEPM should be prescriptive as to how to report substances rather than leaving it to the reporter's discretion.
iv. Clause 2 (d) The Cl needs to be corrected to Cl_2.

The suggested amendments i and ii are not recommended and any clarification required be made in the Emission Estimation Technique Manuals where appropriate. An amendment based on iii above is appropriate.

Current reporting requirements for emissions of chlorine is not clear, reportedly resulting in inconsistent reporting however proposal iv could be misinterpreted so that only chlorine gas would be reported. Careful wording of any amendment is required to ensure that it can not be misinterpreted.

In addition DEH believes that consideration should be given to streamlining the destinations (air, land or water) of emissions of some substances (e.g. total nitrogen and total phosphorus are more usefully only reported to water and land – not air). Another example is it may be useful to only report emissions to air for oxides of nitrogen and carbon monoxide.

Clause 13 of the NPI NEPM clearly states that category 3 substances (total nitrogen and total phosphorus) are related to emissions to water. No evidence was provided to indicate that emissions of substances anticipated being reported to as air emissions were also being reported to water or land.

It has also been proposed in this review and also by Professor Rae (2000) that Total Nitrogen and Total Phosphorus should be linked so that if the threshold of one is exceeded then it be required that both be reported. This amendment is sensible as it provides important information about emissions to water.

DEH also proposed that consideration should be given to simplifying making changes to the substance list whereby

- A minor variation should be required to update or make minor changes to the substance list (e.g. typographical errors).
- Substances could be put on the list temporarily to gather information about emissions (e.g. particulate matter 2.5 micrometres or less in diameter ($PM_{2.5}$)).

Section 22A of the National Environment Protection Council Act 1994 addresses minor variations to NEPMs whereby if the National Environment Protection Council determines that the variation is minor and does not involve a significant change in the effect of the NEPM then Clause 2 and Section 22B the process that is required to make the variation.

There is a risk that the proposal to include substances on a temporary list could result in those substances not being considered by reporters and jurisdictions alike with the same gravity as other listed substances. In addition the knowledge of pollutants and the risk they pose to humans and the environment is constantly evolving, and this necessitates that there are regular reviews of the substance list. It is therefore considered that there id not sufficient merit in including a temporary list of substances.

Recommendations

That the NPI NEPM be varied by adding the following clause after clause 3

20. *" When a facility is required to report on category 3 substance it shall also be required to report on the other category 3 substance whether or not the facility exceeds the threshold for the other category substance".*
21. *That Schedule A, Clause 1 (f) be amended to read "the threshold for "Phenol" (CASR number 108-95-2) refers to the amount to the total amount of phenol used.".*

22. *That Schedule A 1(d) be amended to read "the threshold for chlorine and compounds includes the amount of chlorine compounds used which may produce emissions of chlorine gas (Cl_2), free residual chlorine (Cl^-), hypochlorite ion (OCl^-), hypochlorous acid (HOCl) and chloramines;" and*

    That Schedule A 2(d) be amended to read "the amount of chlorine emitted refers to the amount of chlorine gas ($Cl_{2)}$, free residual chlorine (Cl^-), hypochlorite ion (OCl^-), hypochlorous acid (HOCl), chloramines emitted, expressed as the equivalent weight of chlorine (Cl).

    The CASR number refers to the diatomic gas, ($Cl_2$7782-50-5)"

4.9 Thresholds

Unlike other PRTRs that employ complex systems of thresholds the Australian thresholds are straightforward and simple. In Rae's 2000 review of the NPI and during this review there was broad agreement by most respondents that the thresholds should not be changed with the possible exception of mercury (which is discussed separately below).

The suggestions that were made on the threshold levels included the following:

i. The thresholds should be set more simply as they are sometimes very complicated to determine if the threshold has been exceeded and they can be misinterpreted resulting in some substances not being reported that should be. This can be overcome by having a simple threshold that relates to a set of substances for certain types of facilities (e.g. all mines need to report emissions of particular substances). This would also have the advantage of having common substances reported across an industry sector which would allow more meaningful comparison of facilities within sectors.
ii. To avoid confusion thresholds should be given in kilograms rather than tonnes to avoid facility operators incorrectly report emissions in tonnes per year.
iii. PM10 should have a category 1 threshold
iv. PM2.5, if included, should have a category 2a threshold
v. The threshold for piggeries should be increased to 15 tonnes because of assumptions already made in the NPI NEPM about ammonia.
vi. For the mining industry because of the large quantities of material handled the thresholds are too low.

Given the general satisfaction with the thresholds (with the exception of mercury, PM2.5 and PM10) the current thresholds should be retained. The problems i and ii mentioned above will diminish with proper auditing and data validation and as reporters become more familiar with the reporting systems.

Mercury

In his review Professor Ian Rae made the recommendation that there is a case for making a significant reduction in the threshold for mercury and this should be examined by a technical review panel. The current NPI threshold for mercury is 10 tonnes. UK Pollutant Release and Transfer Registers have a threshold of 1 kilogram for emissions to air and has a threshold for mercury emissions to water of 0.1 kilogram. The US TRI's threshold for mercury is 10 pounds.

Recommendations

23. That the Technical Advisory Panel review the threshold for PM10.

24. That the Technical Advisory Panel review the appropriateness of reducing the threshold for mercury.

4.10 Review of the NEPM

There is general consensus amongst jurisdictions that the NPI NEPM should be reviewed on a regular basis, but different opinions as to the appropriate frequency. A common view of the frequency is 5 years but coincidence with the Commonwealth budget cycle has also been suggested and this implies 4, 8, or 12 year cycles. It would therefore be appropriate for the next review to coincide with the Commonwealth budget cycle in 3 years, and that subsequent major reviews occur at 8 year intervals. This should not preclude more frequent reviews should this prove necessary, nor should it preclude program effectiveness and efficiency reviews at any time.

Recommendation

25. That the next review of the NPI NEPM occur in early 2008, and subsequent reviews occur no less frequently than once every 8 years.

NATIONAL POLLUTANT INVENTORY OPERATIONAL ISSUES

5.1 NPI Systems and Database

The current database has gone through a substantial development phase since it was first proposed in the early 1990s: it was designed based on trials; the NEPM made in 1998; and, the first year of reporting commencing in 1998-99. In the first reporting year 1203 facilities from 23 industry sectors reported emissions data, with 46% of all reporting facilities being from the Petroleum Product Wholesaling sector. The database now contains reported emissions for 85 substances from 410 sources, which were obtained from 3,629 facilities, and 335 diffuse sources.

In the initial years there was an emphasis placed on preparing resource material on diffuse source, for industry reporters and meaningful contextual information on the website, developing cooperative jurisdictional procedures, determining diffuse source emissions for airsheds and water catchments, training and enlisting industry reporters and ensuring adequate industry coverage. The NPI is now at a stage where the emphasis should shift to developing more consistent approaches to data collection and reporting, improving data quality through data validation and auditing and enhancing community awareness

Industry substance reporting

A number of industry reporters raised concerns about the reporting limit for substances. Concerns centred on the lower limit for the emission quantity and the requirement to report half detection levels when measurements were below detection levels. While the NPI reports emissions of toxic substances there are many instances where emissions of extremely low levels are reported both by industry and as diffuse sources. For example the reporting of 0.0000058 kg nationally of sulfur dioxide from accommodation.

In addition, in current calculation methods, if direct measurement results are below the detection level then half detection limits are required to used for calculations which could result in reporting of kg's of emissions when the half detection limit is multiplied by the volume emitted. It would be more appropriate to report 'below detection limit' or "BDL' however the considerable changes would be required to, for example, jurisdictional databases, the National Reporting Tool and to the data transfer protocol between jurisdictions and the Commonwealth as these cannot report text in numeric fields and for this to occur would add complexity to the program and would be expensive. The options appear to be to report a zero or a "-" could be considered.

Currently, the NPI reports the emissions of polychlorinated dioxins and furans in kilograms per year. Dioxins and furans are complex mixtures of families of substances, with a wide range of toxicities. It is more meaningful in assessing their effect on the environment to weight the substances by their relative toxicities. Expressing data for dioxins and furans as Toxic Equivalents (TEQ) will allow the NPI users to better understand the toxicity of emissions. The UK reports polychlorinated dioxins and furans as TEQ rather than total mass and the United States is proposing to. Reporting these substances as TEQs will provide a more useful data set, simplify reporting by industry and enable easier benchmarking within Australia and with other countries.

Recommendations

26. That the NEPM define a range of reporting minimums for all substances.

27. That the NEPM specify that where emissions are below detectable limits consideration should be given to reporting these as zero(or "-" if feasible).

28. That the NEPM require dioxins and furans to be reported as Toxic Equivalents (TEQ).

Emission Estimation Techniques

Emission Estimation Technique Manuals, which are required to be published before an industry reports to the National Pollutant Inventory have been developed for 93 industries and are listed in appendix 5.

However many reporting facilities, and some of the jurisdictions, were critical of the Emissions Estimation Techniques (EET) provided indicating particular concern with the over reliance on USEPA AP-42 protocols and of issues that have been highlighted but have not been resolved. It was indicated that discrepancies between some methods encourages use of methods less appropriate to their specific circumstances, either to reduce workload, and/or reduce reported emissions. Limitations of the NPI EET accounting methodology reduces the value and accuracy of the NPI data for cumulative and regional assessment purposes.

Emissions Estimation Technique calculation methods should reflect the best available science for measurement and interpretation of data and this requires that they be regularly reviewed. A complete review of all manuals is a sizable undertaking and would be assisted by a systematic review schedule, adequate resources and an approval protocol that includes a peer review. An estimate of cost of reviewing and updating each industry manual would be in the order of $2,000 - 15,000 therefore if funds in the order of $200,000 per annum were allocated around 20 or more manuals could be reviewed annually which would give a review cycle for each manual of once in four years. Data accuracy will improve as methodologies evolve and facilities become more familiar with the reporting requirements. Indications are that there are industries, or industry associations, that are willing to assist in reviewing manuals and those that have done so already, from limited comments, show confidence in the emission estimates and have greater interest in the NPI.

Due to the overall size of the task and the limited time available there were many contributors to the development of the EET Manuals and this has resulted in significant variations in style and format. Standardisation of format and style of the manuals would be useful for reporters using several manuals and in preparing revisions. Manuals are downloadable for the NPI website and this is an effective mechanism to disseminate revisions efficiently.

Consideration for alternative ways of delivering manuals to reduce the effort and simplify their use is worth exploring. This would be via an electronic database of estimation techniques for specific processes, unit operations, and equipment which is coded. Use of the code would bring up the correct set of Emission Estimation Techniques for that industry. Thus for example an industry could insert their industry code and a set of relevant pages and list of substances expected to be emitted could be provided on line. This is a longer term project with the potential to make large efficiency gains.

NPI Reporting Tools

The National Reporting Tool (NRT) facility, which is available to reporters in all jurisdictions except NSW, requires industry reporters to email their annual returns to the relevant jurisdiction NPI team. The NRT, which replaces the paper-based system, received positive comments from many industry reporters. It is viewed as more convenient and efficient by industry reporters and jurisdictions. The next step that would be welcomed by industry reporters and jurisdictions in general, is the provision of an on-line system which is in development phase. It is important that the opportunity is taken to incorporate the on-line automatic data checking and validation functions and to reduce jurisdictional reporting differences. It would be anticipated that on-line reporting would improve data handling and reduce costs for both reporters and jurisdictions particularly when compared to the previous paper- based system.

In addition to reporting emissions the current NPI reporting forms request industry reporters to describe the ways in which a facility has reduced emissions to air, water and/ or land of the substances used or produced on site. The questions are posed in such a way that it is difficult

to determine when the actions were implemented and their impact on emissions. Therefore it is not possible to assess the introduction of waste minimisation and cleaner production measures during the reporting year (except perhaps by checking back on the previous year's return).

Recommendations

29. *That Government and industry NPI representatives work together to critically assess deficiencies in resource materials and develop priorities and a schedule for up dating and correcting these.*
30. *That a 4-5 year schedule be developed, with an annual budget allocation of $200,000 for reviewing each of the Emission Estimation Technique Manuals.*
31. *That a standard format and style be developed for the Emission Estimation Technique Manuals.*
32. *That the data transfer protocol be reviewed to allow for a web based reporting tool. The review process may include the specification, design, trialing, and implementation.*
33. *That alternative ways of delivering emission estimation techniques to users be explored.*
34. *That the on-line NPI reporting, currently being developed, should be fast tracked and include automatic data checking and validation functions and be designed to reduce jurisdictional reporting differences and to provide useful and usable information on the waste minimisation and cleaner production measures introduced during the reporting year. The continuing need for paper- based reporting should be assessed.*
35. *That agreed targets for auditing industry returns be establish and resources provided for achieving these targets.*

Industry Sources

A number of jurisdictions have raised the issue of industry reporting, and whether more facilities should be reporting. The question can be looked at from different perspectives.

Firstly, are all facilities in industries required to report actually reporting? Secondly, are there industries, currently excluded from reporting by design or accident due to of the absence of an industry handbook (which is required by the NEPM as a precondition for reporting), that should be included in the NPI? A third issue relates to the appropriate thresholds and is discussed elsewhere in this report.

On the first issue, DEH estimates that based on ABS data, more than 75% of premises that may need to report do not report. It is not clear however what proportion of non-reporters actually trigger a reporting threshold. Estimates made by others suggest much lower, but still substantial numbers of non reporters. This can reasonably be considered an upper bound estimate. A recent Queensland survey (EECO 2005) gives a similar result, with around 55% of premises not reporting that should have reported. This was based on an assessment of survey responses, but the sample size was small. Although the precise capture rate is unknown it seems clear that a very significant number of potential reporters do not report. It is less clear however whether emissions from non-reporters are significant, or how to improve reporting rates.

It is suggested that the scale of the problem in terms of environmental significance needs to be first assessed in order to evaluate what level of resources are warranted to improve reporting rates. The assessment would need to be carried out on an industry by industry basis, and could combine data from reporting facilities in the industry with statistical data from the ABS. A list of substance to be expected from each industry could be useful for industry. The involvement of industry associations would be vital in providing information as well as promoting compliance. Comparative overseas data could also be used.

Various approaches could be taken to improve reporting rates where this is warranted. These range from requiring reporting from all premises in the industry, including a below threshold report, as has been suggested, coupled with appropriate enforcement, to promotional activities preferably through industry associations. There is no universally ideal approach applicable to all situations.

On second issue, Queensland EPA has done some work in identifying industries that are not reporting and in providing a preliminary assessment as to whether they should be included in the NPI. For those suggested for inclusion, an assessment was made of whether an existing manual could be used to cover that industry, or a new manual required. Current advice by the Commonwealth, relayed via the WA EPA, is that industries must report if their ANZSIC code appears in any manual. This means that an industry could be required to report by including the relevant ANZSIC code in an existing manual. Expansion of an appropriate manual for a similar industry may be required in addition to the inclusion of an industry code to increase its relevance. There may be some non reporting industries already covered in this way, but further work is necessary to determine this with any precision.

It is suggested that the current work needs to be reviewed and extended to provide a clearer picture of non-reporters already covered, and to assess priorities for industries not covered and for the work required to include these in the NPI system.

Recommendations

36. That the IWG or other suitable group:

- *explore options to improve reporting rates where appropriate*
- *prepare and distribute to all industry sectors the relevant manuals for each industry*
- *review the necessity for new manuals*
- *explore alternative ways of delivering emission estimation techniques*

(These recommendations are in addition to other others that may be appropriate for this group/s to consider).

Diffuse Sources

There are now 33 airsheds and 32 catchments together with reports on emissions to land included on the NPI database. This diffuse source data is estimated by the jurisdictions and provides estimates of emissions to air, land and water from sources other than reporting facilities. Its inclusion provides more complete depiction of emissions to our environment. Sources include facilities too small to report individually (such as dry cleaners), everyday household activities such as cooking on household barbeques and driving to work, and for land uses that cause nutrient emissions to waterways. These aggregated sources are not estimated annually. There are a number of valid reasons for only making these estimates periodically, the main ones being:

- the expense: a comprehensive air emissions inventory for a major metropolitan airshed reportedly costs in the order of $150,000 - 450,000 and a catchment inventory costs about $50,000 to undertake. Updates of air emissions can cost less. The Commonwealth provided substantial funding to undertake many of the initial emissions inventories but funding has reduced over time.
- the resources and the scale of the task to completely redo the estimates particularly for large airsheds with multitude of emission sources. Work on the inventories needs to be scheduled into work programs and budgets
- emissions are unlikely to change significantly from year-to-year although over a number of years changes can be substantial particularly for motor vehicles. For example the number of registered vehicles on Australian roads is increasing at the rate of 2.8% per annum and 61 percent of passenger vehicles on Australian roads in 2001 were manufactured after 1990.

The following provides an overview of the currency of the aggregate emission estimates for selected airsheds and catchments.

Table 4 Overview of currency of aggregate emission estimates

	Base year	Updates and comments
AIRSHEDS		
Australian Capital Territory	1999	None scheduled
New South Wales		
Sydney-Newcastle-Wollongong	1998	Domestic sources updated in 2000. A complete update is scheduled for release in 2006
Northern Territory		
Darwin and Alice Springs	2000	None scheduled
Queensland		
South East Queensland	1997/98	Updated in 2003
South Australia		
Adelaide, Port Augusta, Barmera, Barossa, Berri, Mount Gambier, Port Lincoln, Loxton, Lyndoch, Millicent, Nuriootpa, Port Pirie, Renmark, Riverland, South East, Spencer Gulf, Whyalla	1998/1999.	Updated for 2002/2003.
Victoria		
La Trobe	2000	2005
Ballarat, Bendigo and Mildura	Post 2000	2005
Port Phillip	1995/6	2004 -selective update for population, fuel use, vehicle kilometres travelled, etc 2005/06- planned update
Whole of Victoria	Based on 2002 data	Available but not supported by NPI database
Western Australia		
Perth	1998/99	Scheduled 2004/05
Pilbara	1999/2000	None scheduled
Bunbury Region	2002-2003.	
Kalgoorlie	1998/99	
WATER CATCHMENTS		
New South Wales		
Hawkesbury-Nepean, Hunter, Port Jackson, Botany, Port Hacking, Illawarra	1998/99	
Richmond, Manning	1999/00	NSW catchments - updated at a sub-catchment level
Clarence	2001/02	
Macleay, Shoalhaven	2002/03	
Queensland		
Johnstone	2000	
Dawson	2000	
South East Queensland	1997/98	Will be updated in 2005.
South Australia		
Adelaide and Barossa	1998/99	
Tasmania		
Eastern Tasmania, North-West Tasmania and South-West Tasmania	2002	

	Base year	Updates and comments
Western Australia		
Swan-Canning.	1999 (based on 1985-1998 stream data)	
Peel-Harvey	2001 (based on 1985-1999 stream data).	
Avon	2001 (based on 1985-1999 stream data)	
Blackwood and Scott River catchments	2002 (based on 1996-2000 stream data).	
Vasse – Wonnerup	2004 (based on 1996-2002 stream data).	

This information was in the main provided by the jurisdictions and not easily found on the NPI database, the implication being that NPI users could not determine the currency of the diffuse source data.

It appears that the major efforts to date have been targeted at providing adequate coverage of diffuse sources in major population centres and that attention is now being directed at updating the initial inventories. However as these inventories have been developed and updated there is a lack of consistency in the base year and it is apparent that there is no systematic process for determining when updates occur making airshed comparisons difficult.

Ng (2005) and Ng et al (2005) presented a number of conference papers on South Australian and Victorian air emissions inventory work at the Clean Air Society of Australia and New Zealand Biennial Conference in Hobart in May 2005. In these papers Ng and Ng et al indicate that in addition to increases in population and vehicle registrations there have been a number of new studies of emissions from Australian vehicles, US vehicles and changes in emission factors for woodheaters amongst other changes that may result in significant changes in the airshed emissions. These changes are highlighted in the following tables that compare inventories for Victoria and South Australia.

Table 5 Aggregated emissions (t/yr) in Adelaide and SA regional airsheds

Airshed	Pollutant	1998/99 inventory	2002/03 inventory
Adelaide	CO	170 000	130 000
	NOx	22 000	28 000
	PM_{10}	8 400	2 700
	SO_2	1 200	1 200
	VOC	40 000	41 000
Regional airsheds	CO	16 000	13 000
	NOx	5 400	6 000
	PM_{10}	2 900	1 800
	SO_2	420	400
	VOC	7 600	8 000

Source: Ng YL, Johnston D, 2005

Table 6 Total annual emissions (tonnes) of primary pollutants in Port Phillip and Victoria regions

Pollutant	Port Phillip Region 1995/96	Port Phillip Region 2002	Victoria Region 2002
CO	670 000	600 000	1 450 000
NH_3	34 000	15 000	142 000
NOx	94 000	135 000	333 000
PM_{10}	20 000	19 000	229 000
SO_2	57 000	129 000	310 000
VOC	240 000	219 000	1 070 000

Source Ng, YL, Joynt B, Yan M, 2005 Development of a State-Wide Emissions Inventory for Victoria

Emissions for the Victorian inventory have been expanded from reporting of 32 pollutants in 1995/96 to reporting 81 pollutants in the most recent update. In undertaking these inventory updates Ng and Ng et al used a methodology based on readily available activity data, which it is claimed is suitable for updating an inventory in which emissions have been estimated accurately before. The computer based methodology, EMADMS coupled with the motor vehicle system, AusVeh, that covers motor vehicles, provides a cost effective method that does not require expensive and time-consuming surveys and data collections. AusVeh also has the capability of determining greenhouse gas emissions.

Ng and Ng et al therefore provide a potential cost effective mechanism (possibly around $10,000 to $20,000 per airshed) that could be used to bring all the airshed inventories in line.

In addition to the apparent inconsistencies in diffuse source reporting years there are also differences in the air emission sources and substances that are reported by the jurisdictions as shown in table 7. These differences have the potential for NPI database users to misinterpret the data. For example for a user who seeks information on emissions from Australia-wide domestic liquid fuel burning will be provided with a report on these emissions but the report will only be an aggregation of emissions from the Australian Capital Territory, the Northern Territory, South Australia, Tasmania and Victoria. It will not include emissions in the states of New South Wales, Queensland and Western Australia as these states do not report on emissions from domestic liquid fuel burning. Therefore the user will also not be aware that say the Northern Territory only reports on 13 substances while the other reporting jurisdictions give emission estimates for 27-28 substances.

Table 7 Number of diffuse sources reported by jurisdiction

	Number of substances reported								
Source	**All Aust** (1)	**ACT**	**NSW**	**NT**	**Qld**	**Sth Aust**	**Tas**	**Vic**	**WA**
Accommodation	19	0	0	19	0	0	0	0	0
Aeroplanes *	27	4	0	22	27	24	26	24	17
Agriculture fertilizer, crops tilling	1	0	0	0	0	0	0	1	0
Agriculture livestock	1	0	0	0	1	0	0	1	0
Agriculture machinery	19	0	0	0	0	0	0	19	8
Architectural surface coatings +	27	14	2	14	14	25	14	10	19
Backyard incinerators	29	0	12	12	0	0	11	19	14
Bakeries	21	3	0	21	0	3	3	3	3
BBQ	50	40	0	38	0	0	40	34	0
Biogenics	2	0	0	0	2	0	0	0	2
Burning (fuel red. regen. agric)/ wildfires *	38	17	8	35	6	0	17	21	21
Cafes and restaurants	19	0	0	19	0	0	0	0	0
Cigarettes	16	14	0	0	4	0	0	0	15
Commercial shipping /boating +	35	0	0	33	29	27	34	23	29
Commercial shipping/boating and recreational boating	11	0	0	0	0	0	0	0	11
Concrete Batching	1	1	0	0	0	0	0	0	0
Concrete product manufacturing n.e.c	19	0	0	19	0	0	0	0	0
Cutback bitumen *	11	11	0	11	0	7	4	7	11
Domestic/commercial solvents and aerosols +	27	20	9	20	20	21	20	21	21
Dry Cleaning +	13	2	4	21	2	4	4	2	4
Electroplating	3	3	0	0	0	0	0	0	0
Food manufacturing n.e.c	19	0	0	19	0	0	0	0	0
Fuel combustion – subthreshold facilities *	49	28	0	19	40	28	41	46	37
Funeral Directors, crematoria, cemeteries	8	0	0	8	0	0	0	0	0
Gaseous fuel burning (domestic) *	24	23	0	19	23	23	19	23	24
Landfill	23	0	0	0	0	0	0	21	21
Lawn mowing +	31	22	14	23	23	25	22	25	31
Lawn mowing (public open spaces) *	25	6	0	12	0	0	0	20	25
Liquid fuel burning (domestic) *	29	28	0	13	0	27	28	27	0
Milk and cream processing	19	0	0	19	0	0	0	0	0
Motor vehicle refinishing +	32	5	7	28	5	9	12	9	14
Motor vehicles +	34	26	9	24	13	30	21	30	32
Natural/town gas leakage *	3	2	0	0	1	2	0	2	2
Paved and unpaved roads	14	0	0	0	0	13	12	13	12
Petrol and coal product manufacturing n.e.c	19	0	0	19	0	0	0	0	
Pets and human	1	0	0	0	0	1	0	1	0

	Number of substances reported								
Source	**All Aust** (1)	**ACT**	**NSW**	**NT**	**Qld**	**Sth Aust**	**Tas**	**Vic**	**WA**
Port operations	11	0	0	11	0	0	0	0	0
Print shops and graphic arts *	20	1	1	1	11	11	5	11	17
Pubs, Tavern Bars	19	0	0	19	0	0	0	0	0
Rail transport	27	0	0	27	0	0	0	0	0
Railways *	32	0	0	27	24	18	26	19	23
Recreational boating *	33	0	0	33	29	25	30	25	29
Service stations +	14	9	5	9	7	11	9	10	14
Services to air transport	12	0	0	12	0	0	0	0	0
Solid fuel burning (domestic) +	54	36	12	26	38	51	25	51	39
Solvent use - subthreshold facilities *	13	1	0	0	0	2	0	2	13
Sports grounds	2	0	0	2	0	0	0	0	0
Structural metal product manufacturing n.e.c	16	0	0	16	0	0	0	0	0
Swimming pools	1	0	0	0	0	0	0	0	1
Technical and further education	19	0	0	19	0	0	0	0	0
Traffic (road line) marking	11	11	0	0	0	0	0	0	0
Windblown particulates	16	0	0	0	0	0	0	0	16

(1) The number of reported substances referred to here is the number of substances given when the database is searched for 'all' in the search criteria for State/Territory.
+ Original core source
* Additional core source (added in 2000)
Source: www.npi.gov.au

Initially nine sources were proposed as core sources. This was extended to a total of 19 core sources in 2000. The original and additional core sources are shown in table 7.

It is evident from table 7 that not all jurisdictions are yet reporting on the core sources and reporting on the substances that are emitted from core sources is inconsistent. One jurisdiction indicated that this inconsistency in reporting was based on cost and data availability, it may also relate to the age of the air emissions inventory. However has the effect that many potentially significant emissions from the core sources are severely under reported at the national level. It also appears that, while not confirmed, there are different methodologies being employed by the jurisdictions. These variations in the methodologies may be well intentioned efforts to, in the absence of improved national estimation techniques, update emissions estimate techniques however they further reduce the capability to compare emissions in different airsheds.

The main aim of reporting the emissions from diffuse sources is to provide a context for the industry emissions data. This aim is currently not adequately being realised in a systematic way that is sufficiently transparent to users.

A number of jurisdictional respondents raised concerns about the diffuse source data quality and indicated that this could and should be improved through better quality assurance procedures including desktop and site audits, improved data estimation techniques and regular reviews to ensure that the data is up to date and relevant. It was suggested that cooperative studies could be undertaken with environment agencies from other countries to improve methodologies or funding be provided to develop emission factors for Australian operation conditions. A number of jurisdictions support diffuse sources being extended to cover more regions and ideally all of Australia however there are database issues related to the grid sizes, resources and overlapping data sets that require resolution for this to occur.

The NPI database has a significant focus on emissions to air, however similar issues of inadequate guidance on estimation techniques apply to emissions to water catchments. Only two of the diffuse emission manuals, aquaculture – temperate and aquaculture – tropical, are directed to emissions to catchments.

The list of emission sources to catchments is long, lacks any consistent approach to categorisation and makes analysis difficult. Advice on the database indicates that the sources studied in each catchment are determined by the State/Territory undertaking the estimations and similar names may not represent the same activity or land use. A coordinated effort to rationalise the list of emission sources would improve the usefulness of this data. The catchment data also may be more useful to users if sub-catchment data which is available in some jurisdictions, were made available on the NPI database.

Emissions to land are a minor component of the database with the main emitters being Water Supply, Sewerage and Drainage Services.

Recommendations

37. *That all jurisdictions agree on the relevant set of emissions that must be reported for each diffuse source category.*
38. *That manuals of diffuse source emission estimation techniques be updated and cost effective techniques for estimating emission changes in critical sources such as motor vehicles incorporated.*
39. *That airshed emissions be updated to an agreed base year.*
40. *That a set of agreed triggers for upgrading the diffuse source emissions based on parameters such as population increases, increases in vehicle registrations and vehicle turnover to new emission standards be established.*
41. *That standard methodologies, including agreed emission factors, be used to estimate diffuse source air emissions.*
42. *That the list of water catchment emission sources be standardised and rationalised.*
43. *That consideration be given to providing water catchment data on a sub-catchment level where available.*

5.2 Sub-threshold emissions

The jurisdictions attempt to determine emissions from selected industries and commercial facilities that do not trigger a threshold and therefore are not required to report. They also may make an estimate of the emissions from facilities that trigger the NPI Category 2a and/or 2b thresholds, but fail to submit an annual report. Guidance on making these estimates and special allocating these emissions are provided in 'Emissions estimation technique manual: Aggregated emissions from fuel combustion (sub-threshold)' (1999).

The estimation techniques are based either on fuel use data provided by energy providers and where this is not available employment figures.

A number of comments were received that indicate that the quality of this data is low and could be improved by investigation into detecting non reporting facilities in each jurisdiction and updating the estimation technique.

Recommendations

44. *That an investigation to critically assess the number of non-reporters and significance of their emissions be undertaken.*

45. *That a program for achieving a predetermined capture rate of all potential emissions be developed, funded and implemented.*
46. *That the emission estimation techniques for aggregated emissions from fuel combustion for sub-threshold facilities be improved.*
47. *That once diffuse source emission estimates are standardised consideration be given to providing historical data on the database to enable trend analysis.*

5.3 Database Systems

The NPI database systems are at a stage where it at risk of failure if its use increases significantly or if it is expanded. It is there requires significant expenditure to provide confidence that they are sufficiently robust to support the present and projected levels of data. It will also soon be required to use a new industry classification code system to fit in with the new codes specified by the Australian Bureau of Statistics.

The Environmental Resources Information Network (ERIN), the unit within the Department of the Environment and Heritage that maintains the NPI database, have advised that while the database design is basically sound the system is not scalable and is close to the limit of its capability.

This is a critical issue that adversely impacts on a number of areas, including:

- Current and potential uses of the NPI
- NPI staff resource efficiencies
- Limitations in the ability to deliver information to the public and other users
- Ability to incorporate additions and changes to NEPM parameters

In addition the current grid system used for diffuse data does not have the flexibility to incorporate large scale additional data sets for expanded geographical coverage such as diffuse emissions for an entire state as has been developed for Victoria.

Recommendations

48. *That a critical assessment of data systems and resource requirements be undertaken, including assessment of priorities.*
49. *That the data system capabilities be urgently expanded to cater for additional data including state-wide coverage.*

5.4 Data Use and Public Awareness

There has been limited attention to activity public awareness or marketing of the NPI to date and this is apparent from the results obtained from several surveys undertaken to assess the use of the NPI database:

- A telephone survey of 582 people in Sydney, Melbourne, Canberra, Newcastle and the NSW North Coast by Consumer Contact in 2002 found that only 6 percent of people were aware of the NPI. Of those who were aware of the database it was usually associated with their work.
- An email-based survey of 722 people in State, Territory and Australian government agencies by ArtCraft Research in 2004 indicated a generally low awareness and use of the NPI. The survey found that 63% were not aware of the database and only 15%

of respondents had used it. Of those that had used it one third had used it many times and more than two thirds had used it in the past year and most found it easy to use once they got used to it. The main uses were for the preparation of internal and external reports, environmental management, identification of pollution causes, policy initiation or evaluation, environmental education, communicate with Public, NGO's Academics, and integration with other pollution programs or licensing processes.

Other data such as the number of computer hits on the database, currently close to 600,000 per annum and number of unique visitors, give a more positive indication on usage.

Market research undertaken in Western Sydney, Wollongong, Brisbane and Rockhampton in 2003 for the Department of the Environment and Heritage indicated that awareness of the NPI was low but there was strong interest for local information in the community. The research highlighted emissions information from regions (e.g. by postcodes) needs to be more meaningfully put into context by comparing them in useful ways to emissions from other regions. This last issue could result in a design of the database to make it more accessible to a wider audience.

For this review those consulted, and therefore those who are already aware of the NPI, were asked about the types of applications they made of the NPI data. These applications are summarised in the box below. As probably would be expected the use and diversity of use was highest in jurisdictional environment agencies while industry use appeared more limited. Some positive comments were received about NPI's value as the only comprehensive data source of emissions effecting our environment and its value in reducing research time. However a number of respondents indicated that the database's use is limited as some parts of the site are difficult to access, data is provided on facility reporting rather than company basis, the diffuse data is out of date and data quality is not adequate for a particular task.

Uses of NPI Data

Jurisdictions

- State of Environment Reports: national and state based
- Air Quality Management Plans
- Crosschecking industry-reported emissions for load-based fee calculations.
- Project approval assessments
- Environmental policy development eg air quality exposure scenarios and prioritising air toxics.
- Air modelling and water modelling.
- Load based licensing modelling
- Assessing load based licensing
- Internal water quality reports
- Public policy and strategy development
- Emissions trends
- Tracking the effectiveness of pollutant reduction activities.
- Support for emission reduction programs
- Support for catchment programs
- Support for resolving pollution complaints
- National Oceans Office National Marine Atlas,
- General information about emissions to air, land and water and use of the mapping function

Community and others

- Curriculum in various universities and schools subjects
- Highlight emissions in particular industrial areas
- Community health information in industrial areas
- State of the Environment Reporting in LGA areas
- Air quality management policy for non-point sources
- Air quality assessments by consultants
- Assessment by some auditing, accounting and insurance companies
- Assessing industrial activity within a region

Industry

- Emissions comparisons with competitors and other industries
- Community presentations and public consultation
- Industry performance reviews
- Company presentations to the local community,
- Inclusion in annual Health, Safety, Environment and Social Performance Reports
- Internal reporting and emissions management systems.

Suggestions on useful enhancements to the database include:

- The inclusion of industry and government ambient monitoring data (or links to appropriate web sites)
- The capability to create graphs, in particular trends
- Including in the contextual information advice on emissions data interpretation
- Naming the parent company for each facility to allow aggregation of company emissions
- Normalisation of reported emissions data to indicate emissions reduction without reference to changes in production (which the US TRI has done since 1991)

- Provision of descriptive information on emission reduction measures initiated by companies in relation to specific substances
- Inclusion of each substance's priority ranking in the site/facility emissions tables.
- Clarification as to whether a facility that did not report emissions because it did not trigger a threshold or it had no emissions.

Recommendations

50. That data presentation and analysis and interpretative tools be redesigned to meet the needs of dual audiences.

51. That greater data manipulation capability, for example to look at trends, be provided.

52. That awareness raising campaigns be undertaken when data presentation is improved.

5.5 Implementation Issues

A number of implementation issues such as data quality, jurisdictional consistency, emission estimation manuals, and currency of emission inventories have already been covered in other sections of this report and will not be discussed further here. Remaining issues centre around data ownership, reporting times, and reporting systems.

Data ownership

At present industry data are provided to jurisdictions and they have responsibility for its quality and integrity. Errors in reported data can occur due to faulty data, errors in data transfer to the jurisdiction and from the jurisdiction to the Commonwealth, and errors in transferring the data to the NPI database.

The process is cumbersome and it has been suggested that a central unit to collect, validate, manipulate, and integrate the data may be appropriate and make the process more efficient. Taking the responsibility for collecting data away from jurisdictions is however undesirable since it interferes with the relationship between jurisdictions and reporters who are their clients in regulatory and other issues.

There may also be a legal issue, and this is beyond the scope of this project to consider and advise on. This is a matter for resolution between jurisdictions and the Commonwealth.

Reporting Times

The issue with the current reporting time frame is the tightness of the time frame particularly when there are late returns. The tight timeframes lead to errors in the published data which requires correction in subsequent months however the industry reporting times do not seem to be a problem with reporting industries

A 12 month reporting period rather than the current six months is seen to have advantages in reducing errors on the public data base, ties in with the next reporting period, and has other benefits. However it reduces the currency of the data, and there are suggestions that the additional time would defer effort rather than improve efficiency.

An alternative to extending the time for all parties is to add a two month "correction time " by having a pre-release data set. Some jurisdictions are of the view that an extension should not occur, while others argue for a longer extension. At the moment, as required by the NPI NEPM, the data becomes public on the 31 January, and corrections made to the data over the next two months. Extending the "public" release date would formalise this process, and

would allow jurisdictions and industry to correct errors before public release. Under this proposal, final public release of the data would occur on the 31 March as happens in practice now. The public would not have the most recent report till two months later than under the current arrangements, but would have final corrected data.

Recommendations

53. That the jurisdictional reference group undertake a review of data ownership issues.

54. That a pre-release set of NPI data be available for jurisdictional and industry review from 31 January, and public release of the data be deferred to 31 March.

5.6 Performance Indicators

There are no specific requirements for measuring performance in the NEPM (except for database publication on 31 January). Since the NPI NEPM does not include standards, as does for example the ambient air quality NEPM, there are no unambiguous indictors against which environmental outcomes can be measured. Performance indicators for the NEPM derive from the Memorandum of Understanding between the Commonwealth and States and Territories, and agreements and guidelines documented in the annual NEPC reports on NPI NEPM implementation.

As previously outlined, the NPI NEPM includes a hierarchy of goals and objectives ranging from the very broad desired environmental outcomes to specific objectives. Ideally, performance indicators should address achievement of the environmental outcomes and the specific goals and objectives.

The 2003-04 NEPC NPI implementation report lists the following performance indicators:

a) Number of “hits” on the database
b) Number of facility reports on the database
c) Feedback/data from industry that indicates that the process of emission estimation and reporting from the NPI has led to increased consideration of waste minimisation and cleaner production initiatives
d) Feedback, from users of the database, on its usability and on the relevance of the information for their needs
e) Total number of reporters in comparison to 2001-02
f) Range of industry sectors reporting
g) Number of new reporters
h) New industry sectors reporting
i) Any other indicator identified

Two indicators only (c and d) relate to performance in relation to goals and objectives, while five relate to industry activity indicators. It is also notable that:

- There are no performance indicators relating to jurisdictional actions, although these are reported in annual reports to NEPC
- There are no targets set for performance in relation to the proportion of potential reporters and the fraction of potential emissions actually captured
- There are no targets on data quality.
- There are no targets for the coverage, or the currency, of AED’s.

The current set of indicators have been criticized to various degrees by respondents to questionnaires, with some industry focusing strongly on the concentration on industry

performance in the indicators, and some jurisdictions focusing on data quality and currency issues. It is clear that there is considerable scope to review the performance indicators.

At the broadest level the desired environmental outcomes are contribution to the maintenance and improvement of environmental quality, and, although only indirectly stated, to achieve the sustainable use of resources. The specific objective clause 7 (c) relates to cleaner production is relevant to sustainability. There are a variety of regulatory and voluntary programs in all jurisdictions that contribute to achieving these broader outcomes, the NPI being one such program. Business and private decisions made for economic and other reasons also play a part when they result in lower emissions and less waste.

While improvements in environmental quality can be measured, the separate influences cannot usually be separated. Establishing performance measures is therefore problematical. In the context of the NPI, reductions in emissions and waste through cleaner production and waste minimisation programs can be measured, but the drivers for improvements need to be determined. Although the current NPI includes provision for the voluntary reporting of emission reduction activities, indications from jurisdictions are that such reporting is not common, and making it a mandatory requirement would seem to be counterproductive and would not answer the question of drivers.

Measurement data from existing monitoring programs provide trends in environmental quality and an indication of the combined performance of environmental programs. It may be possible to select key measurement parameters that are more indicative of the impacts of the NPI, and this could be explored. A second approach could be routine industry surveys seeking specific information on environmental expenditures and programs and the influence of the NPI in these. This is covered in the current indicators. A biennial industry survey would be an appropriate, but not the only, way of implementing this.

Recommendations

55. *That a set of environmental quality measurement parameters indicative of the influence of the NPI be developed.*
56. *That a suitable sample based methodology for assessing the influence of the NPI on cleaner production and emission reduction expenditures in biennial surveys, be developed.*

The specific goals in clause 6 and 7, collecting a broad base of information, and establishing a database, relate to the workings of the NPI, and are its core. Industry has responsibility for providing source information on site-specific emissions, and jurisdictions responsibility for diffuse emissions. It is therefore appropriate that performance indicators are developed for both groups. The NPI data has application in government agencies, industry, research, education, finance, and public information. While different users have different requirements of the data, a basic set of performance indicators to adequately satisfy the needs of all users would include the following:

i. Data quality

High quality data is a fundamental requirement for most uses although some uses can be satisfied by data of a lesser quality. The quality of the information on the database has been criticized by all sectors and given as a reason inhibiting the use of the data. To some extent this is a matter of perception, and also uncertainty as to what is an acceptable quality of data for the specific use. Data quality issues are discussed in section 5 of this report.

ii. Currency of the Data

This particularly applies to diffuse source emission estimates. It has been suggested by industry that in comparing current industry data with out of date and incomplete diffuse source inventory data provides a misleading picture.

iii. Comprehensiveness of the inventory

To be consistent with the intent of providing comprehensive information on a geographic basis, all emitters would need to be covered and all significant emissions captured. This applies to both industry emissions and diffuse emissions. For industry emissions, the main issue is the capture rate of potential reporters by the NPI, for diffuse emissions, the main issue is coverage and the age of inventories. The status and methods for improving these are discussed in section 5.1. In summary, both areas are seen to warrant improvements and performance indicators in these areas are desirable.

Potential measures of performance in these areas could include the following indicators;

- Proportion of reporters that have been subject to desk audits
- Proportion of reporters that have been subject to site audits
- Number of complaints about data quality
- Percentage of the jurisdictional area/population covered by diffuse emission inventories
- Proportion of diffuse emission inventories that have not been revised for more than 5 years.
- Fraction of potential reporters actually reporting
- Fraction of potential emissions captured on the database for a limited number of key substances

It is recognised that some of these are difficult to measure accurately, but it should be possible to develop an assessment approach based on a range of tools such as sample surveys, comprehensive surveys, comparative data from similar industries and other methods. This may mean accepting less frequent reporting for some indicators.

Recommendation

57. That indicators for data collection and data quality be developed that may include some or all of the following:

- *Proportion of reporters that have been subject to desk audits*
- *Proportion of reporters that have been subject to site audits*
- *Number of complaints about data quality*
- *Percentage of the jurisdictional area/population covered by diffuse emission inventories*
- *Proportion of diffuse emission inventories that have not been revised for more than 5 years*
- *Fraction of potential reporters actually reporting*
- *Fraction of potential emissions captured on the database for a limited number of key substances.*

iv. Public use and awareness

Public right to know is covered by the specific goals and objectives of disseminating the information and making it publicly available. Public availability of the data on the internet is not at issue although some questions have been raised about the usability and performance of the system. It will be obvious to any potential user whether the system is accessible or not, although one could include an indicator of system downtime.

The more basic question is whether people are aware of the NPI and what it can legitimately be used for. The evidence from recent surveys suggests that only a very small minority of the general public (6 %) are actually aware of the NPI, and probably an even smaller minority of its uses. The concerns of some industry is that the data can be misinterpreted or used inappropriately usually because of a lack of understanding, or a lack of suitable contextual and explanatory information, or sometimes deliberately.

For government users, the situation is better, with survey data indicating a 37% awareness. The actual number of users was however only 11%.

It has been pointed out that the number of hits on the database (584,954 in 03-04), is not a good measure of actual awareness of the NPI since this will include multiple hits by a single user, particularly, users preparing reports for submission. The number of unique visits, which counts multiple visits from the one computer only once (62,256 in 03–04 or approximately 10% of total hits), is considered a better measure, although this doesn't count multiple users on that computer. Both measures can only be indicative of awareness, and non-informative about uses. Public surveys conducted at regular intervals can provide information about awareness of the NPI and its uses, as well as growth in awareness over time.

Recommendation

58. That biennial public surveys be undertaken to ascertain trends in awareness and use of the NPI.

v. Policy development

The remaining objective 7 (a) relates to the use of the NPI for environmental policy and decision making, and mainly applies to the various levels of government. The Commonwealth, State and Territories', and Local Governments all have environmental responsibilities, and are potential users of the NPI. In survey data and responses to the questionnaire, the NPI has been put to a variety of uses, but it is clear that the full potential has been far from realised.

The NPI also has been used to some extent for environmental decision making and other purposes by a range of non-government organisations including research, environment education, financial, and industry groups. Again much greater use could be made by NGO's of the NPI for both existing and other purposes so its full potential has not been achieved. An appropriate indicator would relate to trends over time, and these can be ascertained by surveys.

Recommendation

59. That biennial surveys be undertaken, or other appropriate methods used, for assessing trends in the use of NPI data in selected sectors, e.g. government agencies, research, education, finance, industry.

5.7 Costs and benefits

Cost benefit analysis in the environmental area suffers from the difficulty that while quantification of costs is relatively straightforward, quantification of benefits is much more problematic. A range of techniques have been developed and used for quantifying environmental goods and services for the purpose of costing externalities, but there remain issues in their application.

The trend more recently has been to move to triple bottom line reporting where social and environmental outcomes are reported alongside financial outcomes and against goals and targets set for each; both private and government departments are adopting this approach. This type of reporting makes more transparent the value judgments that are inherent in resource allocation decisions for meeting environmental, social and economic, the outcome of which are reflected in government and private policies and programs. It does not provide any direct guidance as to how and where the balance in resource allocations implicit in the targets should be, but by providing the information publicly, it provides the basis for stakeholder input and thereby influencing target setting and resource allocation decisions.

The costs of the NPI for industry include the direct cost of reporting, and the associated costs of monitoring and undertaking studies and research that provide the supporting information. For governments, costs include the direct costs of establishing and maintaining the database and associated data systems, the costs for providing supporting information to facilitate reporting by industry and interpretative and background information for data users. Some of these were establishment costs.

Costs to Industry

Estimates of indicative costs of reporting provided in the current survey by a limited number of mainly larger companies and industry associations range from $2,000 to $60,000. The large variation reflects differences in what has been included in the numbers. The $2,000 reported by one company is for preparing the annual report, based solely on estimation techniques, once reporting systems have been set up. At the higher end of the spectrum stack testing and monitoring, multiple sites, and consultant costs are included. Where consultant and staff costs have been split, the ratio of consultant to staff costs appears to be around 1.5.

Stack test costs vary considerably depending on the size of the stack and the range of parameters tested, and whether consultants or in-house staff are used. One company reported costs for a single stack test and laboratory analyses of $30,000. Dioxin testing was stated as costing $2,000 for a single test, with a reasonable dioxin testing program exceeding $20,000.

A complicating factor in estimating NPI reporting costs is that in many cases, the costs of collecting data for reporting to the NPI would have been incurred to meet reporting requirements of the state and territories' authorities. Separating the costs between different reporting requirements is possible but requires more data than is currently available.

Adjusting for all these factors, a plausible estimate is that the ongoing annual cost of reporting to the NPI would be in the range $2,000 – 10,000 per reporting site. Data available to DEH suggests that the costs for NPI reporting in recent years have been between $2,000 and $4,000 per site, which is quite modest and seems realistic, and consistent with a wider range of industries and size than the limited sample in this review. Although an average reporting cost of $3,000 across all industry is appropriate, it needs to be pointed out the majority of reporters are smaller industries, and the reporting costs for these has been put in the hundreds rather than thousands of dollars. The number of reporting facilities in the 2003-04 reporting year was 3,618. The total cost to industry of NPI reporting, based on an average reporting cost of $3,000 per site, and a nominal 4,000 reporting facilities is therefore $12 million per annum.

Costs to Governments

Costs to governments include funding provided to establish the NPI and ongoing funding for its ongoing operation. From 1997-98 to 2001-2002, which is nominally the establishment phase, a total of $14 million was provided. Funding at around $4 million per year was estimated as necessary for ongoing running of the program (ARTD, 2000). For the 3 years from 2001-2002 to 2003-2004 estimated requirements were $12.7million while actual

expenditure was $7.0 million, which is little more than half. Table 8 compares estimates with budget allocations.

Table 8 Summary of NPI Costs

Year	2000-01	2001-02	2002-03	2003-04	2004-05**
Projected costs (ARTD, 2000)	**-**	**4.34**	**4.2**	**4.2**	**4.2*** **
Total actual expenditure*	**3.2**	**2.2**	**2.3**	**2.5**	**2.5**
Commonwealth	3.2	1.2	1.5	1.5	1.5
States** **	-	0.8	0.8	0.8	0.8

* Source Ministerial Budget Statements, 2000 –01 to 2004 –05
** Estimated
*** Assumed based on funding maintenance
**** Assumes matching of Commonwealth expenditure. A number of jurisdictions believe that this underestimates state contributions significantly.

Major cost items for governments have been the establishment and maintenance of the database and reporting tools and systems, the development of handbooks, and undertaking AEDs plus there are ongoing operational costs.

Costs of Variations to the NEPM

The proposed and potential changes to the NEPM , raised in this review, and notional costs to government for implementing these changes are as follows:

i. Addition of Transfers

The cost of including transfers could be considerable. These would include costs for documentation, training costs for industry and jurisdictions, and costs for system changes. The total costs cannot be estimated with any degree of confidence because interdependence of various system changes and enhancements make it difficult to apportion costs. Changes and enhancements to NPI systems are for example necessary to cater for increased computer traffic (increased access for various uses, and for increased reporting), developing and testing a web based reporting tool and improving the efficiency and robustness of data handling and data transfers.

A cost in the vicinity of $200,000, excluding the costs of trials, is possible but this is indicative only, and assumes that existing state hazardous waste tracking systems can be adapted. An upper cost of $700,000 has been estimated by one jurisdictions and on this basis a cost of $500,000 is probably adequate for assessment purposes.

ii. Addition of Aquaculture

The costs are not expected to be significant. Manuals exist already, and it not expected that there the number of reporters would be large. There were 873 aquaculture management units listed in the ABS business register in December 2001, but the proportion of those that would trigger reporting levels is unknown.

iii. Addition and removal of substances

Costs of additions or removals on the scale anticipated (less than 10 substances) are unlikely to be significant.

iv. Potential addition of Agvets

The major costs would be to jurisdictions in undertaking diffuse source emission estimates. These could be in the vicinity of $20,000 to $30,000 per catchment. It is not proposed to proceed with this addition at this stage so costs could be refined when, and if, inclusion of these are considered again.

v. Potential addition of greenhouse

Costs for this will become clearer during the conduct of trials announced by the Victorian Government on 6 April 2005 as part of the Victorian Greenhouse Strategy Action Plan Update. Given that much of the arrangements and estimation techniques are already in place for Greenhouse Challenge (and Greenhouse Challenge Plus) and NGGI reporting costs are not expected to be large, possibly in the vicinity of $200,000.

In summary, it is expected that proposed and potential changes to NPI are unlikely to exceed $0.8 - $1.0 million, or around 10% – 12 % of the cost of necessary changes to make the current system more functional.

NPI Operational Improvement Costs

Estimates for developing handbooks are currently put at $15,000 to $20000, and costs of revision at $2,000 to $15,000 excluding any research costs for determining emission factors

Costs for diffuse source estimates vary depending on the jurisdiction, the complexity of the airshed or catchment, the amount of detail in the estimates, and whether consultants or in-house expertise are used. The estimated costs for developing an inventory of emissions for a major airshed range from $150,000 to $450,000. These estimates however include the level of detail required for airshed modelling purposes that may not be required for NPI reporting. Catchment diffuse source estimates are estimated to cost in the vicinity of $50,000 to develop.

The cost for updating inventories varies depending on the level of update. A simple update using automated technology can cost around $20,000 for a large airshed, while a more complex update can cost around $50,000.

There are a number of expenditure items required to enable the database system to function more effectively, and reduce ongoing costs in future years, irrespective of any additions or subtractions from NPI substances. These items relate to data quality and data reporting systems and are discussed in more detail elsewhere in this report. The issue is as much one of perception as it is with actual data. The fact is that most of the data are of acceptable quality.

Expenditure beyond current levels is required to correct the situation and improve reporting systems. This would not only help in achieving the goals and realising the NPI's potential, but would also lead to increased system efficiencies and lower future operating costs. It would help with the apparent imbalance between costs and benefits as indicated above.

Major items and costs for addressing these issues (based on the above costings, where applicable, and other data) are as follows:

i. Data base maintenance and system cost.

Around **$3 million** dollars is necessary to address critical items, based on initial DEH estimates. Costs for upgrading the system are not available at this time. Changes are necessary to cater for a potential doubling of reporting facilities

ii. Update of Industry Handbooks.

There are 93 industry handbooks, 9 generic handbooks and 21 diffuse source handbooks or 123 in total. If one assumes that around 60 will require updating in the next four years, half at a cost of $10,000 per handbook, and half at a cost of $20,000 to allow for some emission factor determinations, the four year cost is $900,000.

It is also assumed that 10 new handbooks will be required at a unit cost of $20,000 (total of $200,000). The total cost for updating handbooks (including new handbooks) is **$1.1 million** over 4 years. Considerable savings could be made by alternative approaches described briefly in section 5.1 that would reduce future costs for changing manuals and developing new manuals, and would also reduce the cost of reporting to industry. These cannot be quantified at this stage.

iii. Improved Data Quality

An increase of 0.6 persons per jurisdiction (on average) devoted to quality control at a cost of $120,000 per FTE (based on WA estimates) would entail a total annual cost of approximate $0.6 million per year or $**2.4 million** over 4 years.

iv. Diffuse source estimates

The cost of updating airshed and catchment inventories assuming say 10 per year at an average cost of $30,000 is **$1.2 million** over 4 years

The total cost of these 4 major items over 4 years is a close to **$8 million**, and if major improvements in the NPI database systems were to be implemented, the cost would be considerably higher.

As summarised in the previous section, the costs of proposed and potential alterations to the NPI parameters would be minimal compared to the costs of improving the system. As an example, Victoria has allocated $200,000 for conducting trials for inclusion of greenhouse gases in the NPI.

Benefits

As discussed earlier, benefits of the NPI cannot be readily quantified and hence a numerical comparison of benefits and costs is not possible. Judgments about the value of public goods and community values are made in developing public policy and the outcomes of these judgments are expressed in the goals and objectives of those policies. For the NPI, the goals and objectives can be summarized as

- Satisfying community right to know
- Providing information for environmental policy formulation and decision making
- Improved environmental quality, viz
  - By provide a stimulus for cleaner production and waste minimisation
  - Promoting sustainable use of resources
  - Contributing to the achievement of better air and water quality and reducing the risks of hazardous wastes.

The community benefit received can be gauged by the use of the NPI data and whether environmental quality improves over time. Because of the multiple influences on improving environmental quality, separating out the relative contribution of the NPI is difficult. The evidence from PRTRs overseas is ambiguous in relation to the influence of PRTR's on cleaner production and waste minimisation. Some studies indicate clear influences, while others do not. Recent evidence from Canada for example, indicates a reduction in emissions

with public reporting, but this was largely driven by regulation, while the PRTR in the UK is linked to pollution reduction programs for greater synergies.[2]

In Australia, the NPI is relatively new and still evolving and hence trends cannot be established. Responses to the questionnaire indicate that the influence of the NPI on cleaner production has been small. The issues of community right to know and of data use are clearer, but clouded by implementation and data issues.

Statistics on system access indicate some public awareness, but survey data indicates an unmet potential. The data has been used by a variety of users for a variety of purposes, as detailed elsewhere in this report. Users include government departments, industry, and financial institutions and uses include:

- Preparation of internal and external reports
- Environmental management
- Identifying pollution causes
- Policy initiation or evaluation
- Environmental education, media, and other public awareness raising activities
- Communicate with Public, NGO's academics, etc
- Integrated with other pollution programs or licensing processes
- Environmental planning
- Personal use information,
- Industry comparisons,
- Reporting environmental performance in industry and public reports.
- Assessment of company value by financial institutions

While the data on the current system are quite robust, there are some anomalies which create doubts about different aspects of the current systems and inhibit greater use of the data. This is a pity since large potential benefits remain unrealised, the improvements described above would go a long way towards addressing this. Even so, it is clear that the NPI has a much wider range of applications than was envisaged initially.

It therefore seems clear that the NPI is of current benefit to a range of people in meeting their requirements, and potentially of much greater benefit to a greater number, but a monetary comparison is not possible.

The benefits of proposed and potential changes cannot be readily isolated from the overall benefits of the NPI discussed above. The inclusion of transfers is however critical to addressing the information needs relating to cleaner production and waste management and could therefore be seen as an additional benefit for a small additional cost. The inclusion of greenhouse gases would also increase the relevance of the NPI for the general community.

Potential changes to the NPI parameters would strengthen the NPI and make it more comprehensive and relevant to the community. The costs of these changes are estimated at around 10% - 12% of system improvement costs. The combined effect of the system improvements and parameter changes is to move the NPI closer to providing a database of national environmental information suitable for a variety of applications, in line with the Dutch PER model. The NPI goals and objectives make it clear that this was one of the original purposes for the NPI, and this objective remains relevant. The costs and benefits of changes and system improvements need to be considered in this context.

[2] J Boshier, DEH, Personal communication on the PRTR Task Force Meeting, San Francisco, 25-27 April 2005

Cost Effectiveness

The issue of whether the NPI is cost effective can be looked at from two perspectives. One perspective is whether there are better and more cost effective ways of meeting the NPI objectives. It has been suggested that states and territories already operate environmental management and reporting programs and that these are effective in meeting cleaner production and environmental quality objectives. A further reporting layer is seen as additional cost for no added benefits.

There is no doubt that state programs satisfy state needs, and that reporting to the NPI has added additional costs. The issue is however that there has been a lack of coordination between states and territories and inconsistent and varying requirements. This makes compliance by national companies difficult, and obtaining a national perspective very problematic. The IGAE, process was specifically intended to harmonise environmental management across the nation thereby providing equity and certainty for the industry and the general community, and the various NEPMs are the instruments for achieving this. It was, and is, expected that this would result in benefits from harmonized approaches and to some extent this has happened and is increasing. For example, there are now national ambient air quality standards and national protocols for monitoring and reporting. The NPI, despite some problems with data, is still a very useful and useable system. It remains the only database of emissions across Australia, and has resulted in much greater coverage of airsheds and catchments with inventories now covering more than just Capital cities.

The NPI NEPM is essentially a data collection and reporting instrument, and the issue for industry is that there remain requirements for multiple reporting for NPI and for state and territory regulatory purposes. There is no reason why requirements for NPI and state reporting cannot be harmonised. Some states have aligned their state reporting requirements with NPI reporting requirements and it appears that other states could do likewise. This would require substantive expenditure up front but would generate ongoing reporting cost savings for both industry and jurisdictions. It is consistent with the view that focus of the NPI should be on the provision of high quality multipurpose information to guide national environmental management and priority setting decisions and support for other uses.

The other perspective is a cost comparison with other systems. Other than for the US, however there are no readily available data on the costs of overseas programs to compare with. US data indicates that the US EPA budgets for around $US15 million annually for its TRI program, and it is estimated that an equivalent amount is spent by the states. The reporting costs for industry are estimated at $US 300 to 400 million. For 23,000 reporting facilities the reporting costs are approximately $US15,000 per facility for industry, and approximately US1,300 per facility for governments, a ratio of 11.5. For Australia, the comparative numbers are $3,000 AUD for industry, $640 for governments, and a ratio of 4.7.

In equivalent dollar terms, the combined amount spent by government and industry in the US is at least 5 times that spent in Australia, with government spending relative to industry less in the US than in Australia. There are differences in the systems. The TRI covers over 600 substances compared to the 90 substances in the NPI, but is limited to industrial emission sources only. The NPI is broader in scope and coverage and includes diffuse sources. The difference in relative expenditures by governments can be partly explained by the greater support provided by governments for diffuse source estimates, the greater government support required for less mature systems, and possibly greater attention to data quality, but the difference in total expenditures cannot be readily explained by system differences. The fact remains that much less is being spent in Australia by both industry and governments than in the US, with Australian governments contributing proportionally more to the total expenditure.

International comparisons always need to be carefully interpreted because of different philosophies, approaches, priorities and social and economic conditions. Nevertheless, it would appear at least on the surface, the costs and benefits of the NPI seem to rather skewed towards the benefit side and additional expenditure could be allocated for better balance.

The ratio of costs between industry and government seem reasonable, although Australian governments spend less compared to industry. Government spending on the NPI is around 15% to 20% of combined government/industry expenditure. This is a rough indicator of equity in relation to sharing costs and benefits, and consistent with the polluter pays principle although the appropriate proportions can be debated.

In summary, the NPI appears to be cost effective, both comparatively, and in terms of providing a nationally needed system. Costs to industry seem reasonable.

The costs to governments have been relatively low compared to the US, and benefits appear to exceed costs. Increased expenditure for improving system access and increasing the effectiveness of the NPI in meeting its objectives appear to be warranted by the projected benefits to be achieved. The costs of changing NPI are relatively low in comparison to costs of system improvements, and the benefits also appear to be proportionately greater than the costs.

Recommendations

60. *That jurisdictions consider harmonising industry reporting requirements for NPI and regulatory purposes.*
61. *That funding be provided to improve the quality of the data and data systems so that they can be reliably be used for multiple purposes by a greater range of users.*

Bibliography

A M Consulting, 2003, Review of Airshed data for the NPI, August 2003

Antweiler W and Harrison K 2003 Toxic release inventories and green consumerism: empirical evidence from Canada *Canadian Journal of Economics*Vol 36 No 2 pp 495-520.

APVMA, 2005, *Chemical Review Program and Reports*, at http://www.apvma.gov.au

Artcraft Survey 2004 Final Report on Exploratory Research on the Use of the National Pollutant Inventory by State, Territory and Australian Government Agencies, report prepared for the Department of the Environment and Heritage, September 2004.

ARTD, 2000, *Evaluation of the National Pollutant Inventory Program,* November 2000

Australian Bureau of Statistics (ABS). 9309.0 'Australia's motor vehicle fleet grows 24% in 10 years', Media Release, 12/12/2001, www.abs.gov.au/Ausstats

Brandon C and Ramankutty R 1993 *Towards an environmental stratety for Asia. World Bank Discussion Paper 224* World Bank, Washinton, p65ff.

CDC, 2003, *Second National Report on Human Exposure to Environmental Chemicals,* Department of Health and Human Services, Centers for Disease Control and Prevention, January 2003

Commonwealth of Australia, 2004-05, *Ministerial Budget Statement, Sustainability Strategy for the Australian Continent: Environment Budget Statement.*

Commonwealth of Australia, 2003-04, *Ministerial Budget Statement, Investing for a Sustainable Australia: Commonwealth Environment Expenditure*

Commonwealth of Australia, 2002-03, *Ministerial Budget Statement, Towards a Sustainable Australia: The Commonwealth's Environment Expenditure.*

Commonwealth of Australia, 2001-02, *Ministerial Budget Statement, Investing in our Natural and Cultural Heritage: The Commonwealth's Environment Expenditure*

Commonwealth of Australia, 2000-01, *Ministerial Budget Statement, Investing in our Natural and Cultural Heritage: The Commonwealth's Environment Expenditure.*

Consumer Contact Survey, 2002, National Pollutant Inventory Communications Development, report prepared for Environment Australia.

Dias-Sardinha I, Reijnders L and Antunes P 2003 From environmental performance evaluation to eco-efficiency and sustainability balanced scorecards *Environmental quality management* Winter 2003, pp.51-64.

EECO Environmental Engineering, 2005, 'Industry support for Queensland's contribution to the National Pollutant Inventory' draft report to Environmental Protection Agency, Queensland

Environment Australia, 2001, National Pollutant Inventory: Summary Report of Fourth Year Data, 2001-2002, Commonwealth of Australia

Environment Australia, 2001, National Pollutant Inventory: Summary Report of Fifth Year Data, 2002-2003, Commonwealth of Australia

Environment Australia, 2002, National Pollutant Inventory: Summary Report of Third Year Data, 2000-2001, Commonwealth of Australia

Evers C 1997 Pollutant Emission Register in the Netherlands, a paper submitted to the *PRTR Workshop for Countries of the Americas* July 29-31, 1997 in Querétaro

(Mexico).

Foulton J, Lanoie P and Laplante B 2002 Incentives for pollution control: regulation or information? *Journal of environmental economics and management* Vol 44, pp.169-187.

Gerde V and Logsdon J 2001 Measuring Environmental Performance: use of the Toxics release inventory (TRI) and other US environmental databases *Business Strategy and the Environment* Vol 10, pp 269–285.

Grant D and Jones A 2003 Are subsidiaries more prone to pollute? New evidence from the EPA's Toxic Release Inventory *Social science quarterly* Vol 84, pp.162-173.

Harrison K and Antweiler W 2003 Incentives for pollution abatement: regulation, regulatory threats and non-government pressures *Journal of policy analysis and management* Vol 22 No 3 pp 361-382.

Khanna M and Anton W 2002 What is driving corporate environmentalism: opportunity or threat? *Corporate environmental strategy* Vol 9 No 4 pp 409-417.

Kolominskas C and Sullivan R 2004 Improving cleaner production through pollutant release and transfer register reporting processes *Journal of cleaner production* Vol 12 pp. 713-724.

National Environment Protection Council Report Service Corporation, 2004, *Options for and Legitimacy of Incorporating Greenhouse Gas Emissions into the National Pollutant Inventory*, review undertaken by Professor Ian Rae, August 2004

National Environment Protection Council Service Corporation, 1999, National Pollutant Inventory, Technical Advisory Panel Report

National Environment Protection Council Service Corporation, 2000, Review of the National Environment Protection Measure for the National Pollutant Inventory by Professor Ian Rae, viewed at www.ephc.gov.au/nepms/npi/npi_downloads.html, March 2005.

Ng, YL, Johnston D, 2005 'Update of South Australia National Pollutant Inventory Aggregated Emissions Data', Clean Air Society of Australian and New Zealand Biannual Conference, Hobart Australia, May 2005.

Ng, YL, Joynt B, Yan M, 2005, 'Development of a State-Wide Emissions Inventory for Victoria', Clean Air Society of Australian and New Zealand Biannual Conference, Hobart Australia, May 2005.

O'Rouke D and Macey G 2003 Community environmental policing: assessing new strategies for public participation in environmental regulation *Journal of policy analysis and management* Vol 22 pp. 383-414.

OECD 2001 *Why Pollutant Release and Transfer Registers differ: a review of national programmes* OECD Paris 2001.

OECD, 2001, Why Pollutant Release and Transfer Registers (PRTRs) Differ: A review of National Programmes, OECD 2001

OECD, 2005, *Uses of Pollutant Release and Transfer Register Data and Tools for their Presentation A Reference Manual*, OECD, 2005

Saarinen K 2003 A method to improve the international comparability of emission data from industrial installations *Environmental science and policy* Vol 6 pp. 355-366.

Shapiro M 2005 Equity and Information: information regulation, environmental justice and toxic chemicals *Journal of policy analysis and management* Vol 24, No 2 pp 373-398.

The Environment Agency, the Scottish Environment Protection Agency and the Environment Heritage service of Northern Ireland, 2005, Consultation on proposed changes to the

UK Pollutant Release and Transfer Registers (PRTRs) for 2005 to 2007, viewed at www.environment-agency.gov.uk/commondata/acrobat/uk_prtr_co

ns_1012615.pdf April 2005

Terry J and Yandle B 1997 EPA's Toxic Release Inventory: stimulus and response *Managerial and decision economics* Vol 18 pp 433–441.

US Environment Protection Agency (US EPA) 2003 *How are the Toxic Release Inventory data used? Government, business, academic and citizen uses* EPA 260–R-002-004 EPA, Washington.

US Environment Protection Agency (US EPA) 2004 *FY 2005 Annual plan and budget* EPA, Washington, p D-7.

US Environmental Protection Agency, TRI Dioxin and Dioxin-like Compounds Toxic Equivalency Reporting Rule (Proposed), http://www.epa.gov/tri/tridata/teq/teqmodrule.html#q1, viewed April 2005

US Government Accounting Office (US GAO) 1997 *EPA should strengthen its efforts to measure and encourage pollution prevention* Washington. DC.

US Government Accounting Office (US GAO) 1998 *Agency policies and procedures are needed for EPA's information dissemination* Washington. DC.

US Government Accounting Office (US GAO) 2000 *EPA paperwork: burden estimate increasing despite reduction claims* Washington. DC.

United State Toxics Release Inventory (TRI), 2003 Reporting Year List of TRI Chemicals, viewed at http://www.epa.gov/tri/chemical/index.htm#chemlist April 2005

Western Australian Department of Environmental Protection, 1999, National Pollutant Inventory Kalgoorlie NPI Trial, October 1999, viewed at www.npi.gov.au/publications/pubs/kalreport.pdf, March 2005.

Appendix 1 National Pollutant Inventory Review Industry Questionnaires

NATIONAL POLLUTANT INVENTORY REVIEW
INDUSTRY QUESTIONNAIRE

You are invited to comment on all or any of the following questions. Please do not feel obliged to comment on all issues or to be constrained by the space provided for your response: if the space provided is inadequate please increase the size of the space provided or added extra pages.

A summary of the goals, objective and performance indicators of NPI are included at the end of this questionnaire.

Respondent:…….. ……
Name Organisation

Goals and Objectives Are the goals and objectives of the NPI NEPM appropriate? If not how they could be improved?
Specific Substance List Are there any substances which should be either added or deleted from the list? Please specify.
What would be the resource and cost implications of adding additional substance?
Are there any changes that should be made to how substances are reported?
What would be the resource and cost implications of these changes?
Broad substance Lists Should the NPI be modified to include any of the following: (please bold or underline those that should be included). • Agricultural chemicals • Veterinary chemicals • Construction industry emissions • Non-anthropogenic sources eg biogenics • Transfers • Greenhouse gases

If you think any of the last three (transfers, non-anthropogenics and greenhouse) should be included how do you think they should fit into the current NPI? For example should they be directly incorporated or be separate databases?
What would be the resource and cost implications if your company/industry is required to report transfers and/or greenhouse gases?
Thresholds Do you recommend that any of the threshold levels need changing? If so which and why?
What are the cost and resource implications to your company/industry of changing thresholds or methods for determining them?
How can geographically disperse facilities be better defined for reporting purposes (eg pipelines, mines, etc)?
Industry Reporting and Data Quality Is it necessary for a handbook to be produced before reporting is required?
Are there any other industries that should be reporting eg crematoria or forest operations?
How could data accuracy be improved (eg more measurement, better validation, etc)?
Is the current set of industry handbooks adequate or do they require improvement? If improvement is required, which handbooks and what types of improvements are required?
Diffuse Data Quality Do you have any comments on the diffuse emissions in the NPI?
Implementation Are there implementation issues that need resolution?
What improvements in reporting arrangements could be made?
Are the reporting timeframes adequate?
Data Access and Use Is the NPI database being used within your organization/industry? Please give examples.
What are the impediments to its use and how could these be reduced?
Is the contextual information adequate and how could it be improved?
Has the NPI influenced cleaner production decisions within your organization/industry? Please give examples.
Are there any other benefits to your organization/industry from the NPI?

Other Resource Issues
What staff and financial resources have been devoted to the NPI? (Specify time period and expenditure over that period).
Do you have any suggestions on how costs could be decreased and benefits increased?
Are there any other comments you would like to make about the NPI?

Please return the completed questionnaire to environment.link@bigpond.com by 31 March 2005

Thank you for your comments.

NATIONAL POLLUTANT INVENTORY REVIEW
JURISDICTION QUESTIONNAIRE

You are invited to comment on all or any of the following questions. Please do not feel obliged to comment on all issues or to be constrained by the space provided for your response: if the space provided is inadequate please increase the size of the space provided or add extra pages.

A summary of the goals, objective and performance indicators of NPI are included at the end of this questionnaire.

Respondent:……. ……
Name Organisation

Goals and Objectives
Are the goals and objectives of the NPI NEPM appropriate? If not how they could be improved?
Are the performance indicators appropriate?
Are they measurable?
Are there any additional performance indicators you could suggest?
Specific Substance List
Are there any substances which should be either added or deleted from the list? Please specify.
What would be the resource and cost implications of adding additional substance?
Are there any changes that should be made to how substances are reported?
What would be the resource and cost implications to your jurisdiction of these changes?
Broad substance Lists
Should the NPI be modified to include any of the following: (please bold or underline those that should be included). • Agricultural chemicals • Veterinary chemicals • Construction industry emissions • Non-anthropogenic sources eg biogenics • Transfers • Greenhouse gases
If you think any of the last three (transfers, non-anthropogenics and greenhouse) should be included how do you think they should fit into the current NPI? For example should they be directly incorporated or be separate databases?
What would be the resource and cost implications of including any new category, or segmenting the database to your jurisdiction?

Thresholds Do you recommend that any of the threshold levels need changing? If so, which and why?
What are the cost and resource implications to your jurisdiction of changing thresholds or methods for determining them?
How can geographically disperse facilities be better defined for reporting purposes (eg pipelines, mines, etc)?
Industry Reporting and Data Quality Is the current set of industry handbooks adequate or do they require improvement? If Improvement is required, which handbooks and what types of improvements are required?
Should handbooks be required before industry reports?
Are there any other industries that should be reporting eg crematoria or forest operations?
Is the accuracy of industry data adequate for envisaged uses?
How could data accuracy be improved (eg more measurement, better validation, etc)?
What systems could be implemented for detecting non reporting facilities?
Diffuse Data Quality Should diffuse source estimates be expanded to cover a great area? If so, what area?
What are the base years for your aggregated emissions data (AED) and what upgrades have been made since then? Are there any upgrades scheduled?
Is there a need for better guidelines on AED estimates for regions?
Are subthreshold facilities adequately identified and captured? If not, how could this be improved?
What is the cost of undertaking a diffuse source estimate for a small, medium, or large region? How have these been funded?
Are the current set of handbooks for diffuse sources adequate, or do they require improvement? What improvements do you suggest?
What are the costs of improving handbooks?
Are there any other sources that should be included in the AED? What are they?
Implementation Are there implementation issues that need resolution such as reporting arrangements to DEH or reporting by industry?
What are the resource and cost implications?
How can the database be improved and what are the cost and resources required to do this?
Has your jurisdiction undertaken any compliance/ enforcement actions? If so, what?
Is there scope to improve industry reporting though improved compliance and/or enforcement arrangements?

Are the reporting timeframes adequate?
Data Access and Use Is the NPI database being used within your jurisdiction? Please give examples.
What are the impediments to its use and how could these be reduced?
Is the contextual information adequate and how could it be improved?
Has the NPI influenced cleaner production decisions? Give examples if possible.
Is the NPI being used for any education or community purposes that you are aware of? Please specify.
Are there any other benefits from the NPI?
Other Resource Issues What overall staff and financial resources have been devoted to the NPI? (Specify time period and expenditure over that period).
Do you have any suggestions on how could costs be decreased and benefits increased?
What are the expected costs to your jurisdiction in amending the NPI NEPM?
Review How often should the NPI NEPM be reviewed?
Are there any other comments you would like to make about the NPI?

Please return the completed questionnaire to environment.link@bigpond.com by 31 March 2005

Thank you for your comments.

NATIONAL POLLUTANT INVENTORY REVIEW
ENVIRONMENT GROUPS, ASSOCIATIONS AND LOCAL GOVERNMENT QUESTIONNAIRE

You are invited to comment on all or any of the following questions. Please do not feel obliged to comment on all issues or to be constrained by the space provided for your response: if the space provided is inadequate please increase or provide additional pages.

A summary of the goals, objective and performance indicators of NPI are included at the end of this questionnaire.

Respondent:……. ……
Name Organisation

Goals and Objectives Are the goals and objectives of the NPI NEPM appropriate? If not how they could be improved?
Specific Substance List Are there any substances which should be either added or deleted from the list? Please specify.
Broad Substance List Should the NPI be modified to include any of the following: (please bold or underline those that should be included). • Agricultural chemicals • Veterinary chemicals • Construction industry emissions • Non-anthropogenic sources eg biogenics • Transfers • Greenhouse gases
If so, what would the benefits be to your organisation?
If you think any of the last three (transfers, non-anthropogenics and greenhouse gases) should be included how should these be presented within the NPI? For example should they be directly incorporated or be separate databases?
Thresholds Do you recommend that any of the threshold levels need changing? If so which and why?
Data Quality Does the quality of the NPI data adequately meet your needs? If not, why not?
Data Access and Use Are you using the NPI and if so, for what purpose/s?
What are the impediments to its use and how could these be reduced?
Is the contextual information adequate and how could it be improved?

Resource Issues Has the NPI been beneficial to environmental groups? For example has it reduced research time?
Are there any other comments you would like to make about the NPI?

Please return the completed questionnaire to environment.link@bigpond.com by 31 March 2005

Thank you for your comments.

Appendix 2 Respondents

Khokan Bagchi	Department of the Environment and Heritage
Nick Barber	George Weston Foods
Tom Beer	CSIRO Environmental Risk Network
Chris Bell	EPA Victoria
Andrew Best	BP
Jenny Boshier	Department of the Environment and Heritage
Dr Narelle Bowern	Medicines Australia
Jo Brennan	Department of the Environment and Heritage
Sue Clark	Comalco, Alumina Refinery
Paul Cristofani	Minerals Council of Australia
Janine Cullen	Department of the Environment and Heritage. Australian Greenhouse Office
Serghei DeBray	Environment ACT
Ros Degaris	Cement Industry Federation
Georgia Derham (for Colin Trinder)	Department of Defence
Donna Dryden	Centennial Coal
Anne Ellson	EPA South Australia
Geoff Ereaut	Huntsman Chemical Company Aust P/L
Cormack Farrell	Minerals Council of Australia
Frank Ford	Anglo Coal Australia Pty Ltd
David Froud	International Power Hazelwood
Claude Gauchat	Avcare Limited
Mark Gifford	Department of Environment and Conservation, NSW
Warren Godson	Environmental Analyst
Andrew Grabski	Xstrata
Gina Green	Department of the Environment and Heritage, Environmental Resources Information Network (ERIN)
Francis Grey	SAM Sustainable Asset Management,

Lionel Harris	Sydney Water
Mike Hill	Environmental developer
Philip Hine	Department of Environment, WA
Doug Holmes	Monash Sustainability Enterprises
Richard Hoy	Energy Supply Association of Australia Ltd
Mark Hyman	Department of the Environment and Heritage
Alan Irving,	Rio Tinto Coal Australia (RTCA)
Michael Ison	Australian Aluminium Council
Ian Israelsohn	Energy Supply Association of Australia Ltd
Jeya.Jeyasingham	Australian Pork Limited
Warren Jones	Department of Primary Industries, Water and Environment, Tasmania
Sof Kehagias	Mitsubishi Motors Australia Limited
Stephen Kenihan	International Council for Local Environmental Initiatives (ICLEI) A/NZ
Bruce Kennedy	National Environment Protection Council Service Corporation
Di Kotrotsos	Environment Protection Authority, SA
Geoff Latimer	EPA Victoria
Dr Mariann Lloyd-Smith	National Toxics Network Inc.
Peter Manins	CSIRO (Atmospheric Research)
Dylan Marks	Greenbase Pty. Ltd
Ian Marshall	Queensland Health
Mark McCallum	Australian Petroleum Production and Exploration Association
Karen McIntosh	Queensland Transport
Dr Chris Mill	Department of the Environment and Heritage
Dennis Monahan	EPA Victoria
Dr Phil Morgan	Clean Air Society of Australia and new Zealand
John Morris	ACI Packaging
Greg Mueller	Department of Environment, WA

John Newton	Australian Environment Business Network
Ian O'Hara	Australian Sugar Milling Council
Mark O'Neill	Australian Coal Association
Miles Prosser	A3P – Australian Plantation, Products and Paper Industry Council
Stuart Ritchie	Cement Australia
Kevin Roberts	Australian Lot Feeders Association
Nathan Robinson	OneSteel
Carlos Santin	Plastics and Chemicals Industries Association
Cameron Schuster	CSBP Limited
Rimma Serebryanikova	EPA Victoria
Mark Shaffron	Fertiliser Industry Federation of Australia
Vicky Sheppeard	NSW Health
Peter R Smith	Environment and Development, NSW Minerals Council
May Splettstoesser	EPA Victoria
Melanie Squire	Zinifex
Kes Steiner	Sydney Water Corporation
Greg Storrier	Department of Environment and Conservation, NSW
Sally-anne Strohmayr	Office of Environment & Heritage, Department of Infrastructure Planning and Environment (NT)
Rob Sturgess	Department of the Environment and Heritage, Australian Greenhouse Office
Shayleen Thompson	Department of the Environment and Heritage. Australian Greenhouse Office
Peter Thorning	Queensland Environmental Protection Agency
Paul Vogel	EPA South Australia
Roslyn Vulcano	Office of Environment & Heritage, Department of Infrastructure Planning and Environment (NT)
Fiona Wain	Environment Business Australia
Emma Watts	Australian Industry Greenhouse Network
Tom Whitworth	EPA South Australia
Grant Williams	Blue Circle Southern Cement

Bruce Wilson	Department of Industry, Tourism and Resources
Dianna Wright	Department of the Environment and Heritage. Australian Greenhouse Office
Harley Wright	Kimberly-Clark Australia
Ross Yarwood	Department of Environment, WA
Justine Young	Parmalat Australia Ltd
Jonathan Zea	Sydney Water Corporation

Appendix 3 Comparison of Features in PRTRs (OECD 2001)

This table is based on responses made by governments to the OECD PRTR questionnaire.
Operating systems as of June 1999 are highlighted in gray.

	First year of data collection	Environmental media covered	Mandatory or voluntary system	Number of listed chemicals	Transfers offsite included	Reporting of public facilities	Diffuse sources included	Report cycle	Public Dissemination of full (raw) data	Public Dissemination of aggregated data sets	Pilot Study	Consultation with affected and interested parties on design	Site specific reporting
Australia	1998	A,W,L	Mandatory	90	No	Yes	Yes	Annual	Yes	Yes	Yes	Yes	Yes
Austria[1]	N/A												
Belgium Fl. (Air)	1993	Air	Mandatory[2]	63		No	Yes	Annual	No	Yes	Yes	Yes	Yes
Belgium Fl. (Water)	1993	Water	Mandatory	162	Yes	No	No[3]	Annual	No	Yes	No	No	Yes
Canada	1993	A,W,L	Mandatory	245	Yes	Yes	Yes	Annual	Yes	Yes	Yes	Yes	Yes
Czech Republic	N/A	A,W,L	Mandatory	N/A	Yes	Yes	No	N/A	No	Yes	Yes	Yes	Yes
Denmark	1989	Water	Mandatory	300	Yes	Yes	No	Annual	Yes	Yes	Yes	Yes	Yes
Finland	1988	A,W,L	Mandatory	50	No	Yes	No	Annual	No	Yes	Yes	No	Yes
Hungary	N/A	A,W,L	Mandatory	200-250	Yes	N/A	No	N/A	N/A	N/A	Planned	Yes	Yes
Ireland	1995	A,W,L	Mandatory	PER list[4]	Yes	Yes	No	Annual	Yes	Yes	No	Yes	Yes
Italy	1995	Land	Mandatory		Yes	Yes	No	Annual	Yes	Yes	Yes	Yes	Yes
Japan	2001	A,W,L	Mandatory	354	Yes	Yes[5]	Yes	Annual	No[6]	Yes	Yes	Yes	Yes
Korea	1999	A,W,L	Mandatory	80	Yes	Yes	Yes	Annual	Yes	Yes	Yes	Yes	Yes
Mexico	1997	A,W,L	Both	191	Yes	Yes	No	Annual	No	Yes	Yes	Yes	Yes
Netherlands	1976[7]	A,W,L	Mandatory	180	Yes	Yes	Yes	Annual	Yes	Yes	Yes	Yes	Yes
Norway	1992	A,W,L	Mandatory	250	Yes	Yes	Yes	Annual	No[8]	Yes	No	No	Yes
Slovak Republic	1998	A,W	Both	200	Yes	Yes	No	Annual	Yes	Yes	Yes	Yes	Yes
Sweden	N/A	A,W,L	Mandatory	N/A	N/A	N/A	Yes	N/A	N/A	N/A	Yes	Yes	Yes
Switzerland	2001	A,W	Voluntary	50	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes	N/A
United Kingdom	1991[9]	A,W,L	Mandatory	183	No	Yes	Yes	Annual	Yes	Yes	No	Yes	Yes
United States	1987	A,W,L	Mandatory	643	Yes	Yes	No	Annual	Yes	Yes	No	Yes	Yes

A,W,L = Air, Water, Land
N/A = Not available or not answered

1. No PRTR or plans to develop a PRTR at this time

2. Started in 1980 as voluntary; since 1993, it is mandatory

3. Waste Register

4. Available through Republic of Ireland EPA, P.O. Box 300, Johnstown Castle Estate, Co. Wexford, Ireland

5. Planned

6. To be provided when requested

7. 1999 for new system

8. In 2000, data will be available on Internet

9. 1998 for new system

***Since June 1999, programmes were initiated in Korea, Japan and the Slovak Republic.*

Appendix 4 NPI NEPM GOALS

PART 2 - NATIONAL ENVIRONMENT PROTECTION GOALS

5. The desired environmental outcomes of the Measure are:
   (a) the maintenance and improvement of:
      (i) ambient air quality; and
      (ii) ambient marine, estuarine and fresh water quality;
   (b) the minimisation of environmental impacts associated with hazardous wastes; and
   (c) an expansion in the re-use and recycling of used materials.

6. The national environment protection goals established by this Measure are to assist in reducing the existing and potential impacts of emissions of substances and to assist government, industry and the community in achieving the desired environmental outcomes set out in clause 5 by providing a basis for:
   (a) the collection of a broad base of information on emissions of substances on the reporting list to air, land and water, and
   (b) the dissemination of information collected to all sectors of the community in a useful, accessible and understandable form.

7. A database to be known as the National Pollutant Inventory will be established to:
   (a) provide information to enhance and facilitate policy formulation and decision making for environmental planning and management;
   (b) provide publicly accessible and available information, on a geographic basis, about specified emissions to the environment, including those of a hazardous nature or involving significant impact; and
   (c) promote and assist with the facilitation of waste minimisation and cleaner production programmes for industry, government and the community.

8. The National Pollutant Inventory will be a joint programme under which:
   (a) occupiers of reporting facilities will estimate emission data and provide these and supporting data to participating States and Territories;
   (b) participating States or Territories will collect emission data and supporting data from occupiers of reporting facilities and, subject to clause 20, develop or cause to be developed, aggregated emissions data, and will provide these data to the Commonwealth; and
   (c) the Commonwealth will:
      (i) compile contextual information;

(ii) collate the data provided by States and Territories and contextual information as defined in this Measure and as also agreed between participating jurisdictions; and

(iii) disseminate this information annually.

National Environment Protection (*National Pollutant Inventory*) Measure – As Varied 20 June 2000.

Appendix 5 List Of Handbooks

Generic Handbooks

Combustion in Boilers
Combustion Engines
Explosives Detonation
Fuel and Organic Liquid Storage
Fugitive Emissions
Maritime Operations
Railway Yard Operations
Sewage and Wastewater Treatment
Surface Coating (e.g. painting)

Industry Handbooks

Airports
Alumina Production
Aluminium Production
Ammonium Sulfate Manufacturing
Animal and Bird Feed Manufacture
Appliance, Machinery & Electrical Equipment Manufacture
Asphalt (Hot Mix) Manufacturing
Bakery Product and Bread Manufacturing
Battery (Lead Acid) Manufacturing
Beef Cattle Feedlots
Beer Manufacturing
Bricks, Ceramics & Clay Product Manufacturing
Cement Manufacturing
Chemical Processing (Organic Industrial) Industries
Chemicals (Inorganic Industrial) Manufacturing
Chemical Product Manufacture
Coffee Roasting
Combustion in Boilers
Combustion Engines
Concrete Batching & Concrete Product Manufacturing
Confectionery Manufacture
Copper Concentrating, Smelting & Refining
Dairy Product Manufacturing
Defence Facilities
Dry Cleaning
Electronics & Computer Equipment Manufacturing
Electroplating and Anodising
Explosives Detonation
Explosives Manufacturing
Ferroalloy Production
Ferrous Foundries
Fibreglass Product Manufacturing
Fossil Fuel Electric Power Generation
Fruit and Vegetable Processing
Fuel and Organic Liquid Storage
Fugitive Emissions
Furniture and Fixtures Manufacturing
Galvanizing
Gas Supply
Glass & Glass Fibre Manufacturing
Gold Ore Processing
Hospitals

Iron and Steel Production
Lead Concentrating, Smelting & Refining
Leather Tanning and Finishing
Lime and Dolomite Manufacturing
Malting Processes
Maritime Operations
Meat Processing
Medicinal & Pharmaceutical Product Manufacturing
Mining
Mineral Sands Mining and Processing
Mining and Processing of Non-Metallic Minerals
Motor Vehicle Manufacturing
Municipal Solid Waste Landfills
Nickel Concentration, Smelting and Refining
Non Ferrous Foundries
Non Ferrous Metal Manufacture
Non Metallic Mineral Product Manufacture
Non Petroleum Industrial Gases
Oil and Gas Exploration and Production
Oil Recycling
Paint & Ink Manufacturing
Petroleum Refining
Phosphate Manufacturing
Pig Farming
Plasterboard and Plaster Manufacturing
Potable Water Treatment
Poultry Raising
Pressure Sensitive Tapes & Labels
Printing, Publishing & Packaging
Pulp & Paper Manufacturing
Railway Yard Operations
Rubber Product Manufacture
Seafood Processing
Sewage and Wastewater Treatment
Sewage Sludge & Biomedical Waste Incineration
Shipbuilding, Repair & Maintenance
Snack Foods Roasting and Frying
Soft Drink Manufacture
Solvent Recycling
Structural & Fabricated Metal Product Manufacture
Sugar Milling & Refining
Surface Coating
Synthetic Ammonia Manufacturing
Textile & Clothing Industry
Timber & Wood Product Manufacturing
Tobacco Product Manufacture
Urea Manufacturing (Ammonium Nitrate)
Vegetable Oil Processing
Wine and Spirits Manufacturing
Wool Scouring
Zinc Concentrating, Smelting & Refining

Diffuse Source Handbooks

Aircraft
Aquaculture - Temperate
Aquaculture - Tropical
Architectural Coating
Barbeques

Bushfires and Prescribed Burning
Commercial Ships/Boats and Recreational Boats
Cutback Bitumen
Domestic/Commercial Solvents and Aerosol Use
Dry Cleaning
Fuel Combustion (Sub-Threshold)
Gaseous Fuel Burning - Domestic
Industrial Solvents Use
Lawn Mowing - Domestic
Motor Vehicles
Motor Vehicle Refinishing
Paved and Unpaved Roads
Printing and Graphical Arts
Railways
Service Stations
Solid Fuel Burning - Domestic

Appendix 6 Australian Pesticides and Veterinary Medicines Authority: Chemical Review Program and Reports

Reports Available:

2,4 D Review scope document 2003

1080 Review

October 2004 announcement regarding the current status of the 1080 Review:

Many responses were received during the call for public submissions, and there have been some further submissions from State agencies. These submissions are currently being considered by the APVMA. The APVMA is aiming to release a draft review report for public comment in early 2005.

Review Scope document 2002

Aldicarb review 2001

Arsenic timber treatments (draft review, overview to review, review scope, technical report and related media releases)

Atrazine

Atrazine review (Interim), 1997
Draft Final Atrazine Report 2002
Second draft final review report 2004

Avoparcin - status document. 2001

Benomyl 2003

Carbaryl - draft final report June 2004

Carbon Disulfide

Draft Review Report August 2004
Updated suspension notice- 2003
Review scope document 1 2003

Chlorfenvinphos interim review 2000

Chlorpropham , - special review 1997

Chlorpyrifos interim review, 2000

Diazinon

Draft report Sept 2002
2003 Product Cancellations

(Dihydro) Streptomycin / Penicillin Special review - combination products and (Dihydro) Streptomycin products March 1999

Dimethoate and Omethoate - Review Scope Document April 2004

Dimetridazole

Draft Review Report September 2004
Review Scope Document 2002

Diuron - Review Scope Document 2002

EDB (Ethylene dibromide) - Special review, 1998

Endosulfan
- Draft Final Review May 2004
- Interim review, 1998

Fenamiphos Review Scope Document 2003

Fenitrothion

Fipronil - Review Scope Document 2003

Glyphosate Special Review 1996

Hormonal Growth Promotants 2001

Macrocyclic Lactones 1998

Maldison (Malathion) - Review Scope Document 2003

Methamidophos - Review Scope Document 2002

Metham Sodium, Dazonet and Methylisothiocyanate (MITC) June 1997

Methidathion - Review Scope Document - released 5 June 2002

Mevinphos
- Mevinphos (Interim Report) - Summary
- Mevinphos - Supplementary Review - October 2002

Molinate Review Scope Document 2003

Monocrotophos review 2000 and advice to growers

Parathion-methyl Interim review 1999

Parathion (ethyl parathion) review 1998

Pindone review 2002

Procymidone

Sodium Fluoroacetate (1080) - Review Scope Document 2002

Sulphonamides - Final report 2000

Tribufos Special review 1998

Triforine Special review 2003

Vinclozolin Special Review 1997

Virginiamycin

http://www.apvma.gov.au/chemrev/chemrev.shtml

Appendix 7 Joint Environment Protection and Heritage Council / Ministerial Council on Energy - Terms of Reference

Officials Working Group on Greenhouse and Energy Reporting

Terms of Reference

The Joint EPHC/MCE Officials Working Group on Greenhouse and Energy Reporting has been established to examine the costs and benefits associated with implementation of a nationally consistent framework for greenhouse and energy reporting from Australian industry to meet government and public reporting needs. Specifically, the Group will:

- Identify and, as appropriate, develop a national greenhouse and energy reporting framework suitable for Australian industry, taking into account emerging international reporting frameworks;
- Identify extent of data collected on energy and greenhouse by, or on behalf of, government;
- Explore cost-effective mechanisms, including through the National Pollutant Inventory, for implementing the national reporting framework, and assess the relative costs and benefits of these options;
- Identify options for the ownership, collection, analysis and dissemination of energy and greenhouse data;
- Evaluate potential instruments for national greenhouse and energy reporting; and
- Report to EPHC and MCE on these matters by mid 2005.

Membership

The Joint EPHC/MCE Officials Working Group will be co-chaired by two senior officials from different jurisdictions representing, in combination, environment and energy portfolios.

Membership of this Working Group will be drawn from officials nominated by EPHC and MCE members. Each jurisdiction will be able to nominate one or two officials, not including co-chairs.

Meetings will be held as necessary to enable the Working Group to deliver their report to EPHC and MCE within the projected timeframe. At least 4 meetings are likely to be required.

Proposed Workplan

1. Draft Scoping Paper and detailed workplan.
2. Establish a Reference Group drawn from technical experts within industry and government to provide advice to the Working Group and consultant(s).
3. Engage consultant(s) to conduct relevant research, including consultation with stakeholders (including government departments that are currently collecting energy and/or greenhouse data), as well as canvassing views and options with Working Group members, and prepare an Issues Paper on the proposal.
4. Release Issues Paper for discussion and consultation with Australian governments, industry and other relevant stakeholders.
5. Prepare Working Group report, including recommendations, for consideration by EPHC and MCE.

Proposed Timeframe

September 2004	First meeting of Joint EPHC/MCE Officials Working Group to consider *inter alia* project scoping paper.
October 2004	Convene the Technical Experts' Reference Group to advise the Working Group and consultant(s).
	Engage consultant(s) to provide technical support to Working Group, including development of an Issues Paper and consultation with identified stakeholders.
Nov/Dec 2004	Progress report to EPHC and MCE (timing to be confirmed)
Jan/Feb 2005	Release Issues Paper for discussion and stakeholder consultation.
May 2005	Consider consultant(s) report, and develop draft recommendations to EPHC/MCE.
June 2005	Consider draft Working Group report to EPHC/MCE.
July 2005	Finalise Working Group report, and submit to MCE and EPHC for their consideration.

Secretariat and other resources

The Australian Greenhouse Office will host secretariat to the Joint EPHC/MCE Officials Working Group.

Working Group members will meet their own travel and administrative costs associated with participation in this forum.

Other resources required to complete this task will include:

- Engaging a consultant(s) to provide technical and other supports to the Working Group, as agreed.
- Costs associated with the stakeholder consultation process.