

**Report to Chemicals and the Environment Branch,
Environment Australia**

**Evaluation of the National Pollutant
Inventory Program**

FINAL REPORT

November 2000

ARTD
Management & Research Consultants

Acknowledgments

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Table of contents

ACKNOWLEDGMENTS.....	2
EXECUTIVE SUMMARY	6
RECOMMENDATIONS	12
PART A INTRODUCTION	13
1 OVERVIEW OF NATIONAL POLLUTANT INVENTORY.....	13
1.1 The National Pollutant Inventory Program.....	13
1.2 Early Development of the Program.....	13
1.3 Current Stage of Development of the Program.....	14
1.4 Progress to date	16
2 THE EVALUATION	18
2.1 Purpose and scope of the evaluation	18
2.2 Project Management.....	18
2.3 Evaluation methods.....	19
PART B THE FINDINGS	22
3 MANAGEMENT ARRANGEMENTS	22
3.1 Memorandum of Understanding (MOU)	22
3.2 Implementation Working Group.....	22
3.3 State/Territory Government NPI Units	26
3.4 Management by Environment Australia	27
3.5 Allocation of program funding.....	28
3.6 Conclusions	34
4 REACH OF THE PROGRAM	35
4.1 Industry handbooks.....	35
4.2 Education strategies by NPI Units for industry and local government	38
4.3 Consultation with Peak Bodies.....	42
4.4 Education of the community	44
4.5. Conclusions	44
5 REPORTING.....	46
5.1 Extent of facility reporting	46
5.2 Aggregated emissions data (AED).....	55
5.3 Data quality.....	58
5.4 Cost of reporting to industry.....	60
5.5 Conclusions	62
6 THE NATIONAL POLLUTANT INVENTORY INTERNET DATABASE	63
6.1 Utility of web site	63
6.2 Usage of the NPI Internet database	63
6.3 Conclusions	65
7 LIKELY BENEFITS OF THE NPI PROGRAM.....	66
7.1 Usefulness of the information.....	66
7.2 Potential to contribute to the adoption of cleaner production practices	68
7.3 Stakeholder support for NPI.....	70
7.4 Conclusions	70
APPENDICES	71

Appendix 1 Key Informants Interviewed for Review 71

GLOSSARY OF ABBREVIATIONS

AED	Aggregated Emissions Data
ANZSIC	Australian New Zealand Standard Industrial Classification
EET	Emission Estimation Technique
EPA	Environment Protection Agency or Authority
ERIN	Environmental Resources Information Network
GIS	Geographic Information System
IWG	Implementation Working Party
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NGO	Non-government Organisation
NPI	National Pollutant Inventory
OECD	Organisation Economic Cooperation and Development
PRTR	Pollutant Release and Transfer Register
TRI	Toxic Release Inventory
VOC	Volatile Organic Compounds

Executive summary

The evaluation

This is the report of the evaluation of the National Pollutant Inventory Program (NPI), for its first three years of implementation, focusing on the last two years –1999-2000.

The NPI is a database available on the Internet that is designed to provide publicly accessible information on the types and amounts of specified substances being emitted to air, land and water.

Purpose

The purpose of the evaluation is to: meet the requirements of the Cabinet decision to undertake a review of the program; inform the Commonwealth's budget processes for future years; meet accountability requirements under the Memorandum of Understanding between the Commonwealth and State and Territory Governments; and, identify options for improvements in the delivery of the program.

The report assesses how effectively and efficiently the program is being implemented and the potential for meeting its long term objectives.

Methodology

1. An analysis of objectives and strategies to develop an outcomes hierarchy for the program;
2. Interviews with 56 stakeholders from industry, the NGO and government sectors, including program managers at state/territory and Commonwealth level;
3. Analysis of process and reporting data provided by the states / territories, the ERIN group in Environment Australia and the National Pollutant Summary Report of the First Year Data;
4. Analysis of Internet database usage; and,
5. Brief literature scan.

Overview

Early development

The NPI was established as a National Environment Protection Measure by the National Environment Protection Council in February 1998, with reporting starting in July 1998.

This is a complex program and the 1998 start was preceded by six years planning, and involved extensive consultation between governments and stakeholders in industry and the environmental sectors.

Overview

Program achievements

In the establishment phase of the program, there has been significant progress achieved, including:

- Successful completion of six major trials;
- Establishment of a national cooperative management system involving Commonwealth and state/territory governments;
- Publication of 79 industry handbooks which help potential reporters identify their reporting obligations, and provide emission factors and best available estimation techniques to calculate emissions;
- Publication of 19 manuals for estimating aggregated emissions data;
- Establishment of the Internet database;
- Establishment of industry reporting systems;
- Publication of first NPI Report, January 2000, with data on emissions to air, water and land from 1203 facilities;
- Completion of 19 aggregated emissions studies across Australia, with a further 17 in progress and to be reported in the second year report; and,
- Provision of leadership in regard to the development of pollutant inventories internationally.

*Evaluation Findings-
Terms of Reference 1:*

Potential effectiveness

On the balance of evidence, both local and international, the National Pollutant Inventory Program should be continued.

*The likely effectiveness
of the program in light of
its objectives*

The evidence from overseas and early evidence from this study, indicates that the NPI Program has the potential to meet its objectives. However, to produce high quality and useful data that covers all relevant industries and includes comprehensive information on diffuse emissions, it will require effective implementation and adequate and committed funding.

To date, the program has developed an effective and appropriate database, which is capable of meeting the needs of the likely users. In general, other aspects of the program have been implemented effectively, however, the evaluation identified a number of critical areas for improvement (see below, TOR 2 and 3).

Usefulness of data and support for the program

Stakeholders largely supported the continuation of the program. They recognised that the NPI is unique in that it is the only national and publicly available source of emission data. Stakeholders' opinions as to the usefulness of these data varied, with many recognising the data's potential power to positively influence industry practices (as shown in other countries with pollutant inventories), inform the public and contribute to environmental policy. Some industry sectors argued that the data needs more interpretation to be readily understood by the general public and government and that there are other more powerful motivators to adopting cleaner production. Industries are seeking the inclusion of more comprehensive contextual information on the database to enhance the usefulness of the data.

The NPI program is in its infancy and it is clear that the investment of government and industry resources has only just begun, and achieving the desired long-term outcomes will only be possible with continuing commitment

*Evaluation findings -
Terms of Reference 2:*

*Whether the strategies
and processes
established jointly by all
jurisdictions to implement
the program are
operating effectively*

Management arrangements

In general, the management arrangements are appropriate and effective in that they have ensured that the program has been delivered nationally, and with a reasonable degree of consistency. The NPI is a data driven and highly technical program. The management arrangements have ensured that there is sufficient technical expertise available to address technical issues arising from implementation. Delivering the program through units based in states and territories was successful and most stakeholders want this arrangement continued.

The study identified areas for improvement in the delivery of the management framework, principally more strategic direction, stronger leadership, more efficient resolution of broader implementation issues, with greater opportunities for industry input and a greater capacity for timely response to concerns.

The study also identified opportunities for improving particular aspects of the management arrangements for example, assigning and supporting project managers for IWG sub-committees and employing a technical manager located within the Commonwealth NPI Unit.

Reach of program

Educating stakeholders about the NPI was a key implementation task.

The jurisdictions implemented appropriate education programs, with the mix of activities varying in each jurisdiction. Education activities were largely focused on those industry sectors required to report, with limited community education activities, except in SA.

The coverage of industry sectors was variable across jurisdictions. While it is clear from stakeholder feedback that the program achieved substantial exposure, assessment of reach is limited as baseline information was incomplete.

It is apparent that while the education of industry is being implemented relatively effectively there is scope for improving the targeting of education activities and for more sharing of resources and innovations.

The state and territory-based education supplemented Commonwealth information i.e. NPI guide, industry handbooks, NPI newsletters and web-site material. While almost all handbooks are now available, it is apparent that the quality of the handbooks is variable and that revision of lesser quality handbooks is needed to retain the relevant industry sector's confidence in the program.

Reporting

In 1998/1999, 1203 facilities from 23 industry sectors reported emissions data, with 46% of all reporting facilities being from the Petroleum Product Wholesaling sector. Program managers anticipate that 79 industry sectors will report in 1999/2000, and that coverage will improve in those sectors already reporting.

The limited systematic data available on the number of expected or confirmed reporting facilities makes it difficult to assess the extent of reporting. However, feedback from industry and NPI Units indicate that the program has had variable success in encouraging all targeted facilities that are required to report, to do so. Indicative evidence shows that larger facilities and those from highly organised and homogenous sectors, with active industry associations that actively support the program, are reporting. Facilities that were already known to local environmental agencies are also more likely to report.

Barriers to reporting include, lack of confidence in emission factors, lack of company resources, issues of commercial-in-confidence and the absence of penalties associated with non-compliance.

The limited information available indicates that the cost of reporting to industry varied widely, but for many larger reporting facilities, was significantly more than estimated by the NEPM. Industry agrees that costs may reduce over time, as they and government establish more efficient processes.

Quality of reported data

Stakeholders report that the accuracy and reliability of approved estimation factors are variable, as is the quality of data produced.

At this early stage in the program, comprehensive quality assurance systems are yet to be put in place by all jurisdictions. The next stage of the program should address the variable quality of data by refining the estimation techniques and by establishing systematic and rigorous quality assurance systems.

Data transfer

The data transfer processes have been relatively efficient and effective, moreover these processes are being continually refined by jurisdictions and the ERIN group, for example, a national electronic reporting tool is being developed and the submission of records to ERIN is being automated.

The NPI Internet Database

The Commonwealth upgraded the database prior to the launch of the first report in January 2000 and is continually improving search functions and ease of use.

The evidence indicates that these processes have been effective in that the database is regarded as well presented and the data retrieval processes as user friendly and effective.

Initial patterns of use of the database indicate that the database is viable, showing a steady pattern of use with pattern of queries consistent with expectations.

Evaluation findings – Terms of Reference 3:

*What is an appropriate
level of resources
required to develop and
manage the program*

The 1998-1999 funding levels provide a useful guideline for future implementation but should also take into account new information on implementation parameters. As the program matures, funding needs may reduce and / or the mix of activities being funded change. In addition, the current technical review may result in an expansion of the program, which may impact on the resources needed to implement the program effectively.

Overall, program funding should take into account the need to improve the performance of the program, in particular, on-going revision of handbooks, review of industry guidelines for identifying reporting obligations, the establishment of coordinated quality assurance activities and an expansion of community education activities (see TOR 4).

*Evaluation findings. –
Terms of Reference 4:*

*What is the scope for
improving the
performance of the
program, including
recommendations for
continuation,
amendment or
replacement*

There is scope for improving the performance of the program. The evaluation identified operational issues to be addressed to ensure that the program is producing reliable, accurate and useful data across all industry sectors, and for diffuse sources. Detailed recommendations are outlined in the section following.

Overall, we recommend that the continuation of the program be associated with improving both on-going monitoring of implementation and consultation and communication with key industry and NGO stakeholders. We also recommend that the current model of cooperatively delivering the program through the states and territories be retained, but that the model be refined so that it is more responsive to stakeholder input and able to more readily draw on industry expertise in regard to ensuring the program produces high quality data.

The most urgent operational issues to be addressed are the refinement and communication of IWG decisions in regard to reporting responsibilities together with revising or updating industry handbooks. A new management plan needs to be in place that contains a public schedule to update handbooks and revise problematic methodologies, and a mechanism to respond to changes in knowledge about methodologies in a timely and consultative way.

In terms of other broad operational issues, recommended priorities for the program are:

- Further expansion of community education activities to increase community awareness and use of the database;
- Continuation of education programs for industry, particularly in sectors with small to medium companies and the expansion of education to new reporters, in collaboration with industry associations;
- Continuation of the collection of AED - this is a major strength of the program and considered essential by all stakeholders; and,
- Improving and expanding the substance information on the NPI web site to assist the community in interpreting the data in a meaningful way (for example better information on substance standards, bio-availability and health risks).

Recommendations

Program management and resourcing

1 – That funding for the National Pollutant Inventory be continued, based on the levels provided for the first three years of the program but taking into account new information on implementation parameters and suggestions for improving the performance of the program.

2 - That the NPI Program continue to be delivered through a national co-operative model.

3 - That the Implementation Working Group be retained but that processes be put in place to ensure effective project management in order to progress national coordination issues.

4 - That the Commonwealth establish broad and inclusive mechanisms for on-going consultation and communication with industry and other stakeholders so that the program maintains a national focus and is more responsive to stakeholder concerns.

5 - That the Commonwealth and State and Territories seek opportunities for integrating the program with other environmental initiatives.

Program implementation

6 - That all jurisdictions develop rigorous quality assurance programs which include verification systems and independent validation of data. That these systems be implemented in a nationally coordinated and consistent manner.

7 - That the Commonwealth undertake a comprehensive review of NPI guidelines to clarify uncertain definitions and formalise interpretations to assist industry in identifying their reporting obligations.

8 - That inaccurate and unreliable emission factors be identified in consultation with industry and more accurate and reliable factors be developed, either by industry or by government.

9 – That the Commonwealth develop a schedule to review industry handbooks and that this process provide industry with clear mechanisms for instigating corrections and updates.

10 – That an evaluation framework covering both implementation and compliance which includes collection of data on both reporting and non-reporting facilities be developed to enable on-going evaluation of the program.

11 – That the program continue to collect information on diffuse/subthreshold emissions and refine methods for estimating aggregated emissions data to facilitate analysis of sources and regions.

12 – The IWG enhance the sharing of program developments between jurisdictions, especially for areas of major expenditure and that education strategies continue to be targeted to particular industries and types of facilities and take account of factors impacting on facilities' ability to report.

13 - That a national community education campaign be implemented in a coordinated way across all jurisdictions.

14 – That the IWG fast track the development of a standard electronic reporting tool or format, which is able to be accepted by all states / territories

Part A Introduction

1 Overview of National Pollutant Inventory

1.1 The National Pollutant Inventory Program

The National Pollutant Inventory (NPI) was established as a National Environment Protection Measure (NEPM) by the National Environment Protection Council (NEPC) in February 1998.

The NPI is a database available on the Internet that is designed to provide publicly accessible information on the types and amounts of specified substances emitted to air, land and water. The NPI includes two sources of pollution:

- ▶ emissions from industry facilities or point sources; and,
- ▶ emissions from diffuse aggregate sources such as domestic households, small businesses and motor vehicles.

The data are estimates of the amount of specific chemical pollutants generated nationally by industry, small business and public sources on an annual basis. The NPI web site gives contextual information about the 90 NPI listed pollutants but does not interpret the data in relation to risks.

From this knowledge base:

- ▶ governments will be able to make more informed policies and decisions;
- ▶ public and community opinion can operate from both the same and accurate information; and,
- ▶ industry can assess and compare its emissions performance, and know that performance information is public.

The NPI program is developing and implementing the NPI, with objectives to:

- ▶ provide information to enhance and facilitate government policy and decision making on the environment;
- ▶ provide publicly accessible information about specified hazardous emissions to the environment on a geographic basis; and,
- ▶ promote and assist in facilitating waste minimisation and cleaner production programs and practices for government, industry and the community.

The strategy used by the program is to engage industry in reporting emissions so that significant sources of pollution are on the public record, and to develop methods to estimate diffuse sources of emissions.

1.2 Early Development of the Program

Reporting by industrial facilities to the NPI commenced from 1 July 1998 following initial planning for the program from 1992. The NPI, as is the case with similar pollutant inventory programs overseas, is an extremely complex program that has required extensive consultation between governments and with stakeholders in its development. This evaluation examines and comments on this consultation process and other aspects of the program, taking into account that the program is still in a relatively early stage of development.

The Commonwealth Government has funded the program since its inception, with some states or

territories providing in-kind contributions to the program.

Air emissions trials were held around Australia - Dandenong, Port Pirie, Newcastle, and Launceston - in 1995/96, and NPI trials were conducted in Southeast Queensland in 1998 and Kalgoorlie-Boulder, in 1998-99. These trials were valuable in identifying implementation issues that needed to be addressed by the program managers in the design of the National Environment Protection Measure. The Kalgoorlie-Boulder trial was undertaken to test the implementation of the NPI in a mining environment and was supported financially by the mining industry.

In 1997-98, the Commonwealth commenced funding to State and Territory Environment Protection Agencies or Authorities (EPA), through a three-year Memorandum of Understanding signed by Environment Ministers, to establish NPI units in all states and territories (see Section 3). The units were to receive, process and transfer industry facility reports and conduct associated education, assistance and information functions for facility reporters. They were also funded to conduct aggregated emissions studies for pollutant releases from identified sub-threshold, mobile or diffuse sources in particular airsheds or water catchments.

An Implementation Working Group (IWG) was established by the Memorandum of Understanding, with one representative from each jurisdiction and to be chaired by the Commonwealth with terms of reference (see Section 3) to, *inter alia*, manage the nationally consistent implementation of the NPI across all jurisdictions as far as practicable. The IWG is a forum where matters of policy or technical interpretation of the NEPM are addressed and other aspects of the program, such as database development and presentation are resolved. The IWG have also had significant input into the development of industry handbooks.

1.3 Current Stage of Development of the Program

Industry Handbooks

The NPI has completed the development of 79 industry sector handbooks, which provide explanation and emission techniques to assist industry in reporting their emissions to the NPI. The handbooks provide best available estimation techniques for the various industry processes, in an industry sector. An NPI Guide is a part of each handbook, and the Guide shows reporters how to determine whether they trigger the substance thresholds and therefore need to report to the NPI. Information on all the 90 NPI substance characteristics and properties has also been provided separately to the handbooks. The handbooks, including the Guide and other NPI publications, are available in hard copy or via the NPI Internet website.

The development of these handbooks (with initial consultation with stakeholders and drafting done by consultants) was a major component of the work of the NPI units in the first three years of the program. The Commonwealth managed the consultancy projects, received the comments made by stakeholders and State or Territory NPI units on the handbooks and worked with the consultants to finalise the handbooks. The initial listing of 83 handbooks to be produced has been reduced to 81, with the final two handbooks almost finished.

This aspect of the NPI program - the provision by the program of specific assistance to industry in how to estimate their emissions - is unusual amongst pollutant inventory (termed Pollutant Release and Transfer Registers (PRTR)) internationally and is a major achievement of the program. Industry handbooks are discussed further in this report, see Section 4.

Database Development

The development of the database by the Environmental Resources Information Network (ERIN) in concert with the IWG, has been an iterative process, using the experience of the NPI trials and the presentation of data from the trials. The database underwent a major review and upgrade of the “look” of the site and the presentation of data on the database, just prior to the launch of the first NPI report in January 2000. The look of the site and the ease of use for new users of the site were markedly improved. Since that time, the database has undergone further improvement, in particular in relation to the mapping functions, for example, providing improved streets identification and better visual presentation of catchments data. The program has indicated that database development and presentation will be a continuing area of dynamic development and improvement.

The joint presentation of Aggregated Emissions Data (AED) with industry reported data is a component of the program that will be available from the second reporting year.

See also Section 6 of this report for a detailed assessment of the performance of the database.

Industry Reporting

The first NPI report became available on the Internet on 28 January 2000, with data on emissions to air, land and water from 1203 individual facilities (with an average of 5.8 substances reported per facility nationally) in more than 23 industry sectors. See Section 5 for an assessment of the extent of reporting. The report was launched by the Commonwealth Minister for the Environment, Senator Robert Hill, and the Victorian Minister for the Environment, Ms Sherryl Garbutt, at the BASF factory in Altona in Melbourne.

Industry representatives attended the launch and industry organisations have generally been supportive of the program, with some providing resources or in-kind support for the trials and for development of particular industry handbooks. Many reporters provided full year reports, when only partial year reports were required, and 248 facilities reported voluntarily on Table 2 substances, for which reports are not required under the NEPM until September 2002. The issues of verification of industry reported data and reporting compliance are important ones for the next stage of the program and those issues are addressed later in the report (see Section 5).

Reporting of Aggregated Emissions Data (AED)

State and Territory NPI units have managed projects to estimate emissions from sub-threshold, diffuse or mobile sources into major airsheds and nutrient emissions into major water catchments. Nine water catchments and ten airsheds (counting Newcastle, Sydney and Wollongong as three) have been studied to date, with a further six airsheds and 11 water catchments to be added in the second year reports, due to be released by 31 January 2001. As examples, airshed sources studied include motor vehicles, domestic heating (including wood fires) and cooking, railways, commercial and recreational shipping and boating and sub-threshold solvent emissions.

Nineteen source manuals for emissions to airsheds and a handbook on estimating nutrient emissions to water catchments have been produced and are available on the NPI Internet website. The development of these handbooks is a dynamic process, with amendments to be made as improved methodologies for estimating substances are identified or developed. Jurisdictions used best known or available methods for estimating emissions where handbooks were not available at the time of the first AED studies. Jurisdictions acknowledged that there are gaps that will need to be filled, for example further estimation of particular sources or substances, in some airsheds.

Industry sectors have indicated that they consider the AED studies to be a critical component of the

program that are necessary in order to put industrial emissions into a broader and more accurate context. They have expressed concerns that this aspect of the program has not yet been fully delivered. Some jurisdictions, particularly NSW and Western Australia have also indicated that they consider the AED studies a critical part of the program. (See also Section 5).

International Cooperation on PRTRs

Australia has played a significant role in encouraging the development of pollutant inventories in a number of international fora.

Chapter 19 of Agenda 21 recognises inventory programs as an important tool to raise public awareness about potential chemical risks and as an effective environmental management mechanism to encourage reductions in chemical emissions.

In 1996, the OECD Council adopted a recommendation calling on member countries “to take steps and make publicly available a Pollutant Release and Transfer Register (PRTR) system, using as a basis the guiding principles to the Act and information set forth in the OECD’s Guidance Manual for Governments on PRTR.” Nineteen member countries of the OECD have developed, or are developing a pollutant inventory program. Australia is one of about half a dozen countries with programs currently publicly reporting PRTR data. These countries include the USA, the UK, Canada, the Netherlands, France and Norway.

Australia has played a leading role in encouraging the development of PRTRs through OECD fora, making presentations on the Australian PRTR program at a number of OECD meetings/conferences and co-hosting the first PRTR emissions estimations techniques technical workshop with the OECD in Canberra in December 1999. Australia is currently one of three vice-chairs of the OECD PRTR Release Estimation Techniques taskforce.

The Third Session of the Intergovernmental Forum on Chemical Safety (IFCS), held in Brazil in October 2000, released a PRTR/Emission Inventory Action Plan encouraging the further development of emission programs. The IFCS final report document “Priorities for Action beyond 2000” also stated that “By 2004, at least two additional countries in each IFCS region should have established a PRTR/emission inventory and countries without a PRTR/emission inventory should consider initiating a national PRTR/emission inventory design process which involves affected and interested parties and takes into consideration national circumstances and needs”. More than 80 countries (including Australia) were represented at the Forum.

1.4 Progress to date

There have been significant achievements to date in the establishment of the NPI. Some of these include:

- the assistance provided to industry to estimate and report their emissions through the many publications produced by the program;
- the successful completion of major trials of the program;
- the successful reporting mechanisms put in place for the first and following reporting years;
- the development of the database and its publication of reporting for the first reporting year; and,
- the processes put in place for the continuing management of the program.

The coming year will see a huge expansion of the program to include coverage of the vast majority of industry sectors. Further airshed and catchment studies have also been completed and all of this data will be made publicly available in early 2001.

However, those involved in management of the program and non-government stakeholders have indicated that there are areas where improvements can be made to the program. This evaluation has detailed these areas for improvement and made recommendations regarding the future management of the NPI, so that program managers can continue to improve the effectiveness of the program and ensure that it can meet its objectives.

2 The Evaluation

2.1 Purpose and scope of the evaluation

The purpose of the evaluation is to:

- ▶ meet the requirements of the Cabinet decision to undertake a review of the program and to inform the Commonwealth's budget processes for future years, at the end of the third year of the program;
- ▶ meet accountability requirements under the Memorandum of Understanding between the Commonwealth and States and Territory Governments; and,
- ▶ identify options for improvements in the delivery of the program.

The terms of reference for the evaluation are to assess:

- 1. The likely effectiveness of the program in light of its objectives;*
- 2. Whether the strategies and processes established jointly by all jurisdictions to implement the program are operating efficiently;*
- 3. What is an appropriate level of resources required to develop and manage the program; and,*
- 4. What is the scope for improving the performance of the program, including the recommendations for continuation, amendment or replacement.*

The terms of reference are addressed at relevant stages throughout this report.

The primary focus of this review is on the likely effectiveness and efficiency of the program given the progress up to date in this, its third year, covering the activities described in the NEPM for the NPI and the requirements of the MOU between the Commonwealth and State/ Territory Governments. At this early stage in the implementation of the program it is also appropriate to assess the potential for the program to meet its objectives, from stakeholders' and government perspectives.

This report will provide input into the concurrent more technical review of the NPI National Environment Protection Measure (NEPM).

2.2 Project Management

The evaluation project was managed by a Steering Committee of Environment Australia officers as follows:

Mr. Peter Burnett: Assistant Secretary, Chemicals and the Environment Branch

Ms Judy Johnson: Chemicals and the Environment Branch

Ms Kathryn Kelly: Chemicals and the Environment Branch

Mr. Mike Smith: Project Evaluation and Audit Unit

Mr. David Forsyth: Parks Australia South, Parks Australia Division

Members of the Steering Committee met with ARTD consultants on two occasions in the early stage of the evaluation and provided comments on the draft report. The steering committee met to coordinate their comments on the draft report.

2.3 Evaluation methods

The main methodologies used were:

Program analysis and evaluation framework

Analysis of program objectives and strategies was undertaken to develop the program logic, represented as an outcomes hierarchy (Figure 1.1). The outcomes hierarchy illustrates the causal assumptions underpinning the program, and provides a framework for the evaluation. To address the purposes of this review, key questions were developed against the terms of reference and in light of the outcomes hierarchy.

This report is structured around the outcomes hierarchy with Section 3 covering the management arrangements, Section 4 the reach, Section 5, reporting, Section 6 data availability and Section 7 the potential impacts of the program. At this early stage in the program it is not appropriate to evaluate the impacts of the outcome or the achievement of long term outcomes.

Interviews with a range of stakeholders and informants

The key informant interviews explored stakeholders' perceptions of how efficiently and effectively the NPI has been delivered, the future feasibility of the Measure and also identified key evaluation issues and areas for improvement.

Fifty five key stakeholders were interviewed by telephone using a semi-structured interview guide (see Appendix 1). The interviews took on average one hour to complete but were as long as two hours and as short as 15 minutes. Environment Australia NPI Unit staff were interviewed face-to-face as a group.

The interview sample was based on an initial list provided by Environment Australia supplemented by IWG members, and covered informants from the main sectors who had been involved in the implementation of the NPI or were intended users and included:

- state and territory NEPC Council members (5);
- managers in state and territory agencies responsible for program implementation including education and community awareness, data collation and transfer to EA, and management of aggregated emissions studies - Implementation Working Group members (9);
- staff responsible for implementing the NPI within the Commonwealth Government (5);
- industry groups representing industries as reporters of pollutant data (including users of the Guide and the EETs), and as users of the NPI database (13);
- individual industry members who have reported to the NPI and consultants (17); and,
- public interest groups, including environmental groups, as users and beneficiaries of the NPI (6).

Analysis of process and reporting data

The IWG representatives of states and territories completed a written survey, which provided information on the process of implementation, in particular the extent to which educational activities were implemented by the states and territories in the period 1998-2000. Further information on implementation activity was obtained from existing reports provided by South Australia and New South Wales.

This survey also provided some data on the reach and extent of facility reporting, yielding estimates of the proportion of facilities contacted, who reported in 1998/1999. However, this data is very limited, in that no systematic records were kept on facilities that were contacted but did not trip the thresholds and were not required to report. Without these data it is impossible to assess with confidence the reasons for non-reportage - is it because the facility was not required to report or declined to do so? In addition,

although the states and territories used many avenues to identify possible facilities there is no census of all potential facilities available. Thus, the available data does not allow an accurate assessment of the reach of the NPI program. While it is acknowledged that it is not practicable, nor desirable to try and contact all sub-threshold facilities, the area of compliance with reporting requirements is identified as an area requiring further attention in the coming years.

Information on the pattern of reporting was supplemented by an analysis of the NPI data completed by the ERIN group in Environment Australia (personal communication) and the data published in the National Pollutant Summary Report of the First Year Data (2000).

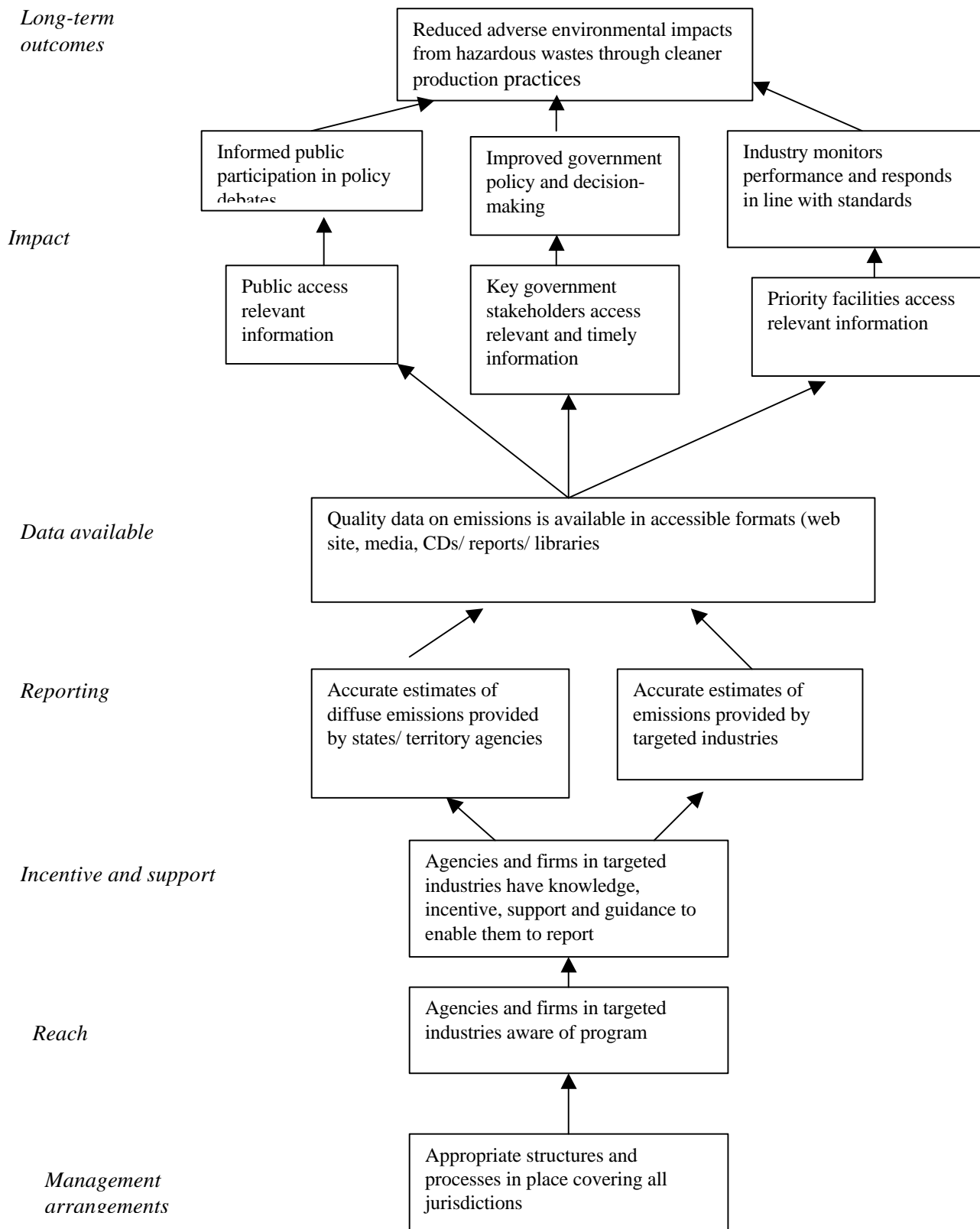
Analysis of web-site usage data

The ERIN group in Environment Australia provided an analysis of NPI web site usage data.

Literature scan / expert views

A brief scan of international research focused on the validity of the NPI Program's assumption that an index can contribute to cleaner production practices by industry.

Figure 1.1: NPI Program Outcomes Hierarchy



Part B The Findings

3 Management arrangements

The NPI is delivered through a national cooperative model between the Commonwealth and States and Territory Governments. The administrative and implementation arrangements are set out in the NPI Environment Protection Measure document and its associated Memorandum of Understanding. Implementation is managed by the Implementation Working Group (IWG), which comprises a representative of each jurisdiction and is chaired by the Commonwealth. Implementation in each state and territory is managed through NPI Units, and by the Commonwealth through the NPI Unit, Environment Australia.

This Section provides an assessment of each of these administrative arrangements, as part of the evaluations response to Term of Reference 2: *Whether the strategies and processes established jointly by all jurisdictions to implement the program are operating efficiently*. It also assesses the allocation of funding for the program, responding to Term of Reference 3: *What is an appropriate level of resources required to develop and manage the program*.

This section is based on interviews with stakeholders, in particular NPI Program Managers, available program data and on Commonwealth responses.

3.1 Memorandum of Understanding (MOU)

The first three years of the program were administered via a Memorandum of Understanding between the Commonwealth and the States and Territory Governments under which the Commonwealth supported the national program setup and funded the other jurisdictions for their roles in administering the program.

The MOU for the first triennium was signed on 27th January 1998 and was between the Commonwealth Government and all the State and Territory Governments, that is, a multi-lateral agreement. This MOU was in force until the 30 June 2000.

Government stakeholders agreed that the MOU was an effective consensus document, which brought a commonality of purpose to the NPI. The original MOU gave broad guidelines for the implementation of the program, and did not include operational details. This lack of detail meant interpretation has been required for many areas (the function of the IWG, see below). Some industry stakeholders criticised this approach on the grounds that in the initial stage of the program it resulted in a level of confusion about who should be reporting.

For the current year, the Commonwealth is negotiating bi-lateral MOUs with each state and territory. The preference from jurisdictions for future years is for another multi-lateral MOU, with a time frame longer than one year.

3.2 Implementation Working Group

As noted above, the 1998-2000 MOU established an Implementation Working Group (IWG) with representatives from all jurisdictions, chaired by the Environment Australia representative. The IWG is central to the implementation of this new national program. The purpose of this group is to assist in implementing the Measure and ensure that the NPI program is delivered using a nationally consistent approach, as far as possible. See Figure 3.1 for the IWG Terms of Reference.

Environment Australia provides a secretariat for the group and a secure web page where IWG meeting notes and decisions can be logged and draft documents are provided for comment by jurisdictions. Other stakeholders do not have access to this site.

Since the IWG has been established it has met very regularly- 33 times in three years – often by teleconference. Because the state and territory membership of the IWG has remained relatively stable with most members having participated for two years or more, the group has developed fairly good relationships and considerable knowledge and expertise in the program. However, the Commonwealth representation at several levels has changed more frequently.

The IWG has formed sub-committees to work on particular implementation issues identified by the group, such as electronic reporting. Individual member expertise has been recognised by the group. The IWG has focused on dealing with immediate administrative and technical issues needing to be addressed to establish the program. It has provided a link between the policy-making role of the Commonwealth and the realities of implementation.

Progressing NPI implementation

The membership of the IWG appears to have been appropriate. IWG members were said to be technically proficient and to have a good understanding of the implementation issues. The relative stability of the state and territory members has increased the capacity of the group to address technical issues and progress implementation over time. However, this advantage was somewhat mitigated by the turnover of Commonwealth staff.

Many IWG members reported that the efficiency of the IWG has been compromised by heavy workloads, for which they were under-resourced in terms of technical support from the Commonwealth and the available time of the members (all members were also responsible for managing implementation through the State/Territory NPI Units - see below). Until recently, the Commonwealth NPI Unit has not included individuals with technical expertise. The employment of a technical staff member is said to have improved the efficiency of the group in addressing technical implementation issues.

However, the IWG ability to address all the emerging technical issues arising from the implementation of the NPI by industry is constrained by the frequency it can meet and the volume of questions arising. Many technical issues require more immediate responses than is possible in this context.

In general, IWG members agreed that the group operates relatively effectively as a forum for sorting out the technical and practical details of implementing this highly complex program. It has also provided a forum for states and territories to put forward their views, share experiences and so negotiate common positions. All members agreed that the IWG should remain in place to assist the future implementation

Figure 3.1: IWG Terms of Reference (functions)

- a) ensure consistency of implementation across jurisdictions as far as practicable;
- b) carry out responsibilities as indicated by MOU;
- c) advise on whether jurisdictions will jointly or individually address implementation issues as they arise;
- d) share information and, where possible, provide assistance to enable all jurisdictions to implement the Measure effectively;
- e) undertake regular assessments of progress in implementation of the NPI;
- f) identify difficulties in implementing the NPI and means of addressing and resolving those difficulties;
- g) assess outcomes from trials aimed at NPI development and implementation, and identify follow-up action as necessary;
- h) provide recommendations regarding funding arrangements and amendments or additions to the Agreement or its Schedules;
- i) advise on amendments to the Measure in accordance with clause 33; and
- j) undertake other tasks as agreed between Chief Executive Officers.

of the program.

Ensuring consistent delivery

Given the complexities it faces, the IWG appears to have had some difficulties in implementing the program consistently in all jurisdictions. IWG members gave examples where the group successfully ensured that the jurisdictions have agreed positions or made similar assumptions in regard to an industry specific methodological question (for example, calculating emissions from airport facilities), so that all used a nationally uniform approach. On the other hand, there have been instances where states and territories gave varying advice to industry about when they were required to report, and approved different methods of calculating emissions which were not necessarily accessible to other IWG members. From an industry perspective, the examples of inconsistent approaches stand out and have been / are a source of frustration. In one example, companies with a national base have observed that the different jurisdictional attitudes to encouraging compliance, varying technical advice and definitions of facilities and the existence of different electronic reporting tools add inefficiencies to their own reporting systems. Given the complexity of the program it is likely that the achievement of consistent advice receives fewer acknowledgements than the instances of different advice.

While there may have been instances of inconsistent approaches, on balance, the program has achieved a reasonable degree of consistency across all jurisdictions.

Issues impacting on IWG effectiveness

IWG members identified broader issues that have impacted on the effectiveness and efficiency of the Group and also on the effective operation of the NPI. These issues include:

- ▶ a perceived lack of leadership within the IWG, which impacts on the capacity of the Group to make effective and timely decisions regarding broader long term implementation issues.

For example, the development of a national approach to electronic reporting proved difficult where the jurisdictions had diverging views on its need and form. The uncertainty IWG members feel about taking on active management or leadership roles also limits efficiency, with members reporting that without active project management, specific implementation issues take longer to address. The formation of sub-committees to deal with specific issues was introduced to improve this situation, with mixed success;

- ▶ little opportunity to be involved in setting long term directions for the program and a perception that only limited long term planning has occurred. This impacts on the confidence of the states and territories in the program and may undermine their commitment to the NPI; and,
- ▶ a perception that some advice given by the state and territory members of the IWG has been ignored by the Commonwealth, resulting in unrealistic implementation timetables being imposed by the Commonwealth.

Communication with stakeholders

Poor communication between the IWG and other stakeholders emerged as an important issue.

While industry views the IWG as being the key forum for addressing technical implementation issues on a national basis, industry stakeholders saw existing communication systems as inefficient and reducing the group's effectiveness. Stakeholders, particularly industry and some NGOs, were uncertain about how to formally raise concerns about details in the handbooks and instigate revisions. They were not aware of how to access IWG decisions in a timely fashion, the process for getting state or territory decisions ratified, or how to have input into the technical decisions made by the group. There is also a perception

by some industry sectors that there is no apparent mechanism for giving feedback on the impact of technical decisions, and limited opportunities for on-going consultation now the program is in its implementation phase. This concern has been partially addressed recently with the setting up of a new FAQ page as well as a “News for Industry Reporters” page on the NPI web site that posts industry or program information such as new handbooks or manual revisions.

The Commonwealth indicated that they acknowledge that IWG decisions need to be communicated more effectively to industry reporters.

A reference group with industry and NGO environmental groups’ representation was disbanded in early 1998, when the NGOs declined to continue their involvement because of, amongst other things, the omission of reporting of transfers of substances in the program.

Five editions of an “Update” newsletter have been produced by the program, giving news of the program to those on the mailing list (approximately 3,000). The last edition of the newsletter was produced in January 2000. Consultations with industry on the NPI were held in December 1999 and again with industry and some environment groups in July 2000. Industry groups have requested that an ongoing consultative / advisory group be established so that their views on implementation issues can be sought and considered in the IWG decision-making process.

Future needs and suggested improvements

Overall, the common view from all stakeholders, including government, was that the IWG is an essential mechanism for achieving a consistent national approach to implementation, and should be retained. There was little support for changing the model to a centrally located national NPI unit responsible for implementing the program in all jurisdictions.

In this context, the following suggestions for improving both the effectiveness and efficiency of the IWG were made:

- provide project managers from amongst the IWG for the sub-working groups with responsibility for providing support for IWG and managing tasks;
- form more sub-group/s, for example, technical coordination, policy development, administration issues that have responsibility for these areas;
- hold long-term planning forums involving IWG and / or other stakeholders;
- employ a technical project manager funded by the Commonwealth with responsibility for managing national NPI implementation issues identified by the IWG, for example, on-going revision of handbooks;
- assign jurisdictional responsibility for leadership of specific areas of implementation;
- provide training for group members in team skills; and,
- rotate the chair of IWG.

There was no common view on how to improve on-going IWG communication with industry and NGOs. A common suggestion was to inform industry of IWG decisions either through the NPI web site or more actively using e-mail messaging and industry association contacts. Few in the industry sector mentioned the FAQ web page or News For Industry Reporters page as meeting this need and may not have been aware that these facilities have been established.

RECOMMENDATION – that the Implementation Working Group be retained but that processes be put in place to ensure the group is effective, in order to progress national coordination issues.

3.3 State/Territory Government NPI Units

Eight State / Territory NPI Units and one Commonwealth Unit were established with Commonwealth funding, with the managers of these units comprising the IWG membership. These units are located within the state and territory and Commonwealth-based environmental agencies with, in most states, discrete staff that are functionally separate to the rest of the agency. The units varied in size, according to the amount of funding allocated to each state and territory. (See 2.5 for a discussion of funding). The NPI units implemented the NPI program in their jurisdictions.

Each state and territory NPI Unit undertook the following tasks required by the MOU:

1. identified and advised potential reporting facilities of their obligations and encouraged compliance with the Measure;
2. ensured that reporting information was provided in a manner consistent with the relevant industry handbook by disseminating handbooks to industry associations and in some cases, individual facilities, or approved an alternative method;
3. assessed the integrity of the data provided by facilities by keeping records of assessment processes undertaken for specific reporting facilities. No NPI units reported conducting comprehensive compliance inspections in the first two years of the program;
4. ensured that corrections were made to database records where appropriate after an assessment and, where necessary, revision of data by the facility - see Section 4; and,
5. implemented an agreed program of aggregated emissions studies - see Section 3.

NPI Units addressed tasks 2 and 3 through educational programs for major reporting industries and local government, developing reporting forms (paper-based and electronic) and spreadsheets to facilitate reporting. See Section 4 for a discussion of the extent and effectiveness of these activities.

The Units also established verification systems for industry data and developed and implemented response strategies for industry queries and problem resolution (see Section 5).

Effectiveness of the NPI delivery model

The model of delivering the program through Units based in states and territories was successful and its continuation is largely supported by government, industry and the NGO sector. The decision to implement the collection of emission data through the states' and territories' environmental agencies rather than a centrally-based unit was based on the rationale that these agencies are familiar with state-based industry and have the technical expertise to implement the program. These factors remain unchanged.

With the exception of two states, the roles and functions of the NPI Units have remained functionally separate from the management of the environmental agencies, and solely funded by the Commonwealth. At this stage, the NPI program is yet to be recognised as a core environmental agency activity by all states and territories. Thus, discontinuity of Commonwealth funding for even a short time may result in a loss of staff and expertise and detailed knowledge of the program. Continuity of staffing is an important aspect for efficiency of delivery of the program.

RECOMMENDATION – that the NPI Program continue to be delivered through a national co-operative model.

3.4 Management by Environment Australia

An NPI Program Unit was established by Environment Australia with responsibility for managing the NPI on behalf of the Commonwealth Government. This Unit has specific responsibility for chairing and providing secretariat services for the IWG, financial and policy management of the program at the Commonwealth level, developing and publishing industry handbooks and NPI reports or documents, compiling contextual information for inclusion on the Internet database, informing the community about the NPI, continuing consultation with NPI stakeholders and managing international PRTR related activities and briefings.

Another section of Environment Australia, ERIN is responsible for developing and maintaining the NPI Internet database (see Section 6) and development of the CD ROM NPI report.

Like IWG, the Commonwealth NPI Unit activities have been focused on establishing the program, in particular, the most time consuming activities have been:

- ▶ developing and publishing 79 of the target of 81 industry handbooks (see Section 4);
- ▶ supporting the NPI data base development and providing research and contextual information for the web site (see Section 5);
- ▶ managing the IWG process and meetings.

No comprehensive community education strategy has been implemented at this stage, but the manager of the program has spoken on the topic of the NPI at a number of conferences and the launch of the first year NPI report resulted in quite extensive coverage in the print media at the time, with a small number of reports via television. A brochure summary of the first year report has been produced, along with posters advertising the program and website.

Industry consultation

The Unit has established active continuing informal consultation arrangements with selected industry sectors through peak organisations. As noted above, two formal consultation meetings with specific focuses have been held in the last year. Where these links exist, industry groups are satisfied that effective consultation is taking place and have felt able to and been pro-active in arranging meetings. Other industry stakeholders without these links are dissatisfied with the level of on-going consultation and suggested a range of solutions, including re-establishing a cross-sector reference group and / or a scientific advisory board with industry representatives, and opening up the IWG to NGOs and industry. The original reference group met six times in 1997 but was disbanded early in 1998. Perhaps due to this earlier experience, other stakeholders did not support formal committees but suggested that more regular forums to discuss specific implementation issues would be more effective. Without noting a specific model, industry groups are generally seeking an inclusive model of consultation.

Industry commented on the need for the Commonwealth Unit to increase its technical capacity and project management skills, which they perceived as needing improvement. The Commonwealth Unit has recently employed a technical person.

Recommendation - that the Commonwealth establish broad and inclusive mechanisms for on-going consultation and communication with industry and other stakeholders so that the program maintains a national focus and is more responsive to stakeholder concerns.

Program management and planning

Responsibility for overall management of the NPI program lies with the Commonwealth, but as the program has been a cooperative one, decisions such as which airsheds or water catchments are to be

studied have largely rested with the states and territories and were detailed in the MOU. However, state and territory IWG members have indicated that the Commonwealth could have taken a stronger leadership role, particularly in relation to forward planning through, and stronger chairing of the IWG.

More broadly, many stakeholders perceived that the program lacks clear direction. IWG members believed that long term operational and strategic planning has been neglected in the rush to establish the program, and broader implementation issues have not always been able to be addressed in a timely way.

Some sections of industry and NGOs regarded the administrative structures as unresponsive and old fashioned and suggested alternate self-regulation or objectives based models. Self-regulation models are used in other EA programs such as the Packaging Covenant. New legislative approaches to working with industry use objectives based models where government, industry and other industry groups set objectives jointly, identify targets and methods and then leave industry to implement the program using their own processes (for example, the recent SA Petroleum Act). With this model, government has an audit role and industry takes the lead in revising manuals and developing reporting formats. However it should be noted that a number of industry groups have worked with Environment Australia in developing handbooks/manuals for their sector and other sectors may not have been aware that this initiative was open to them.

There are many opportunities for NPI data to be used by other environment programs (See Section 6) and it is suggested that in the future the NPI program be more closely integrated with other programs to ensure best use is made of the data for policy making and program development.

Recommendation – that the Commonwealth and States and Territories seek opportunities for integrating the program with other environmental initiatives.

3.5 Allocation of program funding

Funding 1998-2000

The MOU set out the funding schedule and general principles on which Commonwealth funding was allocated to each State / Territory Government.

The funding formula was calculated on the basis of agreed set up costs (ranging from \$10,000 to \$30,000 per state or territory) plus the additional costs for agreed aggregated emissions estimation, salary and travel costs. It was recognised that each state and territory had different needs as a result of differences in the existing infrastructure and large variations in the likely numbers of reporting facilities. The MOU indicates that state and territories are not bound to undertake implementation activities for which they did not receive funding.

The funding formula used by the MOU for salaries and travel was as follows:

Salaries:

NSW and Victoria	3 staff @ \$85,000 = \$255,000 each
Queensland	2.5 staff @ \$85,000 = \$212,000
WA, SA and Tasmania	2 staff @ \$85,000 = \$170,000 each
NT and ACT	1 staff @ \$85,000 = \$85,000 each

Travel:

NSW, ACT and Victoria	\$4,000 each
SA and Tasmania	\$6,000 each
Queensland, WA and NT	\$8,000 each

Aggregated emissions studies were funded at \$120,000 per airshed and \$50,000 per water catchment.

Funding under the 3-year MOU is shown in Table 3.1, below.

Table 3.1: Funding to states and territories for implementation

	1997/98	1998/99	1999/2000
ACT	\$43 000 (\$10k equip + \$29k staff +\$4k travel)	\$132 000 (\$85k staff + \$43k to start air and water work +\$4k travel)	\$132 000 (\$128k split between point, air and water work +\$4k travel)
NT	\$77 000 (\$20k equip + \$29k staff + \$20k education + \$8k travel)	\$93 000 (\$85k staff + \$8k travel)	\$203 000 (\$85k staff + \$110k for Darwin and Alice air work + Darwin water + \$8k travel)
NSW	\$154 000 (\$30k equip + \$85k staff + \$35k local government + \$4k travel) (Systems integration costs)	\$449 000 (\$255k staff + \$190k for Sydney, Newcastle, Wollongong air update + water catchments + \$4k travel)	\$359 000 (\$255k staff + \$100k for two additional water catchments + \$4k travel)
WA	\$108 000 (\$20k equip + \$45k staff + \$35k local government + \$8k travel)	\$258 000 (\$170k staff + \$80k for Perth air update + water catchment + \$8k travel) (Kalgoorlie done as part of trial)	\$398 000 (\$170k staff + \$220k for Pilbara air + two additional water catchments + \$8k travel)
TAS	\$118 000 (\$20k equip + \$57k staff + \$35k local government + \$6k travel)	\$346 000 (\$170k staff + \$170k for Hobart air + water + \$6k travel)	\$346 000 (\$170k staff + \$170k for Launceston air + water + \$6k travel)
SA	\$118 000 (\$20k equip + \$57k staff + \$35k local government + \$6k travel)	\$346 000 (\$170k staff + \$170k for Adelaide air + water + \$6k travel)	\$176 000 (\$170k staff + \$6k travel)
QLD	\$114 000 (\$71k staff + \$35k local government + \$8k travel) (Equip through SE Qld trial)	\$221 000 (\$213k staff + \$8k travel) (SE Qld air + water through trial)	\$321 000 (\$213k staff + \$100k for two additional water catchments + \$8k travel)
VIC	\$154 000 (\$30k equip + \$85k staff + \$35k local government + \$4k travel)	\$389 000 (\$255k staff + \$130k for Port Phillip air update + water catchment + \$4k travel)	\$479 000 (\$255k staff + \$220k for Latrobe air + water catchment + \$4k travel)
Multi		\$200 000 (\$150k Murray-Darling N+P + \$50k report existing water info)	
Total	\$886 000	\$2 434 000	\$2 414 000

Source: Commonwealth NPI Unit, 2000

Adequacy of funding

The Commonwealth and State / Territory Governments agree that the funding allocation between activities was appropriate to establish and initially implement the program, but that allocation of funding between activities is likely to change as the program matures.

In terms of the adequacy of funding received by the jurisdictions, the Commonwealth indicated that the funding formula has been satisfactory under the present circumstances. Six of the eight jurisdictions agreed that adequate funding had been provided, matching their expenditure needs.

Two jurisdictions, WA and ACT claim that they had contributed additional funding for the program in order to implement the program adequately. For example, WA claims to have expended \$340,000 of state funds in the three years of the program, in addition to the Commonwealth provided funds. The Northern Territory implemented some aspects of the program with the mining and quarry sectors, its biggest NPI industry sector, through its normal infrastructure (no cost estimates provided). The MOU specifically says that state and territories are not bound to undertake implementation activities for which they did not receive funding. In these three cases the extra commitment suggests that the original formula underestimated the cost of implementation.

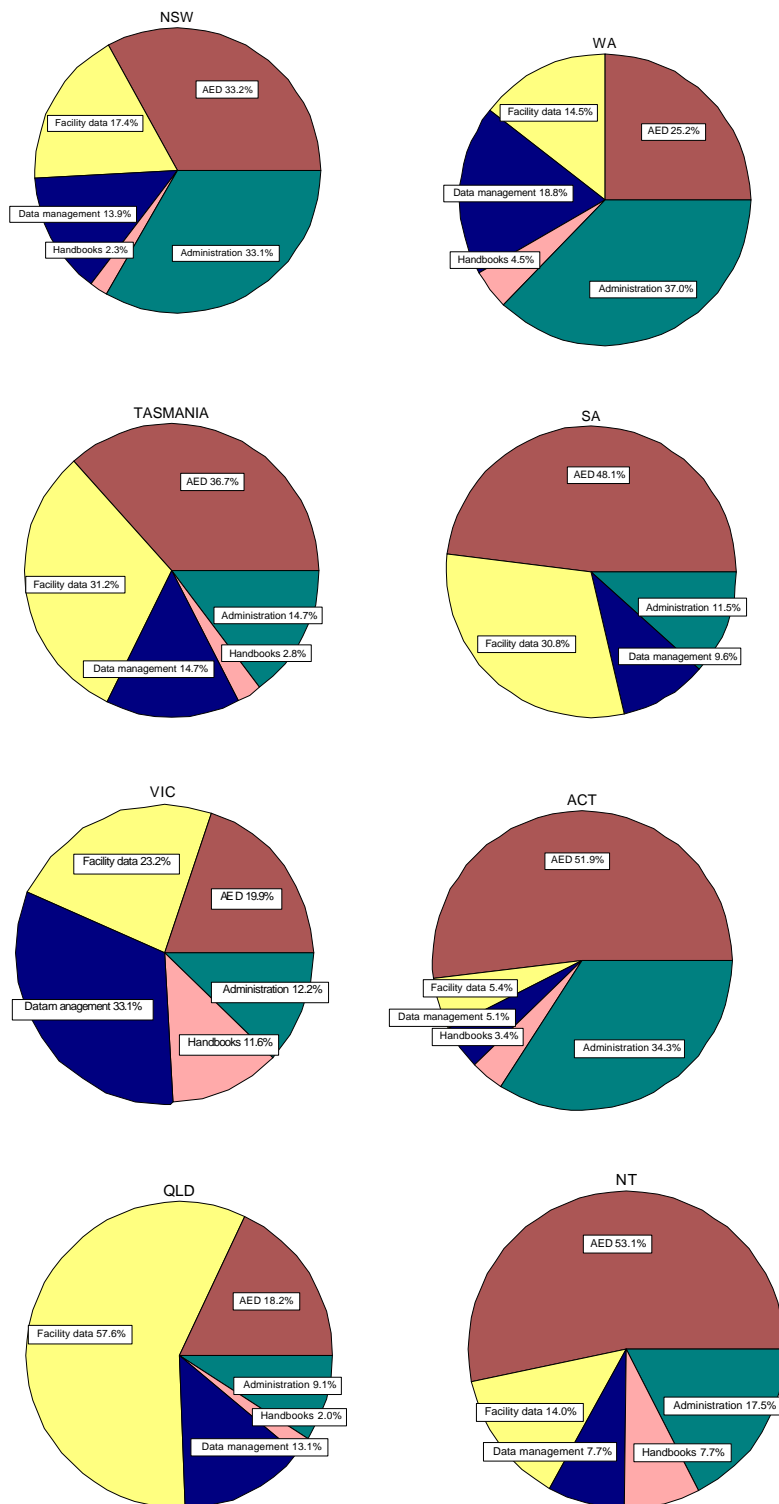
With two years experience in implementing the program now available, an information base is available for re-negotiating the formula. From the Commonwealth's perspective, future funding allocated by the Commonwealth to the states and territories could be based on parameters directly related to implementing the program, such as the number of facilities reporting to the various jurisdictions or support provided by the other jurisdictions for NPI-related activities.

RECOMMENDATION – that funding for the National Pollutant Inventory be continued based on the levels provided for the first three years of the program but should take into account new information on implementation parameters and suggestions for improving the performance of the program.

Variations in use of funds between jurisdictions

The Commonwealth has allowed each state or territory some flexibility in how they have used the NPI funds, as long as they were expended on MOU identified NPI activities. This is reflected in the considerable variation in the pattern of expenditure (Figure 3.2). For example, AED collection ranged from around 50% of expenditure in the three jurisdictions (NT, ACT and SA), to less than 20% in Queensland and Victoria. By contrast, facility data collection was the most significant expenditure in Queensland (58%). Victoria expended some of its resources on the NPI electronic reporting tool, which is an extremely effective reporting and validation tool and which has now been received very favorably by reporting facilities.

Figure 3.2: Expenditure by activity, State/Territories, 1998 –2000 (Indicative estimates only)
 (Source - Survey of NPI Units Oct 2000)



Such variation in the pattern of expenditure could be expected given the different relative sizes of the allocated funds, the diversity in existing infrastructure, and particular interests and expertise of the NPI units and environmental agency staff.

At the same time, where a state or territory has allocated substantial funds to developing particular aspects of the program, for example, database management or educational resources, the value of the expenditure would be increased if these developments were shared at an early stage with other states and territories.

RECOMMENDATION. – that the IWG enhance sharing of program developments between jurisdictions, especially for areas of major expenditure and that education strategies continue to target particular industries and types of facilities and take account of factors impacting on facilities ability to report.

Future funding

The states and territories largely recognise that funding needs may reduce in the future, but indicated that any reduction at this stage is premature as the program is still in its set-up phase. They stated, with a few exceptions, that 1998-2000 funding levels should be sustained for at least two more years. Two states indicated that minimum funding levels are greater than the amount that had previously been allocated and they may be seeking additional funding.

The Commonwealth has also indicated that there may be a gradual decrease in funds needed to implement some key Commonwealth activities, for example, the development of industry handbooks is virtually completed, and use of on-line communications could result in decreased printing costs (although summary reports will still be required under the current NEPM). However, the Commonwealth accessibility requirements will necessitate significant additional expenditure (not included in the above estimates) at least in the shorter term, to produce html versions of on-line documents. The database will continue to require support for development and improvement of the Inventory and to take account of an increasing amount of annual data.

As well as being subject to the current evaluation, the NPI is also undergoing a more technical review. It is likely that both the technical review and the current evaluation may identify desirable changes to existing activities and new activities that could have budgetary implications. The following comments from the Commonwealth are provided with this context in mind.

Table 3.4: Projected costs for the NPI Program for the Years 2001/02, 2002/03 and 2003/04 (\$,000)

Program Component	2001/02	2002/03	2003/04
State costs ¹ (data collection and management, education and administration, AED studies)	3,146	2,630	2,630
Industry Handbooks development/manuals revision	50	350	250
Priority AED projects	50	50	50
Database/Internet/CD ROM maintenance, development	225	300	300
Possible NEPM Amendment	70	-	-
Reviews, evaluations	-	-	100
Education and Communication	50	100	100
Printing, Publishing and Distribution	30	30	30
Meeting support costs	10	10	10
International Activities	10	25	25
Data auditing and verification	20	50	50
Trial (eg on transfers)	50	-	-
Commonwealth staffing	630	630	630
TOTAL	4,341	4,200	4,175

(Source, Commonwealth NPI Unit)

¹ as identified by states / territories

From the Commonwealth's perspective, the emphasis to date has been to introduce industry reporting incrementally as handbooks were made available. The kinds of activities that will need to be funded in coming years include expanding the advocacy and publication activities and improving contextual data, in the form of both aggregated emissions data and substance information (for example, better information on substance standards, bioavailability and health risks). In particular, assisting the understanding of the significance of emission data in a particular location would help both governments and the community. However it has been a recognised aspect of the program that the NPI cannot provide all the information required by the community and its main function is to provide emissions data for NPI listed substances. There is significant analytical or further ambient monitoring data work which needs to be done before emissions data can be translated into health risks at a particular location.

In order to meet the goals of the NPI, increased attention will need to be given in the future to facilitating reductions in emissions by sharing information on cleaner production techniques and technologies, both from the EA's cleaner production database and also from the experience of facilities as reported to the NPI.

All states and territories agreed that any changes to the coverage of the program, particularly introducing reporting of transfers or a significant number of new substances, could increase the cost of the program

to the jurisdictions.

The additional financial and human resources required would depend on the extent to which these expanded and new activities were affected. However, as a guide, the Commonwealth estimates that updating the handbooks is likely to cost a total of \$500,000 (\$5,000 per handbook) in the coming three years

By far the most common issue raised by the states and territories in regard to funding was the need for long-term commitment. The current uncertainty and negotiations over funding were said to have affected the capacity of the states and territories to implement the program in the longer term. Uncertainty about future funding has led to loss of expertise within some state agencies.

3.6 Conclusions

Generally, government and industry stakeholders were of the view that the NPI Program had an appropriate management framework through the MOUs between the Commonwealth and State / Territory Governments, coordination by the IWG, program delivery through State/Territory environmental agencies, and database development and management by Environment Australia. This administrative framework has been effective in establishing the NPI and progressing implementation in all jurisdictions.

In response to Term of Reference 2: *Whether the strategies and processes established jointly by all jurisdictions to implement the program are operating efficiently*, it can be concluded that the management and administrative arrangements have demonstrated a reasonable degree of efficiency and effectiveness.

Many stakeholders, whilst preferring to retain the existing framework, identified areas for improvement. The most significant are:

- ▶ improved leadership and clearer overall strategic direction for the program;
- ▶ more efficient resolution of broader implementation issues;
- ▶ improved consultation with industry in regard to implementation issues; and,
- ▶ certainty about future funding.

In response to Term of Reference 3: *What is an appropriate level of resources required to develop and manage the program*, the following conclusions can be reached on the basis of current implementation (see Section 4-6) and stakeholder responses:

- the 1998/2000 level of funding to State/Territory Governments provides a useful guideline for future implementation over the next three years, but should take into account new information on parameters such as number of facilities,
- overall program funding should take account of the need to revise handbooks and to expand communication strategies and,
- any significant changes to the coverage of the program should be reflected in future resourcing.

4 Reach of the Program

This Section assesses how effectively the educational strategies of the NPI program have been in reaching the target audiences, through the distribution of handbooks and through the workshops, consultations and other educational methods used by NPI Units. It also examines the quality of the information and support, and, within the limits of the information available, the impact of the education strategies on improved awareness and understanding of NPI and the reporting obligations.

The Section addresses in part Term of Reference 2: *Whether the strategies and processes established jointly by all jurisdictions to implement the program are operating effectively*, and Term of Reference 4: *The scope for improving the program including recommendations for continuation, amendment or replacement*.

This Section draws on a number of sources of evidence – stakeholder interviews, IWG responses to a written survey, NPI documentation such as annual and internal project reports, the NEPM, MOU and Commonwealth responses.

4.1 Industry handbooks

A significant feature of the NPI Program is the investment in industry handbooks containing an NPI Guide and Emission Estimation Technique Manuals (EET) for each industry sector. There have also been 19 manuals developed to assist states and territories to prepare aggregated emissions data.

The handbooks are intended to inform industry of their reporting obligations and to ensure standard and high quality data collection. Facilities were required to commence their reporting period for the NPI on the first day of the third month after the relevant industry handbooks had been published. If the handbooks were only available for part of the reporting year, then the facility was only required to report for that period.

Preparation and distribution of handbooks

The production of handbooks was managed and funded by the Commonwealth NPI Unit, with individual manuals being developed through contracted state agencies (Queensland and NSW EPAs) and by a number of private consultants. State and territory units disseminated the handbooks to facilities.

The NPI Program aimed to publish 83 industry handbooks to be ready for the first reporting year - 1998/1999. This target was amended to 81 as several industries do not operate in Australia and a couple of new industry sectors were added.

The development of handbooks took longer than anticipated and did not reach the target of 81 in the first year. At the start of the first reporting year eight handbooks were available, increasing to 23 by the end of the reporting period (July 1999). As a result, reporting obligations were reduced, and in particular, seven of these handbooks required industries to report from May 1999 and eight from June 1999. By the end of the second reporting year, 79 handbooks had been developed. One state commented that the delays in the publication of handbooks meant that some facilities chose not to report in the first year.

Industry and non-government stakeholders were consulted in the drafting of the handbooks and their comments were taken into account as much as possible in the finalisation of the documents and in subsequent revisions of related documents such as the NPI Guide.

While the development of the handbooks has been slower than the original targets set by the Commonwealth, the most common view of stakeholders was that the time frame for completing a task of this scale was unrealistic. From the industry perspective, the process was too short and did not take into account industry's reduced capacity to respond in these time frames. In addition, some industry sectors claimed that they were consulted at too late a stage in the process, when the manuals were difficult to change. By contrast, where an industry sector was consulted at all stages of the process, or able to develop their own handbooks, their satisfaction with the quality of the handbooks was much higher.

Quality of the handbooks

Stakeholders identified the principle criterion for judging the quality of handbooks as enabling facilities to calculate accurate and reliable estimates of emissions. Associated criteria were clarity, conciseness and ease of understanding.

Limited monitoring of user satisfaction with the handbooks appears to have been undertaken, with the exception of the SA study (see below). While a systematic review of the quality of the handbooks was beyond the scope of this evaluation, the perception of industry stakeholders highlighted some key patterns.

Overall, the handbooks were said to be consistent and logically set out, but in many cases needed refinement. It was also clear that the quality of handbooks varied significantly, ranging from very adequate to inadequate.

Handbooks that were well regarded by stakeholders included Combustion in Boilers, Coal Mining Automotive and Oil and Gas Extraction handbooks. Handbooks regarded by stakeholders as poor quality included foundry, fuel and organic liquid storage, steel, and printing. As not all sectors with a handbook were interviewed for this study, this is only an indicative list.

A South Australian study, *A Survey into Industry's Response to the NPI Implementation in South Australia (1998-1999)* found that almost one third of facilities required to report indicated that the relevant handbooks were difficult or very difficult to understand.

Comments from stakeholders interviewed for the evaluation indicated that particular handbooks have fundamental problems so that the relevant industry sector judged the resulting data to be meaningless (both inaccurate and unreliable) because the recommended emission calculation techniques are not appropriate. For some industry sectors the emission factors are based on American studies, which the industry claim, are either out of date or not relevant to Australian industrial processes.

As noted earlier, the handbooks all contain the four methods of estimating emissions, mass balance estimations, engineering calculations, use of emission factors and use of monitoring data. These are the acknowledged methodologies for estimating emissions.

Value of handbooks as an information strategy

Overall, industry regarded the development of handbooks as an appropriate strategy for providing relevant and basic information for facilities about the NPI and guidelines on calculating emissions. Industry associations representing smaller facilities, which lack in-house technical expertise, commented that the content needed to be made simpler and more practical to be readily understood by these types of facilities.

Given the range of processes that are specific to individual facilities, the handbooks have not always been able to meet the information needs of all facilities in regard to calculating emissions. For some industries, such as the chemical manufacturing industry, multiple handbooks are needed to cover all

reportable industrial processes. Where the information in the handbooks was not specific enough, industry have responded by seeking further advice from the local NPI Units, developed other methods to estimate emissions or invested in monitoring studies. These last two responses are claimed to have added considerable cost to reporting for these sectors.

Some industry associations and companies have developed spreadsheet formats to complement the handbooks, and found that these innovations have improved the accuracy and efficiency of reporting.

It appears that the handbooks are unlikely to be effective on their own, and cannot be expected to cover all contingences for all facilities. Advice and support from specialist agencies will remain a necessity. The further development of tools such as standard spreadsheets to complement existing handbooks could increase their effectiveness. In addition, continuing revision of the handbooks is needed. It is a difficult task to make handbooks appropriate for the many varied levels of expertise in Industry and to have them cover all industry processes.

An important separate issue raised by many industry stakeholders is that the basic rules for reporting are unclear, and that the NPI Guide and handbooks do not sufficiently explain the complexities of the program, especially as it applied on a practical level to their facility. Simply, some facilities are unsure if they need to report, and have found that considerable investment needs to be made just to work this out. Some stakeholders found the rules ambiguous on other levels, with facilities unsure what handbooks apply to them, and finding ambiguities where the explanations are formalised. For example, one industry sector association stated that members in different states had been sent different handbooks, which resulted in confusion across the sector. Stakeholders reported instances of uncertainty about the definition of a facility and an emission. Others had insufficient detail to allow them to work out how to calculate emissions. Many stakeholders hired consultants to resolve these ambiguities.

Despite these difficulties, all agreed in principle that handbooks are a valuable tool, but need improvements. Approaches to improving the handbooks that were suggested included:

- ▶ make handbooks live documents that are regularly updated and electronically available;
- ▶ improve quality of manuals in regard to clarity and comprehensiveness;
- ▶ fund research to develop emission factors based on Australian processes;
- ▶ involve industry in all stages of handbook development and revision; and,
- ▶ commission industry to develop and up-date handbooks.

From the Commonwealth's perspective, most of the above activities are or have been done to different degrees. It appears to be necessary to continue or extend this work.

The handbooks developed are reportedly seen as a major resource internationally and have been used/accessed by a number of countries that are developing their own PRTRs.

Major improvements are covered by the following recommendations:

RECOMMENDATION – that the Commonwealth undertake a comprehensive review of NPI guidelines to clarify uncertain definitions and formalise interpretations to assist industry in identifying their reporting obligations.

RECOMMENDATION – that the Commonwealth develop a schedule to review industry handbooks and that this process provides industry with clear mechanisms for instigating corrections and updates.

4.2 Education strategies by NPI Units for industry and local government

Although the Commonwealth had consulted industry and the NGO sectors extensively prior to the operational phase of the NPI, they recognised that successful implementation of the program rested on effectively educating industry and local government about the NPI and their obligations, and of further engaging stakeholder support for the NPI. As such, the state and territory NPI Units were funded to implement education activities in their jurisdictions to inform all industry sectors who were obliged to report. Industry associations were also an important mechanism for educating their members about the NPI. These education activities were supported by the development of information materials, published documents (Industry Handbooks above) and the NPI web site (Section 6).

The MOU specifically allows for flexible implementation, recognising that the existing infra-structure and the nature of industry will vary in each jurisdiction and that tailoring the education activities to meet local conditions is essential. All NPI Units undertook education strategies targeting industry and local government, each using their own mix of methods (see Table 4.1). Activities common to all jurisdictions included mail-outs, seminars or workshops and direct contact with individuals. The smaller states and territories - ACT, Northern Territory and Tasmania - focussed more on one-to-one direct contact with stakeholders, rather than seminars or workshops.

Methods used and extent of reach

The coverage of industry sectors and patterns of attendance varied across the states and territories (see Table 4.2). For example, South Australia, Western Australia and Victoria indicated that they offered an opportunity to attend seminars or workshops to all industry sectors required to report. South Australia also provided data on attendance, showing on average, attendance by approximately one third of those invited. SA also observed that it was difficult to interest smaller companies in attending.

Western Australia and Queensland offered the highest number of seminars or workshops. Western Australia in particular conducted 56 cross-sector seminars with an average of nine persons attending. In this case, small seminars across industry sectors were appropriate as the large distances between like facilities made industry specific seminars less practical than in more densely settled states. Queensland indicated that in the first year industry were uninterested in the program and they had disappointing numbers attending, while the second year showed improved interest and attendance.

NSW chose to target seminars to industry associations, potentially large reporting industries or industries that are high emitters. Given the large number of potential reporters in NSW, this appears to have been an appropriate strategy.

All local NPI Units indicated that they actively provided one-to-one advice on meeting their reporting obligations to potential industry reporters, and that this was a high priority. South Australian statistics show that the Unit responded to 500 enquiries from facilities in the period July 1998-December 1999.

The Units also mailed handbooks and the NPI Guide directly to potential reporters, which were identified using ABS data, existing information from licensing databases, and through industry associations. Three Units, South Australia, Northern Territory and Western Australian developed additional information materials to send to all potential reporters. Victoria's database management system allowed them to record all contact history with every client. Victoria also developed a large scale group e-mail messaging system that they claim has increased their ability to communicate with reporters efficiently. One industry facility that had used this system commented favourably that they were able to receive a fast response to their queries.

On the available evidence, the jurisdictions appear to have implemented the industry education programs in appropriate ways for their local conditions. There was general agreement on the need for guided instruction for industry, and it was clear that different target audiences (industry sector, facilities) have different information needs, and so education strategies may need to be refined and more narrowly targeted.

Comments made by the managers of the NPI Units shed some light on the relative effectiveness of the different activities and lessons learnt in different jurisdictions:

- **Workshops** - an efficient method that allowed the very complex NPI program to be explained to many people at once. Industry representatives generally appreciated the opportunity to attend sessions. Some frustrations with cross-sector workshops that did not allow industry specific queries to be fully addressed. Some states experienced low industry interest in workshops. In general, it is clear that workshops need to be supplemented by one-to-one advice.
- **Direct contact** - seen as essential by all jurisdictions for providing advice and support to industry re their obligations. Used by smaller states as the main method, where it was said to be highly successful in encouraging industry to report. Strengths included the high level of personal service, increased customer satisfaction with process, and fast response to enquiries. However, it was regarded as ineffective as a sole strategy.
- **Industry associations** - their involvement in education processes was a critical factor, with a large number of reports received from sectors with pro-active industry association (see Section 4). A number of industry associations also conducted workshops.

It is clear that NPI Units are developing a wealth of experience in educational methods, innovative approaches to communication, and useful information materials and packages. However, more sharing of this knowledge and materials could take place, and there is scope for improving the effectiveness of the Program through greater sharing and coordination between jurisdictions.

Table 4.1: Education strategies used to reach main target audience by jurisdiction 1998-2000

Education strategy	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	CW
Target audience - Industry									
Industry specific workshops		√	√	√	√		√		
Cross industry workshops			√	√	√	√	√	√	
Direct contact, meetings and presentations to industry peak groups	√	√	√	√	√	√	√	√	√
Direct contact with facilities thru one-to-one meetings/ phone	√	√	√	√	√	√	√	√	√
Site visits		√	√		√				√
Mail-outs to facilities/interested stakeholders	√	√	√	√	√	√	√	√	√
E-mail messaging to facilities					√		√		
Information development and dissemination	√		√		√		√	√	√
Surveys of industry			√		√				
Web-based information					√				√
Launch of NPI			√		√		√		√
Target audience - Community (including environmental groups)									
Public meetings/briefings		√	√	√	√	√		√	√
Direct contact with environmental groups			√		√				√
Launch of NPI			√						√
Information development and dissemination	√				√	√			√
Web- based information					√				√
School-based education re NPI					√				
Media activity (radio/ press releases)	√				√	√			√
Mail-outs to environmental groups					√		√	√	√
Target audience - Local government									
Workshops		√		√	√			√	
Direct contact				√	√				

1 Victoria has data base system (Pollutant Inventory Management System) that facilitates e-mail.

Table 4.2: Activity levels and attendance at workshops/ meetings 1998-2000

State	Cross-sector industry meetings (no.)	Industry specific meetings (no.)	Ad hoc industry meetings (no.)	Other forums/ workshops (no.)	Total attendance (est)	Average workshop attendance (est)
ACT	0	0	na	na	na	na
NSW	10	16 ¹	na	20	700	15
NT	1	3 (mining)	na	3	143	35
QLD	40	16 ²	na	4	649	12
SA	23	9	na	9	159	5
TAS	10	na	na ⁴	na	100	10
VIC	22	22 ³	20	19	995	22
WA	56 ⁵	1 (mining)	10-20	1	530	9
Total	162	67	na	56	3276	na

Notes: na = not available

¹ Meetings with paint manufacturers, mining, environmental engineers, bakery, aluminium smelting, power generators, petrochemical; seminars with mining, surface coating

² Mining, sugar industry and ports

³ Industry seminars for all industry sectors with published handbook

⁴ Too many to enumerate

⁵ Attendees at certain workshops were predominantly from one industry eg landfills, printing aluminium, gold, mining, water treatment

Quality of advice and support through education strategies

Overall industry's assessment of the quality of advice they had received from the local NPI Units varied according to the industry sector, the subject of the advice and the jurisdiction, and ranged from good to poor. In many cases, different industry sectors gave the same state or territory different ratings.

One indicator of quality is the extent to which facilities need to obtain advice outside the formal program structures. Many industry sectors indicated that their member companies were hiring consultants and coming to the associations for more information and help. One consultant reported that they are in high demand because many industry sectors and facilities are not clear about their reporting obligations (see also Section 3).

Another indicator of the effectiveness of the NPI Units provision of advice is the impact of the withdrawal of the service. Industries in contact with the Western Australian Unit commented that the temporary disbanding of the unit has been a "nightmare", and that, without access to advice they had found meeting their reporting requirements very difficult.

It was apparent that different audiences have different needs and starting knowledge base and this makes assessing the quality of the education activities, and advice and support difficult. Industry sectors and facilities had mixed opinions as to how well the messages were targeted. For example, an officer of a reporting facility commented that he had expected to obtain advice as to individual problems and queries at the workshop he attended, but found that the content was very general and he could not get immediate

responses. Larger companies felt less need for education because they were involved in previous consultation or are closely linked to an industry association, and therefore felt well informed.

It appears that multiple level education activities are needed to meet the varying information needs of all industry sectors, and individual companies, as has been recognised by the implementation of the education strategy.

Impact of education strategies on industry awareness and understanding of reporting obligations

While it is clear that the program has achieved substantial exposure in each jurisdiction, on the available evidence it is not possible to assess whether all potential reporting facilities were offered the opportunity to attend education sessions or received materials, and consequently whether they have been informed about the Measure. Data supplied by the local NPI Units were incomplete, and until these gaps are addressed, the extent of reach achieved will not be clear.

However there is some indicative evidence on these issues from the interviews with NPI Unit managers and industry stakeholders, recognising that the industry sample was not representative and included only a small number of individual facilities.

The smaller jurisdictions, Tasmania, Northern Territory and Australian Capital Territory indicated that they had reached almost all facilities in most industry sectors, so that a high proportion were aware of the NPI Program and that they had some level of knowledge of their obligations and the processes to meet them. One exception was the quarry industry in Northern Territory where there was a poor response to an invitation to attend a workshop. The relative success of the smaller states and territories reflects their ability to more easily identify and establish personal contact with individual facilities, given the smaller industry base. Such a strategy is unlikely to be possible without a very large increase in resources in the larger states.

One observation made by many of the states and territories was that it was difficult to reach smaller companies and that these companies were less aware of the NPI Program and less knowledgeable of their obligations and how to calculate emissions. This observation was confirmed by a number of industry sectors. Industry associations representing more diverse companies or that have smaller member companies indicated that many of their members were likely to be unable to attend seminars or workshops and were still either unaware of the NPI Program, or their reporting obligations. On the other hand, industry associations covering larger and/or narrowly defined industry sectors such as the mining and sugar cane industries indicated that most if not all of their members are aware of the NPI Program.

Evidence of the impact of educational activities comes from the South Australian study, *A Survey into Industry's Response to the NPI Implementation in South Australia (1998-1999)*, which found a high satisfaction rate with workshops, with 88% indicating that they found them useful. On the other hand, 43% of potential reporting facilities were still uncertain of some aspects of the NPI. The authors of the study, Capricorn Communications Consultancy concluded that there is an ongoing need for an industry targeted education program.

4.3 Consultation with Peak Bodies

All states and territories consulted a selection of peak industry and environmental bodies to encourage them to support the NPI Program. The level of contact varied, ranging from three industry groups in the ACT to 51 industry and 33 environmental groups in Victoria.

The consultations resulted in varying levels of support across jurisdictions and industries (see Table 4.3). Associations which responded with high levels of support typically conducted joint workshops with the

local NPI Unit, arranged their own seminars, kept industry members apprised of the NPI, provided sound advice, and encouraged members to participate. On a national basis, the Mineral Councils were supportive of the program in most jurisdictions.

Support by industry associations appears to have been an important factor in encouraging their members to become informed about the NPI Program and their obligations by attending workshops and seminars. It also appears to have impacted on patterns of reporting. Large number of reports have been received from those industry sectors with pro-active associations. If an industry association was either hostile or uninterested in the NPI then member companies did not attend workshops and seminars or report. The extent of reporting and factors effecting likelihood of reporting are discussed in Section 4.

Table 4.3: Peak bodies consulted and perceived level of support for NPI program 1998-2000

State	Contacted	Extent of support
ACT	3	high - Printing Assoc of Australia; Dry Cleaning Industry Association of Australia medium - Motor Vehicle Industry Association of Australia
NSW	16	high - NSW Minerals Council; Aust. Paint Manufacturers Federation low - NSW Surface Coating Association; Environmental Engineers Society; Petrochemical Group; Australian Feedlot Association; Plastics and Chemicals Association; Aust Pharmaceuticals Manuf. Association; Textile Rental & Laundry Association; Aust Foundry Institute; The Crushed Stone and Sand Association of NSW; Greenpeace; The Wilderness Society; Friends of the Earth; Total Environment Centre; Environmental Defenders Office
NT	7	high - NT Minerals Council; NT Environment Centre; Arid Lands Environment Centre; Local Government Assoc of NT; Marine and Coastal Network medium - NT Chamber of Commerce low - NT Motor Traders Association
QLD	13	high - Queensland Mining Council; Australian Sugar Milling Council; Australian Industry Group; Australian Centre for Mining and Environmental Research medium - QLD Chamber of Commerce and Industry; Dry Cleaning Institute of Australia; QLD Port Authority low - Local Government Assoc of QLD; Australian Paint Manufacturers Assoc; Australian Electrical and Electronic Manufacturers Assoc; Australian Petroleum Institute; Queensland Rail; Baking Industry Assoc of QLD
SA	*	low - Farmers Federation; Wineries; Chamber of Mines and Energy; Business SA; Engineering Employers Assoc * contacted every Council/ Association that had relevant handbook and that had presence in SA
Tas	2	medium - Minerals Council; Chamber of Commerce and Industry
Vic	51 industry 33 environl.	not available
WA	6	high - Chamber of Minerals and Energy medium - Chamber of Commerce and Trade; WA Municipal Association low - Kwinana Industries Council; Lithographic Institute of Australia; Conservation Council of WA

4.4 Education of the community

Extent of reach

All jurisdictions targeted the community sector to varying extents ranging from very limited activities to multi-strategic campaigns.

South Australia implemented the most extensive community education program, during the second reporting year. It included public meetings, public relations campaign, school-based education and development of information materials. Activities in the other jurisdictions were much more limited, and generally involved arranging a small number of public meetings or liaising with key environmental groups.

Effectiveness of community education

No systematic evidence on the public's recall and awareness of state and territory-based activities or the NPI itself is available. However, the general perception by stakeholders is that community awareness is low in line with the limited education activities. This perception is somewhat supported by the apparent low use of the NPI database at this stage by the public (see Section 6).

The consensus from stakeholders in all sectors was that now that the NPI database has reached the current phase, a comprehensive community education campaign needs to be undertaken if the NPI is to meet the objective that the public has a right to know what chemicals are being emitted to land, water and air. A coordinated national approach is required, and the balance between national campaign elements and separate elements within jurisdictions needs to be established.

RECOMMENDATION - that a national education campaign be implemented in a coordinated way across all jurisdictions

4.5. Conclusions

Educating stakeholders about the NPI Program was a key implementation task, and a focus of both Commonwealth and State and Territory Governments.

The education activities were multi-strategic and comprehensive, and in general terms appropriate for the NPI and with the potential to deliver the intended outcomes. However, while there are gaps in the evidence about the reach and impact of educational activities, it is apparent that the effectiveness of their development and implementation to date has been mixed.

The industry manuals and handbooks are a key element, and it can be concluded that the efficiency and effectiveness of this process has varied. The development of the handbooks has been slower than the targets set by the Program, although the time frame for such a large task was probably unrealistic and limited consultation. The quality of the handbooks varies, and a systematic process to review these documents, make any corrections, and communicate this to stakeholders, is needed to retain industry confidence in the program.

The education strategies used by NPI Units to target industry and local government are being implemented relatively efficiently and effectively, although there is scope for improvement by better targeting future activities and sharing implementation lessons, materials, techniques and innovations. The Program will be in a better position to assess its progress in this area if more systematic monitoring of reach and impact is developed.

While consultations with peak industry and environmental bodies to support the Program have had varied levels of effectiveness, these partnerships appear to have the potential for substantial leverage.

Community education has been limited to date and the Commonwealth reports that this has been a lower priority than other aspects of the program up to this time. This is particularly the case as the database does not yet provide a comprehensive coverage of all industry emissions. A coordinated community education campaign needs to be undertaken now that the NPI database is established.

In conclusion, an appropriate set of educational strategies have been established by all. While the effectiveness of implementation to date has been varied, with assessment limited by useful data, stakeholders have identified many useful improvements and the evidence suggests that the intended educational outcomes can be achieved.

5 Reporting

This Section will review the extent of reporting and factors that have impacted on the patterns of reporting. In the long term, effective implementation of the program can be assessed by the comprehensiveness of the data published on the NPI. However, at this early stage of the program, systematic data on the extent of reporting are only available for the first reporting year, 1998/1999. These data are of limited analytical value as the program was only partially implemented in the first year, with around 25% of all industry sectors being required to report. Thus, using the extent of reporting as a measure of effectiveness in this context can only be indicative. However, factors that impact on patterns of reporting can provide useful insights to improve the future effectiveness of reporting.

One important issue in regard to reporting is the quality of the data that are included on the NPI database, and this Section will also review the efficiency and effectiveness of the systems in place to ensure data quality.

These assessments address in part, the Term of Reference 2: *Whether the strategies and processes established jointly by all jurisdictions to implement the program are operating effectively* and, Term of Reference 4: *The scope for improving the program including recommendations for continuation, amendment or replacement.*

This section draws evidence from stakeholder interviews, data published in the *National Pollutant Inventory Report Summary of First Year Results 1998-1999*, IWG members responses to a written survey and Commonwealth NPI Unit responses.

5.1 Extent of facility reporting

Coverage by industry

A total of 1203 facilities from 23 industry sectors reported emissions to the NPI for the year 1998-99.

In the Year 1998-1999, the Petroleum Product Wholesaling industry sector provided the largest number of reporting facilities, with 46% of all reporters being from this sector (see Table 5.2). Facility reporting in this sector was coordinated by the head offices of the small number of companies that make up this sector.

For the Year 1999-2000, coverage will have been expanded so that an expected 79 industry sectors will be reporting. The local NPI Units are predicting a substantial increase in reporting, for example, QLD had processed 350 facility reports when interviewed and are expecting more than 500 to come in. Another example, in Victoria 20 out of 23 (87%) Victorian power generators had reported for 1999-2000 compared with just 35% in 1998-1999.

The industry stakeholders interviewed for this evaluation (not a representative sample) commented on the pattern of reporting for the first two years. These data indicate that full reporting is unlikely to be achieved at this stage, although there are indications that more sectors are now reporting. For example, stakeholders observed that around 10-15% of chemical manufacturers are reporting. Another sector mentioned that are yet to report are food companies. On the other hand, all oil companies, most mining companies (with the exception of NSW), coal companies and the sugar industry are said to be now reporting. Stakeholders observed that smaller companies are less likely to be reporting. Industry sectors consisting of larger companies have had higher rates of reporting, for example, mining, oil and gas and power and water utilities and heavy chemical manufacturing.

As discussed in the methods section, it is difficult to assess the extent of reporting based on the limited kinds of compliance information available. To be able to confidently assess extent of reporting and rates of compliance, agencies should be systematically recording data on both facilities required to report to the NPI and on those that do not trip thresholds and so are not required to report emissions. Data could include the number of potential reporters in a sector, number of facilities that do not trip a threshold, number of facilities that trip a threshold and number of reporters. All contacted facilities should be required to provide basic information, even if they are not required to report to the NPI. This will allow more accurate estimations of the extent of reporting and rate of non-compliance.

RECOMMENDATION – That an evaluation framework covering both implementation and compliance which includes collection of data on both reporting and non-reporting facilities be developed to enable on-going evaluation of the program.

Coverage by substance

There were 67 substances reported on with an average 5.8 substances reported per facility (see Table 5.1). Most facilities chose to provide estimates for the full year.

Industry facilities were required to report on 36 substances for the first year, if they tripped the threshold of emissions. From July 2001 facilities will be required to report across 90 substances. It is apparent that some facilities made the decision to report across all substances from the first year.

Relative effectiveness of state and territory education activities

Given the early stage of the program and the relatively limited implementation of education strategies in some jurisdictions, it is of interest to assess the relative success of the states and territories in regards to the number of reporters in the first year (see Table 5.2). However, this assessment is made difficult by the limited data that are available to the evaluators in regards to the base-line numbers of potential reporting facilities in each state and territory and the lack of data in regard to the reasons for non-reporting once contact has been established.

Tables 5.3 to 5.6 show the number of facilities that were contacted and the proportion reporting, for the four largest industry sectors that reported to the NPI in 1998-1999, by jurisdiction. Within the limits of the data, as discussed above, these tables show that there were differences in reporting patterns by jurisdictions. Given the magnitude of the differences, some of the observed patterns may be attributable in part to the relative effectiveness of the education activities. For example, there were a greater proportion of mining companies who reported in the Northern Territory (65% of those contacted) compared with NSW where just 15% of those contacted reported. Northern Territory indicated that they were able to establish close relationships with key personnel at all their facilities, and that this was an effective strategy in encouraging reporting. On the other hand, a lower proportion of electricity supply facilities chose to report in Victoria, and this was reportedly attributable to an industry-wide decision not to report at that stage due to the lack of penalties for non-compliance and not to lack of awareness of the program.

South Australia, NSW and Victoria all commented that having previous contact with a facility either through licensing systems or other environmental reporting meant that they were more likely to report.

In general, the jurisdictions indicated that for the most part they considered their education activities to be relatively successful in regards to encouraging facilities to report. The smaller states and territories appear to have been relatively more successful than larger states in the first reporting year, probably because a smaller industry-base makes the logistics of identifying and then establishing personal contact possible. For example, Tasmania stated that 90% of companies expected to report did so and, in the

Northern territory, 93% of mining facilities reported for full year with two thirds reporting on all 90 substances. On the other hand, the larger states achieved better reporting than they expected.

Factors impacting on reporting

The NPI Program logic is that facilities will report if they are aware of the program and provided with the tools and techniques, and if needed, the skills to enable them to report. As such, the education activities of the states and territories have been designed to raise awareness of the program as well as increase knowledge and skills of the facility in estimating emissions. The industry handbooks were specifically designed to provide facilities with the technical tools to estimate emissions. Reporting forms allow the transfer of data to the database.

Other factors that increase the likelihood of an individual facility to report include:

- ▶ active support of the NPI by their industry association;
- ▶ co-ordination of individual facility reporting by a single owner company;
- ▶ existing relationship with environmental agency, especially if licensed;
- ▶ larger company that can afford to access outside expertise or commit employee time and understands environmental reporting requirements;
- ▶ ease of reporting, for example, being a facility whose emissions come solely from boiler combustion of fuel because of the simplicity of calculation;
- ▶ recognition that reporting is a legal requirement, under law; and,
- ▶ active enforcement of compliance by the responsible government agency.

Factors that decrease the likelihood of a company reporting include:

- ▶ lack of confidence in the recommended methods for calculating emissions. Stakeholders indicated that some industry sectors are only reporting on particular substances if they feel confident that the emission factor yields accurate and reliable results. Others are waiting for problems to be fixed. For example, landfill operators did not report due to uncertainty associated with thresholds;
- ▶ medium to small companies - these companies lack expertise and resources to access advice through attending education sessions or paying for consultants;
- ▶ involved in the introduction of load based licensing in NSW. This process coincided with the first reporting year and has been given a higher priority by some companies;
- ▶ absence of penalties attached to non-compliance - changing in July 2001; and,
- ▶ being concerned about issues of commercial confidentiality.

Table 5.1: No. of reporting facilities, substances and sectors reported on by jurisdiction in 1998/1999

State	No. industry sectors covered by report in each state ¹	Facilities that reported in each state		No. of substances reported
		Number	% of total	
QLD	15	287	23.9%	46
NSW	15	270	22.4%	58
WA	15	199	16.5%	47
VIC	14	177	14.7%	50
SA	14	116	9.6%	29
NT	10	74	6.2%	47
TAS	10	68	5.7%	32
ACT	5	12	1.0%	27
Total	not applicable	1203	100%	na

Notes:

¹ See Table 4.2 for industry sectors with significant reporting by jurisdiction

Data from *ANPI Summary Report for the First Year Data 1998-1999* , Commonwealth of Australia, 2000.

Table 5.2: Industry sectors with significant reporting by facilities, by jurisdiction 1998-1999

Industry sector	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	TOTAL	% of reporting facilities
Petroleum product wholesaling	5	144	16	118	70	17	75	58	503	46%
Sewerage and drainage services	2	35	6	47	13	26	15	4	148	14%
Mining	0	6	15	22	2	5	2	58	110	10%
Electricity supply	0	7	29	9	4	3	8	31	91	8%
Ceramics manufacturer	0	16	0	7	6	1	14	9	53	5%
Bakery manufacturer	2	12	2	11	2	1	8	4	42	4%
Oil and gas extraction	0	0	1	20	0	0	0	6	27	3%
Organic industrial chemical manufacturing	0	9	0	7	1	0	5	3	25	2%
Paper and paper manufacturer	0	4	0	5	3	3	10	1	26	2%
Iron, steel casting and forging, steel pipe, tube manufacturer	0	5	0	2	3	1	1	1	13	1%
Petroleum refining	0	3	1	2	1	0	2	4	13	1%
Paint and ink manufacturer	0	2	0	2	1	0	5	1	11	1%
Beer manufacturer	0	2	0	3	2	2	3	2	14	1%
Glass and glass products manufacturer	0	4	0	1	2	0	2	1	10	0.9%
Non-ferrous metal casting	0	1	0	2	1	1	0	0	5	0.5%
Total	9	250	70	258	111	60	150	183	1091	100%

Notes:

Data from *NPI Summary Report for the First Year Data 1998-1999*, Commonwealth of Australia, 2000.

Table 5.3: Mining industry- Implementation of NPI program by jurisdiction 1998-1999

State	Context	No. of mining facilities contacted ¹	No. of mining facilities reported ²	% mining facilities reported	<u>Estimated</u> proportion of mining facilities expected to be required to report
ACT	no facilities in ACT				
NSW	large emissions in rural areas	40	6	15%	na
NT	significant industry sector	20	13	65%	70%
QLD	difficulties associated with reporting and locating potential facilities	na	22	na	na
SA	na	na	2	na	na
TAS	na	na	0	na	na
VIC	not traditional EPA client - not large industry	4	2 ³	50%	100%
WA	large industry base, many licensed facilities	100+	56	approx 56%	70% [based on fuel burning PM10 threshold, not all had to report in 1998/99]
Total					

Notes:

¹ Data from Survey completed by IWG members, September 2000

² Data from *NPI Summary Report for the First Year Data 1998-1999*, Commonwealth of Australia, 2000.

³ In Oct 2000, 1/4 (25%) Victorian mining facilities had reported for 1999/2000

Table 5.4: Electricity supply / power generation - Implementation of NPI program by jurisdiction 1998-1999

State	Context	No. of electricity supply facilities contacted ¹	No. of electricity supply facilities reported ²	% electricity supply facilities reported	<u>Estimated</u> proportion of facilities expected to be required to report
ACT	no facilities	na			
NSW	impact on metropolitan air quality	12	7	58%	100%
NT	significant industry sector	30	29	97%	100%
QLD		na	9	na	na
SA		na	4	na	na
TAS		na	3	na - average 90% reporting for all facilities	na
VIC		23	8	35% ³	100%
WA	large emitters of pollutants, many licensed	35	29	83%	95% (some power stations associated with mining sites)
Total					

Notes:

¹ Data from Survey completed by IWG members, September 2000

² Data from *NPI Summary Report for the First Year Data 1998-1999*, Commonwealth of Australia, 2000.

³ In Oct 2000, 20/23 (87%) Victorian power generators had reported for 1999/2000

Table 5.5: Sewage and drainage services - Implementation of NPI program by jurisdiction 1998-1999

State	Context - reasons industry targeted	No. of facilities contacted ¹	No. of facilities reported ²	% facilities reported	<u>Estimated</u> proportion of facilities expected to be required to report
ACT	handbook	2	2	100%	100%
NSW	emissions to water (inland)	>100	35	approx 35%	na
NT	significance of Darwin Harbour	5	5	100%	100%
QLD		na	47	na	na
SA		na	13	na	na
TAS		na	26	na - average 90% reporting for all facilities	na
VIC		180	15	8.3% ³	60%
WA		na	4	na	na
Total			148		

Notes:

¹ Data from Survey completed by IWG members, September 2000

² Data from *NPI Summary Report for the First Year Data 1998-1999*, Commonwealth of Australia, 2000.

³ In Oct 2000, 51/180 (28%) Victorian sewage and drainage facilities had reported for 1999/2000

Table 5.6: Petroleum product wholesaling - Implementation of NPI program by jurisdiction 1998-1999

State	Context - reasons industry targeted	No. of facilities contacted ¹	No. of facilities reported ²	% facilities reported	<u>Estimated</u> proportion of facilities expected to be required to report
ACT	handbook	6	5	83%	100%
NSW	state-wide coverage	na	144	na	100%
NT	large number, VOC emissions	17	16	94%	almost all
QLD		na	118	na	na
SA		na	70	na	na
TAS		na	17	na - average 90% reporting for all facilities	na
VIC		98	79	81% ³	most
WA		na	58	na	na
Total			509		

Notes:

¹ Data from Survey completed by IWG members, September 2000

² Data from *NPI Summary Report for the First Year Data 1998-1999*, Commonwealth of Australia, 2000.

³ In Oct 2000, 71/98 (73%) Victorian sewage and drainage facilities had reported for 1999/2000

5.2 Aggregated emissions data (AED)

Extent

The NEPM requires that individual jurisdictions estimate the amount of particular substances emitted from smaller, diffuse and mobile sources within agreed regions, that is, collect aggregated emissions data.

The MOU states that aggregated emissions were to be estimated using handbooks prepared for the purpose. To date, 19 of these handbooks have been prepared. These handbooks provide coverage of the main pollutant sources, however it is reported that a small number of further handbooks are likely to be required to provide sufficient coverage of diffuse or mobile emissions.

The MOU sets out a list of priority airsheds and water catchments for each jurisdiction, a total of 28 separate regions.

The states and territories have substantially completed the program of aggregated emissions data as agreed in the MOU in that, aggregated emissions data for 26 of the 28 regions have been completed (see Table 5.7). Studies yet to be completed are the Peel-Harvey and Avon water catchments in Western Australia.

Industry stakeholders had strong opinions on the coverage provided by the existing aggregated emissions program. They commented that they were “disappointed” with the coverage in relation to both sources and destination of emissions, and to geographical coverage. Industry stakeholders advocate that the program be continued and expanded to more regions and sources and to include emissions to land.

Effectiveness

There has been variation in the implementation of the aggregated emissions program with states and territories using a range of methods and including variable sources of admissions (see Table 5.7). This variation is said to have resulted in a level of inconsistency in the results between common sources of emissions and limits user’s ability to compare and / or analyse the emissions in different regions.

The presentation of the AED data with facility data to enable the different proportions of various sources of emissions to be easily identified will be available for the second reporting year. Currently it is only available for the Port Phillip airshed region.

Quality of AED

Table 5.7 records detailed comments on the methods used by the jurisdictions. Stakeholders indicated that estimation of aggregated emissions data is a complex task, that there are gaps in the methods available to estimate these data for certain sources and that some methods need further refining, and development.

Industry and NGO stakeholders had varied opinions on the quality of the AED available on the NPI. One NGO indicated that the quality of the data was poor and the data “meaningless”. Other stakeholders thought the quality was good for particular sources or regions.

RECOMMENDATION – that the program continue to collect information on diffuse emissions and to refine methods for estimating aggregated emission data to facilitate analysis of sources and regions.

Table 5.7: Aggregated emissions data - methods and comments

State	AED data collection methods	Comments	AED Reports	
			Airshed	Water catchments
ACT	<p>Surveyed industry eg bakery, printing, concrete batchers, service stations, household services, motor vehicle refinishing, and 1600 households.</p> <p>Motor vehicle emissions - transport model commissioned using Nairn and Company, based on VKT using car counts to establish usage of roads</p>	<p>Motor vehicle refinishing survey -100% response but methodology was not ideal/effective.</p> <p>Service stations declined to participate in surveys.</p> <p>Motor vehicle emissions model had error rate 10-20%.</p>	Canberra	Canberra catchment
NSW	<p>Motor vehicle emission estimated using VKT (Vehicle Kilometres Travelled) data from RTA</p> <p>Surveyed households re solid fuel use.</p>	<p>Solid fuel use data to be improved by survey for 2001 database.</p>	Sydney-Newcastle-Wollongong	<p>Botany bay</p> <p>Hawkesbury-Nepean</p> <p>Hunter River</p> <p>Lake Illawarra</p> <p>Port Jackson</p> <p>Richmond- Manning</p>
NT	<p>Developed models for estimating emissions from bushfires, motor vehicles, shipping and boating. Surveyed households and small business and added national data.</p> <p>Monitored representative catchments to estimate emissions from land use into Darwin Harbour to develop export coefficients.</p>	<p>Bushfires model complex and good coverage.</p> <p>Motor vehicle model -very good coverage of activity and sources</p> <p>Shipping and boating -moderately complex model. Main inaccuracies due to limited data set from domestic survey.</p> <p>Small business - limited coverage of industry sources and variations within sectors possibly not well characterised.</p> <p>Darwin Harbour - only a few years data is available for each land use type and the land use types are not well defined.</p>	<p>Darwin</p> <p>Alice Springs</p>	Darwin Harbour Water Catchment

State	AED data collection methods	Comments	AED Reports	
			Airshed	Water catchments
QLD	Did studies on emissions of PM10 for unpaved roads, denuded areas and agricultural tilling and stock movement to provide data as a comparison to impact of mining. No details of methods used supplied.		SE QLD Bowen Basin (PM10 only, study suspended due to lack of reliable data)	SE QLD Johnstone River Dawson River
SA	Surveyed households re use of domestic chemicals, wood burning and lawn mowing through school AIRWATCH program. Industry surveys eg Architectural Painters, dry cleaners, motor vehicle refinishers, printing industry, and service stations		Adelaide Five major regional airsheds (Barossa, Spencer, Riverland, South East and Port Lincoln) and 11 towns airsheds within these regions	Adelaide (Mt Lofty Rangers)
TAS	Used standard methods outlined in AED handbooks to estimate emissions on core and non-core sources as agreed by IWG		Hobart Launceston	Derwent Tamar/Esk
VIC	Used standard methods outlined in AED handbooks to estimate emissions on core and non-core sources as agreed by IWG		Port Phillip Region Latrobe Valley	Port Phillip Bay Latrobe/Thomson
WA	19 areas based sources for Perth Airshed. Conducted surveys, used ABS data and source specific usage ratios. Estimated emissions of Total nitrogen and phosphorous using monitoring data where available and statistical modelling.	Data reliability and coverage was source specific. Varied with availability of data.	Kalgoorlie Perth	Perth (Swan-Canning)

5.3 Data quality

The quality of the data is central to the long-term outcomes of the NPI. Good data quality rests on using accurate and reliable methods, competent and honest application and on quality assurance systems at all stages in the collection and transfer of the data. However, as the NPI is an estimations database some data is likely to contain a level of error, possibly depending on the estimation technique/emission factors used.

Accuracy of estimation techniques

Stakeholders universally regard the accuracy and reliability of the approved estimation factor methods as variable. The current view is that as a result, the data for a range of industry sectors are mediocre to poor quality.

On the other hand, some industry sectors and facilities (for example, mining) have invested in studies to test the accuracy of the selected estimation techniques, and found “the more accurate methods quite good.”

Both industry and NGOs are advocating that existing methods be replaced or improved for particular sectors and processes.

RECOMMENDATION - that inaccurate and unreliable emission factors be identified in consultation with industry, and more accurate and reliable methods be developed, either by government or by industry.

Efficiency and effectiveness of transfer of data between facility and NPI Units

Once estimated, data are transferred from the facility to the local NPI Units. Facilities originally reported their data on a standard paper-based reporting form, developed by the IWG. Subsequently, several of the states and territories have independently developed electronic reporting forms to improve the efficiency of the process. However the hard copy reporting form is still used, and likely to remain in use, by a significant number of reporting facilities.

Both the local NPI Units and the industry reporters agree that electronic reporting has improved the efficiency of the transfer of data. However, the non-standardisation of this process has caused inefficiencies to nationally based companies seeking to co-ordinate their reporting systems. The IWG are currently addressing these inconsistency through a specially formed sub-group formed to develop a standard electronic reporting format.

The use of electronic reporting which is linked to a sophisticated database has also improved the effectiveness of the process. Victoria invested in a database that they report has solved “huge data quality problems” encountered in the first reporting year when paper-based reporting was used. The database - IRIS - uses limited fields to prevent transcription errors and validation rules to ensure consistent data. This database provides an example of best practice, which other states/territories could adopt, depending on their IT platforms and related programs.

RECOMMENDATION 4.5 – that the IWG fast track the development of a standard electronic reporting tool or format, which is able to be accepted by all states/territories.

Efficiency and effectiveness of transfer of data between NPI Units and the Commonwealth

The local NPI Units transfer data to ERIN to place on the NPI database. ERIN validates the data and publishes information gathered for the preceding financial year, by 31 January.

From the Commonwealth database management perspective, this process was rather inefficient and only relatively effective in the first year. Interestingly, all jurisdictions reported that they received high quality

of service.

Many jurisdictions provided reports after the cut-off date, continually revised their data and transferred invalid records. The consistency of the data submitted with the transfer format was variable, probably as a result of having inadequate systems for processing the data and possibly due to changes in staff.

The Commonwealth has now put in place systems to improve the efficiency and effectiveness of the transfer in 1999-2000, for example, automating the system so that the data is submitted directly to a secure web page, which will show if the records are invalid. The responsibility for correction will be with the states and territories. In addition, there will be a schedule established for publicly updating the database.

Quality assurance activities

Quality assurance activities minimise errors in calculating emissions and reporting, and in the transfer of data, that is, they ensure the integrity of the data.

Quality assurance can relate to different aspects of the data collection process, for example, in ensuring that details of the company and location are correct, that no errors are made in transferring the data in the correct electronic format, ensuring that there are no obvious outliers in the reports (ie, identifying whether the emissions reports are either clearly too high or too low – if they are, it is likely that unconscious errors have been made in the estimations), and lastly that reporters have estimated the emissions as accurately as possible.

In the MOU, the priorities at this stage of the program were to identify reporting facilities and encourage compliance. Other agreed actions to assess the integrity of the data were that the parties keep records of the assessment processes undertaken for specific reporting facilities, correct database records after appropriate assessment and conduct compliance inspections, if there was reason to believe a facility has failed to report.

Although all states and territories instigated some quality assurance activities, there was no consistent approach taken. Each state implemented its own activities with some of seemingly very limited scope and others being more comprehensive programs. Some jurisdictions acknowledged that although they did do quality assurance activities they had not yet developed a comprehensive quality assurance program.

Jurisdictions with more comprehensive programs checked and verified all reported data, compared data with known data from other sources and established integrated data-handling systems that allow for automated validation of records. One smaller jurisdiction was able to inspect facilities and collected information on industrial processes that allowed independent validation of the data.

The variable quality assurance activities ultimately had some impact on publicly presented data. In a very small number of instances, data that had been incorrectly estimated by reporting facilities was published and later corrected.

In summary, the effectiveness of these processes varied between jurisdictions. Jurisdictions recognise that this aspect of the program will become increasingly important in the future. At this early stage of the program, the agreed priority has been to get facilities to report in the first instance.

RECOMMENDATION - that all jurisdictions develop rigorous quality assurance programs which include verification systems and independent validation of data. That these systems be implemented in a nationally coordinated and consistent manner.

5.4 Cost of reporting to industry

The Summary of Key Impacts of NEPM for the NPI estimated the annual implementation costs to reporting facilities as \$1,690 in the first year and \$1,500 in the second year. This document further estimated that the average annual cost per facility would be \$2,000 once the full reporting list has been implemented.

It is apparent that these forecasts underestimated the expenditures on meeting the requirements of the Measure by most facilities and possibly the industry as a whole (see Table 5.8).

On the limited data available, the estimated expenditures on meeting reporting obligations varied widely by both industry sector and facility, varying from \$5,000 to \$30,000 per facility in the first year. Generally, the first year of reporting where facilities established internal systems and protocols to enable them to report was relatively costly. Industry commonly agreed that the cost would probably reduce over time as they became more familiar with the requirements and established efficient processes.

In the first year, industry sectors' expenses could include the establishment of an environmental knowledge base and monitoring systems, payment of consultants to develop systems such as spreadsheets and investment of staff time in understanding the NPI.

Stakeholders commented that the development of electronic reporting and industry specific electronic spreadsheets to calculate emissions would increase the efficiency of the process from industries perspective and decrease costs.

Table 5.8: Examples of the cost to industry of meeting NPI reporting requirements (not a representative sample)

Industry sector	Estimated costs - first year	Estimated future costs	Comments
Aviation	\$10,000 (all company facilities)	na	Set up systems and protocols
Mining (minerals):	Company 1 \$100, 000 (whole group)	\$60,000 per annum (Whole group)	large company with many facilities Cost included \$40,000 to consultant
	Company 2 \$17,000 per facility	\$5,000 per facility	did testing in first year
	Company 3 \$120,000	na	new monitoring system
Mining (coal)	Company 1 \$8,000	\$5,000	designed spreadsheet
	Company 2 \$10,000 per site	na	
Petroleum wholesaling	\$300,000 (all facilities) includes 3 months consultancy	\$100,000	expect cost to reduce if standard electronic reporting introduced
Cement	\$10,000 per facility	\$10,000	costs may reduce if thresholds stay the same
Chemical	\$5,000-\$10,000 per facility	na	
Foundry	\$15,000 per facility	na	
Packaging	\$15,000-\$20,00 per facility	na	
Automotive	\$20,000 per facility	na	will reduce
Sugar	\$5,000 to \$10,000 per facility	na	

Source of data: Stakeholder interviews

5.5 Conclusions

In response to Term of Reference 2: *Whether the strategies and processes established jointly by all jurisdictions to implement the program are operating effectively*, it can be concluded that the NPI Program appears to have had variable success at this stage in effectively encouraging all potential facilities in the targeted industry sectors to report in the first year, being more successful with the larger, more specialised and highly organised sectors.

In regard to efficiency, there have been refinements and improvements of the processes in place to engage and inform industry of their obligations and ensure efficient transfer of data. Indications are that some steps taken have already started to improve the effectiveness and efficiency of these processes.

In response to Term of Reference 4: *The scope for improving the program including recommendations for continuation, amendment or replacement*, the program must address the variable quality of the data by refining and developing the estimation methods and by establishing rigorous quality assurance systems.

6 The National Pollutant Inventory Internet Database

The NPI Internet database is managed by ERIN and is located on the NPI web site www.npi.ea.gov.au and is part of Environment Australia's Departmental web site. It is the major output of the NPI Program.

This Section reviews the effectiveness of the web-site in terms of user satisfaction with the utility of the database (navigation and data retrieval), and access by the target groups as indicated by the patterns of usage since January 2000 and stakeholder feedback. These assessments address in part the Term of Reference 1: *The likely effectiveness of the program in light of its objectives*, and Term of Reference 4: *The scope for improving the program including recommendations for continuation, amendment or replacement*

6.1 Utility of web site

The web site underwent a major review and upgrade just prior to the launch of the first report in January 2000. The visual aspect of the site and its ease of use were reportedly markedly improved at that time, and the development of the database is stated to be a process of continual evolution of search functions and improving ease of use.

Generally, stakeholders across all sectors thought the web site and database were well presented and effective. Stakeholders commented that the data-retrieval process is effective; that they were able to navigate the site with relative ease and find the information they sought. Many had high praise for the web site and described it as an "excellent" and "exceptional" web site. A minority of stakeholders criticised the speed of the site and the efficiency of navigation and the utility of the mapping functions.

In this context, the stakeholders suggested the following improvements:

- ▶ Refine the GIS mapping functions; and,
- ▶ Refine web site map to improve efficient navigation.

6.2 Usage of the NPI Internet database

Although the database was only launched on 28 January 2000 and reporting data is still being developed (Section 5), the initial pattern of usage provides an indication of future viability.

ERIN monitors usage through statistics produced by pwebstats, presented as monthly reports covering requests, main hosts accessing the server, and the frequency of items requested. These statistics and the summary report provided by ERIN (October 2000) are the basis for the following assessment.

Ongoing usage

Users can query the database by substance, source, facility or location. After an initial surge of interest following the launch, the database has received steady usage of over 5,000 requests for data (reports) per month (see Table 6.1, excluding January and February as abnormal and the one abnormal access in June). ERIN note that their evidence indicates that once in the database an individual user requests several reports before logging out again, so the number of individual users cannot be determined from the requests.

Individual users can be estimated by entries to the database through the caveat acceptance page, with an average of 1,100/month over the last seven months. This is a minimum estimate as users may bookmark a location in the database past the caveat. These figures may also include a high proportion of repeat users.

Users can also download an Excel spreadsheet of the emission data for each state or for the whole of Australia, giving full details of facility emissions that can be used for statistical analysis. There has been a consistent pattern of around 125 downloads per month over the last seven months.

Table 6.1: Requests to NPI by month

Month	Reports requested	Entries to database (through the caveat acceptance)	Downloads of facility data	Hit rates (total web-page requests)
Jan 2000	6343	3300	163	66438
Feb	11083	2362	412	72987
Mar	6309	1234	114	30553
Apr	4101	1063	89	26801
May	6180	1433	151	36814
Jun	13149*	1005	121	36115
Jul	5412	887	101	29258
Aug	4695	1010	162	31477
Sep	5355	1074	135	36110
Average/ month	6958	1485	161	40728

* High figure for June is due to a set of nearly 8000 automatic enquiries from one source

Types of query

The pattern of queries has been fairly evenly spread between location, individual facility and substance queries.

Table 6.2: Query by type

Type of query	Min all queries in a month	Max all queries in a month
Location	25%	40%
Facility	20%	30%
Substance	25%	30%
Source	13%	16%

Substances queried

A snapshot of data requests over a few days after the launch (January 2000) found that the most common queries (in order of interest) were:

1	Carbon monoxide	8	Lead & compounds
2	Oxides of Nitrogen	9	Polycyclic aromatic hydrocarbons
3	Sulphur dioxide	10	Total Phosphorus
4	Benzene	11	Fluoride compounds
5	Total Nitrogen	12	Mercury & compounds

6	Arsenic & compounds	13	Toluene (methylbenzene)
7	Particulate Matter 10.0um		

Target group reports of usage

Feedback from the industry, NGO and community stakeholders interviewed for the review revealed that members of the target groups have been accessing the database, but their usage has been limited. Many commented that the partial reporting achieved in the first year has reduced the value of the data and constrained their use of the database.

Industry have accessed the database to:

- ▶ review company data;
- ▶ compare their performance against similar companies in the same sector;
- ▶ compare their performance against other industry sectors;
- ▶ obtain NPI documentation and other information;
- ▶ contrast industry information to aggregated emissions data; and,
- ▶ review extent of reporting.

Industry stakeholders who had reported also commented that the NPI was yet to generate the expected public requests for information.

Environmental organisations indicated that they had been monitoring the progress of the database and started to explore analytical options. In addition, they have begun to refer local community groups to the NPI as way of meeting local information needs about emissions.

6.3 Conclusions

The program has developed an effective and appropriate web site and data base which is capable of meeting the needs of the likely users.

The available data shows a steady pattern of use with a pattern of queries consistent with expectations. While these statistics do not provide an absolute measure of use, they provide a baseline for comparing future trends as the NPI database is more fully implemented. A more comprehensive assessment of usage in the future will require comparing usage data from the web with a survey of targeted users.

At this stage, the NPI Database is operating effectively and meeting most users' current needs for NPI data. The Commonwealth managers of the database indicate that the site will continue to be developed to meet the future needs of users, and continue to improve usability.

7 Likely benefits of the NPI Program

In the earlier sections of this report we have assessed the extent that the NPI has been implemented in terms of educating users and reporters (Section 4), making available quality data on emissions (Section 5) and providing appropriate access to this information (Section 6).

In this section we discuss the usefulness or potential usefulness of this information to government, community and industry users, from the perspective of these groups. We will also review the validity of the underlying assumption that providing publicly available information of emissions will encourage the adoption of cleaner production practices by industry, with reference to international experience. Lastly, we report the feedback from program managers and stakeholders on the perceived value of the program and the level of support for its continuation.

These assessments address in part, the Term of Reference 1: *The likely effectiveness of the program in light of its objectives.*

This section is based on interviews with stakeholders, evidence from a brief literature review and Commonwealth responses.

7.1 Usefulness of the information

The NPI Program's long-term objectives are to make available information on emissions that will be used by government, the public and industry:

- *to provide information to enhance and facilitate government policy formulation and decision making for environmental management and planning;*
- *to 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;*

At this stage in the NPI implementation, a direct assessment of usefulness cannot be made as the data in the NPI have limited applicability because of the small number of facilities required to report for the first year. Nevertheless, stakeholders were able to comment on the potential usefulness of the data.

A theme common to all stakeholder groups was the importance of data quality and the relationship between meaningfulness and data quality.

Stakeholders saw a significant role for the NPI if the data were of adequate quality, and this has been acknowledged by jurisdictions as an important issue. However the Commonwealth pointed out that all similar programs overseas have gone through "teething problems" with data accuracy and that accuracy improves with reporting experience and adoption of the best estimation techniques and/ development of appropriate emission factors.

Although environmental data on industry performance and emissions is collected by all the state/territory environmental agencies and by industry, stakeholders agreed that the NPI is unique. The NPI is the only national, comprehensive and publicly available source of emission data. Other sources are not able to provide the same data. For example, state/territory-licensing data is not readily accessible to the public, while company environment reports only provide specific information on a single company.

In general, stakeholders' opinions about the potential usefulness of the NPI data correlated with the nature of their business and interests. There are differences over the relevance and ease of understanding of the data.

NGOs

NGO stakeholders stated that the data are relevant and potentially useful but claimed that the program is limited in scope.

Stakeholders from the NGO sector suggested that program be broadened to include:

- ▶ emissions from transfer of materials;
- ▶ more substances,
- ▶ more sources, for example farming activities;
- ▶ more diffuse source data; and,
- ▶ agri-chemicals.

The data were seen as a powerful tool for local people, providing locally relevant information that could be used to influence the behaviour of companies operating in their community. There were three examples cited where NPI data have been used by local groups to campaign for reductions in emissions from local facilities. NGOs also saw potential for using the data to target poor environmental performers and influence government policy. The large NGO groups indicated that the data was easy to understand and interpret.

Industry

As the main contributors to the NPI as well as one of the main users, industry views focused on the usefulness of the data at the company level and to drive changes in environmental performance.

Industry expressed a range of views as to the usefulness of the data. Those industry sectors that were doubtful about its usefulness, said the data are:

- ▶ of limited relevance to the general public because they are not interpreted and cannot readily be translated into environmental impact;
- ▶ not readily understood and liable to be misused because the context is not fully explained and there is insufficient information on diffuse data;
- ▶ not all of environmental interest and that the number of sources should be reduced; and,
- ▶ of some use for tracking environmental performance but not for evaluating the effectiveness of industry specific environmental programs.

Industry sectors that indicated the data are potentially useful, said the data are:

- ▶ powerful motivators for improving environmental performance, especially for larger companies as industry are sensitive to public and shareholder interest in their actions;
- ▶ able to be used to demonstrate improved environmental performance to the public; and,
- ▶ useful to refine and improve production practices (see detailed discussion in 7.2).

Government

The NPI data was seen as very relevant to government. The potential uses for government identified by stakeholders included:

- ▶ meeting the public's right to know;
- ▶ identifying environmental hot spots;
- ▶ informing environmental policy by providing information on trends in emissions, gaps and comparisons across industry and to inform public opinion and ideally lead to improvements in the wider environment;
- ▶ informing local government planning decisions:

- ▶ contributing to state of the environment reporting; and,
- ▶ contributing to targeting clean production programs.

Stakeholders noted that the NPI cannot be expected to meet all its objectives as a stand-alone initiative but has the potential to become a major contributor to environmental policy.

7.2 Potential to contribute to the adoption of cleaner production practices

One of the assumptions of the NPI program is that publicly available and accurate information on emissions can contribute to cleaner production practices by industry. Its long-term policy objective is,

- *to promote and assist with the facilitation of waste minimisation and cleaner production programs and practices for industry, government, and the community.*

Clearly such changes will take a number of years to become apparent, and also be influenced by a range of other political, economic and environmental factors. In practice, it is far too early in the Australian situation to evaluate the validity of this assumption using local examples, although some have emerged as part of this review.

Local industry views

The potential for the NPI Program to encourage cleaner production practices in Australia appears to depend on the type of industry and to a lesser extent on the production processes of the facility.

For example, some industry sectors regarded the data as irrelevant and unlikely to add knowledge about their production practices. In short it was seen simply as a number crunching exercise. These sectors tended to already be involved in extensive environmental monitoring, either to meet license requirements or due to the nature of their business. They also indicated that there are other more powerful drivers of change in regards improvement in production practices, notably licensing requirements and economic considerations.

Other industry sectors recognised the potential for fine-tuning production practices, improving their knowledge of their industrial processes and the possibilities for reducing production costs. For example, a chemical manufacturer has already changed their production processes when the NPI audit identified the loss of valuable materials into the atmosphere.

On the other hand, for some there may be little potential to reduce certain emissions because the process involved is an essential component of their production and no alternative exists.

International experience

The United States, Canada, and a number of OECD countries have similar programs that have been operating for a sufficient number of years (since 1987 in the US) to assess the impact on industry practices. A brief literature review of the results obtained in these countries has been undertaken in order to ascertain what impact Australia might reasonably expect to see on cleaner industrial practices from the NPI in future years.

In the US, the total on- and off-site releases of Toxic Release Inventory (TRI) chemicals declined by 46% between 1988 and 1996. Reductions occurred for nearly every industrial sector and chemical. Chemicals designated as carcinogens declined by 51%, and ozone-depleting chemicals dropped by 95%. The public access to facility-specific information and the industry's interest in reducing inefficient use and demonstrating responsible citizenship were cited as crucial factors in obtaining these reductions. (From

Proceedings of the OECD International Conference on Pollutant Release and Transfer Registers (PRTRs), Tokyo, 1998).

There is also evidence that public access to site-specific and chemical-specific emissions information has allowed more focussed and well informed discussions to take place between individuals and local companies, which can result in great improvements. For example, a group of Minnesota residents used TRI data to pressure a local firm to reduce the use of a carcinogen by 90 percent (US EPA report on TRI).

The international experience shows that companies are often not aware of their emission rates until they are required to form estimates for programs such as NPI, and that this can alert them to areas of inefficient or wasteful practice. In some countries this information alone has spurred firms to cut this wastage, which has resulted in avoiding costs, increasing efficiency and reducing environmental harm simultaneously. (J. Waller-Hunter, Director, OECD Environmental Directorate, 1998). Some industries in the US are now publishing annual reports using their TRI data to demonstrate their responsible stewardship of environmental resources.

The public availability of emission data allows specific pollutants to be identified as a cause for concern. This can prompt the innovative development of new technologies aimed at these precise targets. The facility-specific reporting of the data also enables effective marketing of these cleaner options to the relevant industries. In this way, a National Pollution Inventory has the potential to enable the supply and demand for cleaner technologies to be matched without expensive and time-consuming intermediary processes such as government-sponsored programs and consultancy services (OECD Scoping Study on Uses of PRTR Data, 2000).

The effectiveness of using the TRI data for tracking emission rates over time and hence encouraging industry participation in voluntary programs for the reduction of harmful emissions has been demonstrated in the US by the success of the 33/50 program. This program, using the 1988 TRI data as a baseline, sought to achieve a 33% national reduction in releases and transfers of 17 chemicals by 1992 and a 50% reduction by 1995. Companies were invited to participate and to set their own goals. The 1995 goal was surpassed (55% reduction), and by 1996 TRI data on the 17 chemicals indicated a 60% reduction. Ongoing state and regional programs seeking to reduce emissions and using the TRI data to set benchmarks and track results are currently being linked via a homepage on the Internet, thus potentially increasing their effectiveness and influence.

An important factor in achieving genuine reductions in pollutants as a result of systems such as NPI is the inclusion of transfers. The exclusion of transfers from reporting requirements creates an incentive for reporting facilities to reduce reportable releases rather than total releases. If creating cleaner production practices by industry is seen as desirable, the reporting requirements must aim for data on total releases, including transfers, so that reductions are genuine and not merely on paper. (OECD Scoping Study, 2000).

The objectives of programs such as the NPI determine the type and form of the data collected, which in turn determines to a very large extent how that data can be used and therefore the impact it will have on such things as cleaner production practices by industry. The international experience indicates (a) the importance of collecting data on total emissions, including transfers, (b) the value of having the data used by individuals and local residents groups as a means for initiating informed dialogue with industry, and by the private sector for commercial and marketing purposes and (c) that many industries will use the data they collect to reassess their own best practice for waste reduction and efficiency, and that some will participate in voluntary emissions reduction programs, both of which will enhance their public standing as responsible users of environmental resources.

There is increasing interest in Pollution Release and Transfer Reporting (PRTR) internationally. For example, the IFCS agreed in October 2000 to a PRTR / Emission Inventory Action Plan which promotes establishment of PRTRs in all countries, urges that the reporting requirements of the various international environment agreements are linked to national PRTRs, and recognises the important contribution of the OECD in this area. Therefore, there is potential for the NPI program and other countries' pollutant emissions programs to benefit significantly from exchange of information through increased involvement in OECD and other relevant international activities. As well, Australia may be able to develop markets for its environmental management experts through contributing to assistance on establishing PRTRs in regional developing countries, for example through AusAID.

7.3 Stakeholder support for NPI

Stakeholders largely supported the continuation of the NPI Program, with the exception of particular industry sectors. These latter sectors saw no value for their businesses, and questioned the ability of the NPI Program to have an environmental impact and be of benefit to the community. They regarded the NPI Program as a financial "imposition" on their business. It was apparent that these industry sectors had not supported the establishment of the program and their views remained unchanged.

By contrast, other stakeholders regarded the program as a valuable and potentially powerful tool, if implemented as intended and funded adequately. Many industry sectors indicated that they were now quite comfortable with the program and committed to supporting it. Industry stakeholders commented that they could not quantify any return on investment at this stage, "it's too early". Many stakeholders also agreed that the program needs time to realise its potential, up to ten years and committed long term funding.

Stakeholders from all sectors commented that the value of the NPI Program would increase when integrated with other government programs with related objectives. Government and stakeholders from the NGO sector pointed out that the NPI Program will help fulfil Australia's international obligations in regard to protecting the environment.

7.4 Conclusions

The evidence from overseas and early evidence from this study indicate that the NPI Program has the potential to meet its objectives, if implemented effectively and given adequate funding to ensure that the data is as accurate as possible and coverage of industry and of diffuse emissions are comprehensive.

Appendices

Appendix 1 Key Informants Interviewed for Review

John	Allen	Newcrest Mining
Charles	Almond	BASF
Yoke	Berry	Illawarra Action Campaign
Brian	Beudeker	Ansett
Kirsten	Blair	NT Environment Centre
David	Bowman	Shell
Bill	Bourke	Qantas
Martin	Byrne	EA
John	Cameron	Australian Sugar Milling Council
Drew	Collins	NSW EPA
David	Coutts	Aluminium Council of Australia
Sue	Dawson	NSW NEPC member
John	Delaney	NT Dept lands, Planning and Environment
Vivienne	Filling	Australian Industry Group
Elizabeth	Fowler	ACT NEPC member
John	Gilmore	QLD NEPC member
Peter	Glazebrook	Rio Tinto
Phillip	Glyde	EA
Bob	Goreing	SA Chamber of Mines
Lauren	Gray	Australian Petroleum Production and Exploration Association
Michael	Hambrook	Australian Paint Manufacturers' Federation
Geoff	Harris	Australian Chemical Specialists Manufactures
Max	Harvey	SA NEPC member
Wes	Henstridge	Huntsman Chemicals
Phillip	Hine	WA EPA
Don	Horan	ACT- Dept of Urban Services
Kim	Isaacs	Minerals Council of Australia
Bryan	Jenkins	WA NEPC member
Judith	Johnson	EA, NPI Unit
Trisha	Kaye	EA - ERIN
Kathryn	Kelly	EA, NPI Unit
Brian	Koks	Pacific Air and Environment
Diane	Kotrotsos	SA Environment Protection Authority
Geoff	Latimer	Vic EPA
Nick	Lefebvre	MIM
Mariann	Lloyd-Smith	National Toxics Network
Mick	O'Keefe	Moranbah North Coal Pty Ltd
Mark	Oakwood	Greenpeace
Susan	Pennicuik	Australian Council of Trade Unions
John	Pinney	NT NEPC member
John	Quilligan	Shell
Tony	Richards	Sydney Water Corporation
Brian	Robinson	VIC NEPC member

Evaluation of the National Pollutant Inventory Program - Final Report

Matthew	Rochel	Greenpeace
Peter	Roe	BHP Coal
Harry	Schaap	Electricity Supply Assoc of Australia
Peter	Smith	NSW Minerals Council
Ian	Swan	Plastics and Chemicals Industry Association
Steve	Tatzenko	NT Dept Mines and Energy
Peter	Thorning	QLD Dept Environment
Matthew	Warren	AFGC
Adrienne	Williams	Cement Industry Federation
Barry	Windridge	Tas Dept Primary Industries, Water and the E
Robin	Wright	Newfield
Kristen	Zeise	Pacific Air and Environment