Department of the Environment and Heritage

Analysis of the financial costs of including transfers in the National Pollutant Inventory

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in association with

ECONOMIC ASSOCIATES PTY LTD

WASTE SOLUTIONS AUSTRALIA PTY LTD

CENTRE FOR SOCIAL RESPONSIBILITY IN MINING

Contents

Executive summary

This report presents information on the financial impacts of including transfers in the National Pollutant Inventory (NPI). A variation to the NPI National Environmental Protection Measure is in the developmental stage and consideration is being given to the inclusion of transfers.

The estimated costs associated with transfer reporting are provided in the table below. The estimated costs are derived from an industry survey that was conducted as part of this project. To provide some context on the expected financial impacts, the transfer reporting costs are presented along side the overall waste management costs, waste tracking costs and current NPI reporting costs. The average transfer reporting cost per reporting facility is $8,300 plus an additional first year set-up cost of $2,200. The median transfer reporting cost per reporting facility is $1,200 plus an additional first year set-up cost of $1,000.

	Cost components*							
	Staff – technical	Staff – admin, other	Equipment & consumables	Consultants	Service providers	Other	Total (average)	Total (median)
Overall waste management costs	$60,000	$36,000	$130,000	included in 'other'	$140,000 (waste contractors)	$58,000	$430,000	$50,000
Current waste tracking costs	$1,200	$1,300	$520	$540	$1,000 (analytical laboratory)	$80	$4,600	$900
Current NPI reporting costs	$1,700	$760	$300	$1,100	$1,100 (analytical laboratory)	$20	$4,900	$1,100
Estimated transfer reporting costs	$1,500	$1,500	$1,000	$1,400	$2,600 (analytical laboratory)	$220	$8,300	$1,200
Additional estimated transfer reporting set-up costs (first year)	-	-	-	-	-	-	$2,200	$1,000

*rounded to 2 significant digits

The median values represent the mid-point position where there are an equal number of higher and lower costs per facility. Further cost analysis is presented following the Background and Literature review summary.

Background

The proposed variation to include transfers would bring the NPI closer in line with international practices and it would broaden the information available to the community. The additional reporting would have associated costs for industry as well as government.

If transfers are included they may relate to operations such as:

- trade waste discharge to sewer;
- waste transport (eg vacuum truck) to a treatment plant, landfill or incinerator;
- wastewater irrigation;
- process waste discharge to a tailings dam, ash dam, landfill or other containment structure; and
- waste transfer for energy recovery, reuse, recycling or re-processing.

Detailed definitions for 'transfer' and 'transfer data' have been developed and the current plan is to apply the existing, material usage based thresholds (eg 10 tonnes of a Category 1 NPI substance) to waste transfer reporting and to include both offsite *and* onsite transfers.

The Department of the Environment and Heritage commissioned EECO Pty Ltd to conduct an analysis of the financial costs of including transfers in the NPI and the project utilised three main methods to estimate the financial impacts of transfer reporting: a literature review, an industry survey of current NPI reporters and case studies.

Literature review summary

A literature review was conducted to examine overseas experience with pollutant release and transfer registers (PRTRs). An extensive search of authoritative internet sites confirmed the following observation made by Dr Laura Altinger, United Nations Economic Commission for Europe, (UNECE) Economic Analysis Division:

> *"...surprisingly little research so far has gone into developing detailed cost estimates...only a handful of studies exist that provide estimates of the costs of pollutant release and transfer register (PRTR) reporting and these either have a relatively narrow focus or represent very rough estimates."*

Given the dearth of information on this topic, the scope of the literature review was broadened to place the limited available data in context.

The term 'cost' is deceptively simple. In essence there is no such thing as a single, readily identifiable, 'cost' of complying with environmental regulations. To estimate costs, either quantitatively or qualitatively, there should be an understanding of the basic reporting activities. A common basis for cost estimation (a detailed disaggregation of activities) is provided by the UNECE's standard description of reporter activities under the following main headings:

- determining reporting obligations on a preliminary basis
- performing calculations, measurements and estimations
- completing reports
- keeping records and filing
- confidentiality claims
- consultation
- notifying suppliers

For jurisdictional authorities, the Organisation for Economic Cooperation and Development (OECD) lists the following standard activities and required resources:

- developing, testing and implementing the PRTR system;
- software and hardware for the information management system including selection and testing;
- database development and maintenance or adapting a system currently in operation;
- training;
- preparing and distributing report forms – electronic distribution is likely to conserve resources;
- validation of incoming data (QA/QC);
- updating of data;
- modelling and statistical evaluation if a calculated component is included in the PRTR;
- analysing and interpreting data;
- data entry and any subsequent data handling;

- dissemination of outputs; and
- aiding the public (including the media) in interpreting the data.

An *Analysis of costs and benefits of pollutant release and transfer registers* (UNECE, 2002) was produced to assist and progress international implementation of expanded PRTRs. The analysis used both a qualitative approach to costs and benefits and a quantitative approach to costs, and built various plausible scenarios that captured a basic system, over time, for countries with different characteristics, as well as expansions to that system. Under the modelled scenarios, the average cost per facility in the first year was approximately US$29,000 and then fell to $17,000 in the second and third years. Modelled changes to the PRTR requirements, an expansion of the substances requiring reporting, increased the average cost per facility from about $17,000 to about $25,600 and a change in both substance expansion and inclusion of new activities resulted in an increase from about US$17,000 to $39,000. The scenarios illustrate that the first year costs have a 'set-up' component that subsequently dissipates and that changes to established PRTRs can have significant financial impacts. Even if the lower-end of US$17,000 is accepted as the average facility cost for this European model, it is significantly higher than Australian costs.

The cost of reporting to the Australian NPI has been compiled for several years. The current reporting form contains two optional questions under the heading *Resources incurred in completing this form*. Amounts can be provided for 'Personnel costs' and 'External costs (Consultants, analysis)'. For the 2004/05 reporting year, 37% of NPI reporters also provided their costs. The average cost was $2,900 and the median cost was $650. These costs are low in comparison with international PRTR reporting costs; approximately 28% of reporters responded that they incur a total cost of $200 or less.

A comparison of the median costs with the average costs shows a significant difference. This is due to some of the facilities being much higher than the median. For example, in one State for 2004/05, the top 3% of reporters incurred 50% of the State's total costs. The reporting burden is not evenly distributed across all reporting facilities.

The report *Review of the NPI* (Environment Link, April 2005) commented on the costs to industry for current NPI reporting; the comments included:

> Estimates from a limited number of larger companies & industry associations ranged between $2,000 and $60,000 per year.
>
> - The lower end costs were for report preparation based on estimation only, and with an established reporting system in place.
> - The higher end costs involved stack testing and monitoring, multiple sites and consultant fees.
> - NPI costs would have been incurred (in many cases) for other reporting requirements.
> - A plausible estimate of ongoing cost per annum per facility was $2,000 to $10,000.

The *Review of the NPI* also observed:

> *"For 23,000 (US) reporting facilities the reporting costs are approximately $US15,000 per facility for industry, and approximately US1,300 per facility for governments, a ratio of 11.5. For Australia, the comparative numbers are $3,000 AUD for industry, $640 for governments, and a ratio of 4.7."*

The *Review of the NPI* commented briefly on the notional costs government associated with the addition of transfers to the NPI, including:

> *"The cost of including transfers could be considerable. These would include costs for documentation, training costs for industry and jurisdictions, and costs for system changes. The total costs cannot be estimated with any degree of confidence because interdependence of various system changes and enhancements make it difficult to apportion costs.*
>
> *A cost in the vicinity of $200,000, excluding the costs of trials, is possible but this is indicative only, and assumes that existing state hazardous waste tracking systems can be adapted. An upper cost of $700,000 has been estimated by one jurisdiction and on this basis a cost of $500,000 is probably adequate for assessment purposes."*

A UN study (1998, UNITAR Series) quotes the cost to a USA facility which reported on 4 chemicals per year to comply with the US PRTR (the TRI or Toxics Release Inventory) regulations as being US$5,170 per chemical for the first year and half that in subsequent years (assuming that there were no changes to the legislation). A total cost of US$20,680 is incurred in the first year and US$10,340 per year thereafter. The TRI is complex and large (eg nearly 650 chemical compounds to potentially report as compared to the NPI's 90 substances) and this contributes to the costs to their industry and government.

A pilot project in Japan involved 1800 medium to large scale businesses, who were asked to provide information on releases into air, water, and soil and transfers as waste of 178 chemical substances. Business facilities in Japan reportedly handled, on average, the same number of target chemical substances as their counterparts in the U.S. and Canada. For the businesses, the PRTR system required the most time for investigating the chemical substances contained in the materials being handled, and incurred the greatest financial cost for analysis and measurement, but the average cost per facility in 1999 was determined to be only about 140,000 yen (US$2,400).

One of the difficulties in adopting overseas experience as a basis for predicting the outcome of potential changes to the NPI is the differences in systems and associated costs. The overseas literature is occasionally narrow in its focus and the studies may not be rigorous in following standard reporting activities (as described and recommended by the UNECE). The Australian system is unique in its implementation, operation and cost structure. Application of international experience to estimate financial impact is valuable, but this should be verified with as much independent, local data as possible.

Industry survey and case studies

An industry survey was conducted to obtain information directly from NPI reporters about the expected financial impacts of transfer reporting. Obtaining such 'grass roots' data was considered to be important as the literature review provided little usable data.

The survey questionnaire was designed to balance the need for information (quantity and quality) with the need to minimise the response time and effort. Previous experience suggested that if the survey was overly complex, it would not generate a good response rate. Additionally, given the tight timeframe of the project, the survey respondents could only be given about a week in which to respond. The survey aimed to be concise, well presented and non-intimidating.

In addition to information on transfers, the survey requested information on related topics such as waste management and current NPI reporting. This information was collected to enable better 'in-context' understanding of the expected costs and to allow comparisons of transfer reporting costs with existing costs.

The State NPI Teams emailed the survey to current NPI reporters in New South Wales (including the ACT), Queensland, South Australia and Western Australia. An approximate total of 1,400

questionnaires were sent and the responses were collected by the State NPI Teams and collated by the Queensland NPI Team.

The collated results were organised and analysed in a project-specific spreadsheet that was developed to produce the statistics and graphics for this report.

Seven national industry associations were contacted during the course of the survey. All industry associations were interested in the NPI transfer variation but none elected to complete a questionnaire as a representative composite of their membership. Comments were provided and they were similar to the comments provided by industry.

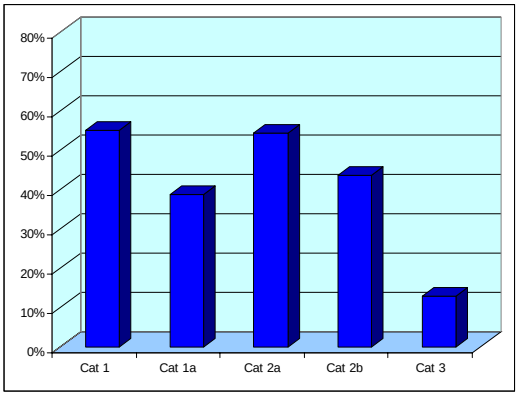
Four case studies were developed to augment the survey. The survey responses were combined to create amalgamated information and this helps ensure that the effect of an anomalous response is mitigated by the majority of responses. However, the combined information cannot represent the impact on an individual facility or industry sector. The case studies illustrate the step-by-step process of transfer reporting for various individual facilities. The transfer reporting tasks used the UNECE reporting activities as a starting point and these are described together with estimated costs. The case studies were developed through face-to-face interviews using the survey questionnaire and other documents to elicit consideration of the potential financial impact of NPI transfer reporting.

Results and discussion

The survey results are based on 140 responses. Two-thirds of the respondents were reporting for a single facility and the remaining one-third that reported for multiple facilities actually represents a far greater number of reporting facilities. If the questionnaire category '16+' is assumed to be 20, then the total number of facilities captured in the survey was 422.

The responses gave good representation for each of the participating States: NSW, QLD, SA and WA. National groups represented 9% of the total responses. The responses also represented a range of industry sectors. Although some States/Territories are not represented, this should not significantly affect the survey results with the possible exception of comments (if unique situations exist in those locations). The charts/graphs presented below were developed from the survey response data and their captions were derived from the survey questions.

Which NPI reporting thresholds are currently exceeded?



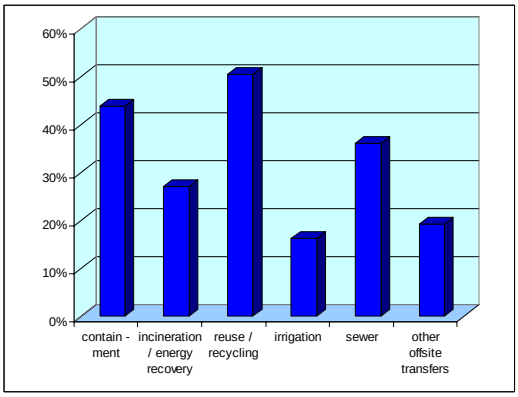
Many respondents triggered more than one category. Fifty-five percent of respondents exceeded a Category 1 threshold (eg use of 10 tonnes or more of NPI substances). Only thirteen percent of respondents exceeded a Category 3 threshold relating to total nitrogen or total phosphorus discharges to water, excluding groundwater. Transfers of nutrients (for irrigation or trade waste discharge) may capture a significant number of new reporting facilities in the areas of sewage treatment, food processing and agricultural manufacturing/processing.

The current preferred option for the transfer variation is to *not* require transfer reporting for substances that are only triggered by exceeding the thresholds for Category 2a or 2b for fuel combustion/electricity consumption. The transfer reporting costs may be slightly overestimated if the respondents considered reporting Category 2a or 2b substances.

Transporting waste offsite and using a waste tracking system are common activities for NPI reporters with two-thirds responding yes.

Proportion of respondents expecting to report offsite transfers

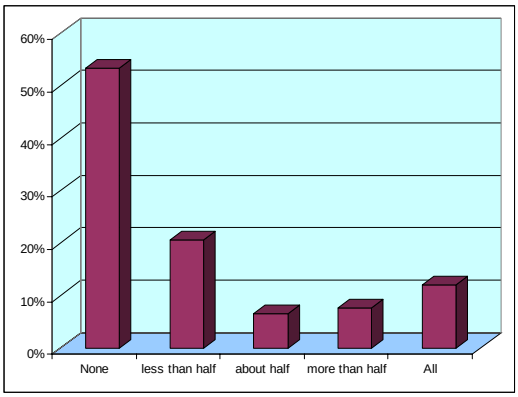
Respondents were asked what types of offsite transfers they expected to have to report. The response for *reuse or recycling* had the highest 'Yes' tally at 51%. All categories had a significant response. Several respondents expect to report transfers for more than one purpose. Respondents were also asked what types of transfers they expected to have to report *onsite*, and the overall proportions were lower than for offsite. The onsite *containment* category had the highest 'Yes' response at 29% and as a comparison offsite *containment* was higher at 44%.



Most States and Territories operate or are introducing waste tracking systems. A wide range of responses were provided for the number of tracked waste loads per year, with more than 30% below 20/yr and more than 40% above 100/yr. The number of waste types transported is also wide ranging with nearly 40% transporting 2 types or less and 30% at 6 types or more. This indicates a diversity of activities generating wastes.

What proportion of the tracked waste types are analysed?

Only 12% said that all of their tracked wastes are analysed, while 53% responded that none of the tracked wastes are analysed. This indicates that the data generated by the waste tracking systems could support transfer reporting, but could not replace it and still provide the same information. For example, a facility transferring waste under the waste classification code N190 – Filter Cake could compile and use the annual waste volume data, but the total annual mass of NPI substances is unlikely to be derived from the waste tracking certificates or similar on-line system.

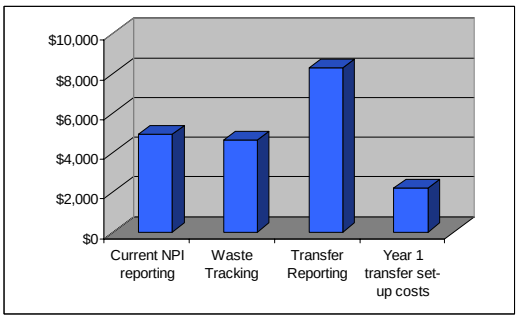


Waste tracking systems help ensure that each waste load is handled responsibly. The purpose of annual transfer reporting is more holistic and includes community right-to-know and recognition of waste management improvement opportunities. Because of the differences between waste tracking systems and transfer reporting, a full integration could compromise the desired outcomes. Nonetheless, partial integration would be an important future step to streamline the interrelated data requirements.

The following charts and discussion focus on the transfer reporting costs as estimated by the questionnaire respondents. Information on waste tracking costs and current NPI reporting costs are intended to provide some context with which to assess the transfer reporting estimates.

Average costs per facility

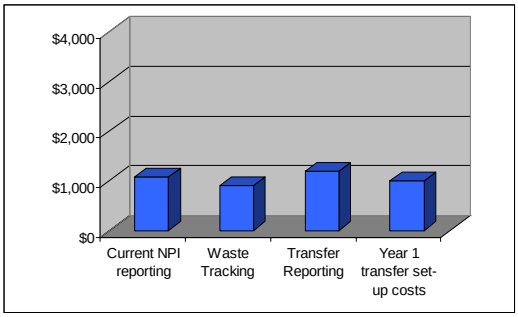
This chart shows the average cost per facility for their current NPI reporting ($4,900), waste tracking ($4,600), transfer reporting ($8,300) and transfer reporting set-up costs ($2,200).



These costs are dwarfed by the overall waste management costs of $430,000 which are in turn a subset of the facility's overall environmental management costs.

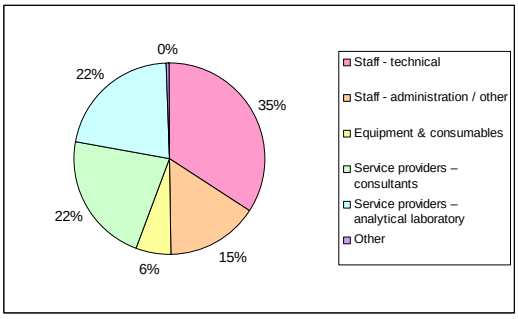
Median costs per facility

The median costs per facility are very closely aligned for the same four components shown in the above chart. The median values represent the mid-point position where there are an equal number of higher and lower costs per facility. The majority of facilities have costs below the average costs and thus these median values are lower than the averages. A smaller number of facilities have costs significantly higher than the average. The estimates for transfer reporting are similar in scale to the costs for current NPI reporting and waste tracking.



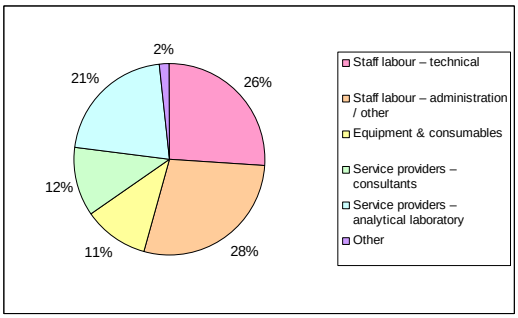
Current NPI reporting cost breakdown

This chart presents the cost breakdown for current NPI reporting. The main cost area at 35% is for technical staff. Consultants and analytical laboratory services are equal second at 22% followed by staff – administration/other and equipment/consumables. Costs under the heading 'other' are insignificant. A service or labour cost may not be exclusive to NPI reporting if it is also used for other purposes, such as NPI laboratory testing also being used for licensing requirements, thus proportioning can be difficult.

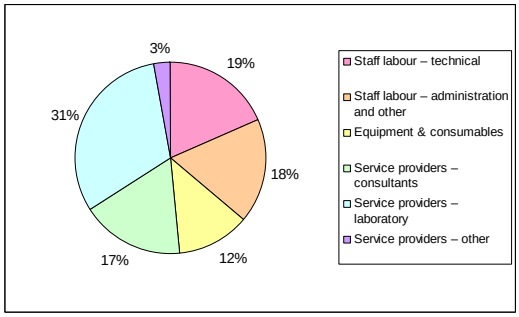


Waste tracking cost breakdown

The highest cost area for waste tracking is staff – administration/other, which may indicate that waste tracking tasks are conducted by the operational staff who supervise waste collection and/or by administrative staff for accounting and record-keeping. In general, the cost breakdown is similar to that for current NPI reporting.



Transfer reporting cost breakdown



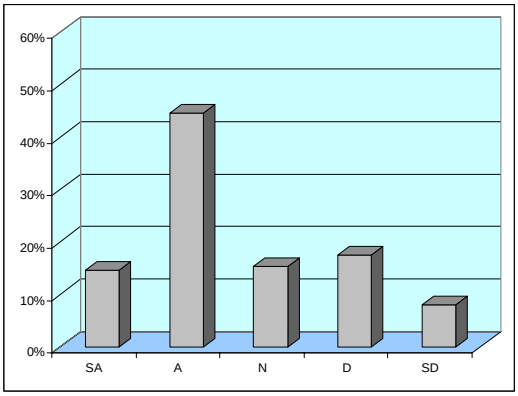
The expected cost breakdown for transfer reporting shows that respondents expect laboratory analyses to be the largest single cost. It is 10% more than the laboratory component for waste tracking or current NPI reporting (shown above). Governmental assistance efforts could focus on this area to reduce analytical costs through the provision of transfer factors to aid reporters. After wastes are characterised in the first year, analyses may become less essential and used mainly to test process changes or to check seasonal variations in waste composition.

The predicted cost of transfer reporting has been compared to the costs of current NPI reporting and waste tracking. Both the cost magnitude and the breakdown patterns indicate the similarity of the three tasks for most facilities. The facilities that would be most impacted are those that have several waste streams that have not been characterised for NPI substances. There would also be new reporters that trigger based on a Category 3 threshold for total nitrogen or phosphorus discharged to sewer or used for irrigation. Although the transition from a position of not needing to report could be viewed as a major financial impact, these facilities should have most of the required analytical data through the existing trade waste permits or irrigation licences.

The case study results provide an interesting comparison with the survey results. A notable aspect of the case studies' costs is that less emphasis is placed on the on-going annual costs and more emphasis is on the first year set-up activities such as regulatory requirement review, procedure development, data management system development and analytical testing for waste characterization. The on-going tasks include maintenance of each of the first year activities plus data gathering, training, reporting and quality assurance. On-going task costs also account for the possibility of staff turnover and process changes that affect the transfers. The major food processing facility case study shows a likely annual cost of $4,100 plus a first year set-up cost of $4,600. The major oil and gas extraction facility case study shows a likely annual cost of $5,500 plus a first year set-up cost of $7,000.

The level of governmental guidance would impact on industry costs and data quality. The following charts examine transfer issues and the importance of possible forms of guidance and assistance. The figure captions in this subsection contain the statements to which the respondent would select – strongly agree (SA), agree (A), neutral opinion (N), disagree (D), or strongly disagree (SD). For example, if a facility generated wastes for which the respondent had no idea whether it contained NPI substances, then they would select 'Strongly Disagree' for the statement *We can identify all waste that contains NPI substances.*

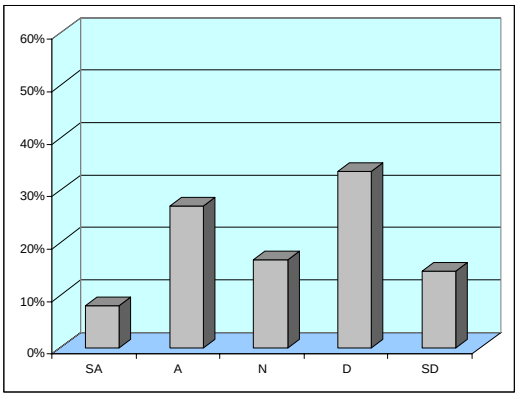
We can identify all waste that contain NPI substances



The chart shows some uncertainty about waste characteristics. Only 60% of respondents agreed or strongly agreed that they could identify all wastes containing NPI substances. This is an area where assistance could be made to industry sectors, possibly through the relevant industry associations, to classify the common process wastes as to their potential for containing NPI substances. Where the processes and wastes are consistent between facilities, a transfer 'factor' could be developed and applied for simplified estimation.

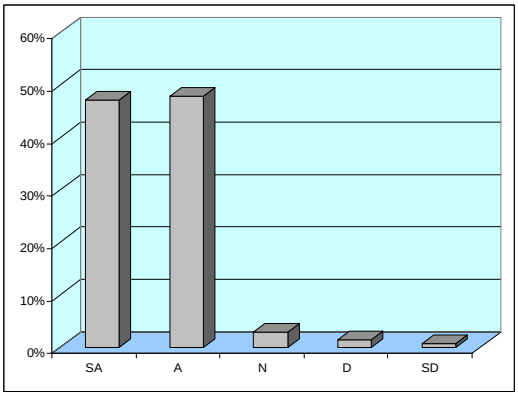
We know the proportion of NPI substances in our waste

This statement is a subset of the previous one. Even if the wastes containing NPI substances can be identified, transfer reporting would require knowledge of the proportion (concentration) of NPI substances in the waste. The response indicates that there is more 'disagreement' than for the previous statement, which is to be expected. Only about one-third of respondents agreed or strongly agreed that they knew the proportion of NPI substances in the waste. This is an area where site specific analyses may be required to characterise the waste in the first year.



Written guidelines / manuals about waste transfers would help with waste transfer reporting

The response to this statement is overwhelming – nearly all respondents either agree or strongly agree that written guidelines or manuals would be helpful, if not essential. Other types of potential assistance, such as ½ day training workshops, were also strongly supported.



Industry comments were invited on the last page of the questionnaire. The respondent had become familiarised with the transfer reporting subject matter through the previous questionnaire sections and could now express opinions outside the necessarily restrictive closed-question approach. The following excerpts are from the overall comments.

- It is difficult to separate and account for specific costs associated with waste tracking and waste transfer reporting. These costs are well integrated into our business and not categorised in this manner.
- In terms of assessing NPI substances, the substance may be a very small proportion of an overall large flow stream which, when coupled, would report a large emission via NPI even though the potential for harm from the substance due to its low proportion may be negligible. In addition, some substance may be in an inert state when transferred, even though an analysis may indicate it soley as an elemental form (which may not be inert). This may cause undue concern.
- All answers are estimates only as the timing didn't allow for accurate data collection across the nation.
- Would it be easier (and probably more accurate) if data was collected directly by NPI from waste transporters, or coalated by State EPAs from submitted waste transport certificates etc. I can not see the need for two reporting systems: waste tracking and NPI. Is there a more efficient approach to servicing community right to know about key wastes which are tracked through some state government systems?
- We still have a great concern that the NPI would be better to spend its time getting all companies to report the basic NPI information before getting into this level of detail. Currently many companies including government entities do not do even basic reporting to the NPI !!!!!!
- New record keeping, tracking and reporting procedures would need to be implemented to enable us to report waste transfers with any accuracy.

1. Project background

1.1 Project background

The National Environment Protection Council has commenced a variation process for the National Environment Protection (National Pollutant Inventory) Measure (NPI NEPM). The scope of the variation would include information on the transfer of NPI substances.

The transfer variation would bring the NPI closer in line with international practices and it would broaden the information available to the community. The additional reporting would have associated costs for industry as well as government.

A Technical Advisory Panel for the variation to the NPI NEPM developed the following definitions, which have been adopted for this study.

> **"transfer"** is the transport or movement, on-site or off-site, of substances contained in waste for:
> (a) containment;
> (b) destruction;
> (c) treatment which leads to
> (i) reuse, recycling or reprocessing;
> (ii) purification or partial purification;
> (iii) remediation; or
> (iv) immobilization.
> (d) energy recovery.
>
> It includes the transport or movement of substances contained in waste to a sewerage system. It does not include the transport or movement of substances contained in overburden, waste rock or uncontaminated soil or rock removed in construction or road building.

> **"transfer data"** for a substance, means an estimate of the amount of the substance transferred in a reporting period that identifies:
> (a) the type of transfer (for example, for containment, destruction, reuse, recycling or reprocessing, purification, remediation, immobilization or energy recovery);
> (b) the type and grade of containment or treatment, if applicable;
> (c) whether the transfer is on-site or off-site; and
> (d) the estimation technique used;

The Department of the Environment and Heritage (DEH) commissioned EECO Pty Ltd to investigate and report on the financial impact associated with the transfer variation. The DEH project brief is included in Appendix A.

2. Literature review

2.1 Introduction

The proposed variation would increase overall reporting costs and the focus of this literature review was to obtain evidence from international experience to help answer the core questions of this study, including: "What are the additional costs to reporters likely to be?"

An extensive search of authoritative internet sites confirmed the following observation made by Dr Laura Altinger (2005, Economic Affairs Officer, United Nations Economic Commission for Europe (UNECE) Economic Analysis Division) "*...surprisingly little research so far has gone into developing detailed cost estimates...only a handful of studies exist that provide estimates of the costs of PRTR reporting and these either have a relatively narrow focus or represent very rough estimates.*"

As a measure of the international acceptance of the above statement, the Geneva International Academic Network (RUIG-GIAN) awarded a grant to a joint UNECE – University of Geneva team lead by Dr Laura Altinger to develop a cost guide for implementation of the UNECE Protocol on Pollutant Release and Transfer Registers. The project reports are expected in 2006.

Given the dearth of information on this topic, the scope of the literature review was broadened to place the few data available in context. The review provides selected background information on: methodology, key events in the evolution of Pollutant Release and Transfer Registers (PRTRs); constraints on cost estimation; and examples of cost estimates from reliable international sources. By seeking information directly from NPI reporters (refer Section 3), this study may contribute to international knowledge regarding the cost to industry for PRTR reporting.

2.2 Methodologies used overseas

Investigations have been made into the costs of compliance with regulation changes. In 1999, the USEPA began an investigation into the cost to the paint manufacturing industry to comply with a proposed change that would reclassify certain paint wastes as hazardous wastes, thus requiring more stringent environmental management and regulatory reporting.

The methodology employed by the USEPA can be seen as a blueprint for conducting a financial analysis on the impact of regulatory change on industry. The USEPA conducted their investigation via the following steps:

1. research and preparation
2. developing a consultation register (about 100 facilities)
3. questionnaire development
4. survey, including follow-up
5. technical verification of the responses, including telephone and site visit follow-up
6. estimating burden and cost (facility and governmental)
7. reporting

The above methodology was similar to the one used by EECO to complete this report, however, there were some striking differences. Estimates of the cost to industry to respond to the USEPA survey were as follows:

- 1,200 questionnaires were distributed
  - It was estimated that, on average, each respondent took 28 hours to answer the questionnaire at a cost of US$1,184
- 100 letters were sent
  - It was estimated that, on average, each respondent took 6 hours attending to the letter at a cost of US$260
- 25 site visits were undertaken
  - It was estimated that, on average, the visit would cost each paint plant US$525

The many differences between the NPI transfer variation and the overseas regulatory systems limit the use of their reported dollar amounts or estimated industry burden (labour hours). If this NPI investigation asked respondents to spend anywhere near 28 hours to provide data, the response rate would be extremely poor. However, the methodologies and specific techniques employed to investigate the financial impact are quite valid and set a precedent for this NPI investigation.

2.3 Reporting activities

The term 'cost' is deceptively simple. In essence there is no such thing as a single, readily identifiable, 'cost' of complying with environmental regulations. To estimate costs, either quantitatively or qualitatively, there should be an understanding of the basic reporting activities. The UNECE (2002) noted that a facility's legal obligation to comply with PRTR regulations would be associated with a number of activities; each of these being a complex source of costs. The UNECE (2002) activities provide a common basis for cost estimation and the activities were:

Determining Reporting Obligations on a Preliminary Basis

Reporters must assess the quantities of listed toxic chemicals manufactured, processed or otherwise used at the facility. This requires approximate measurement, calculation or estimation of their emissions and transfers, using purchasing records or production data to make threshold determinations.

To assess whether they have compliance obligations, facilities must acquaint themselves with the compliance rules and compliance assessment software and to this end may need to attend training workshops organized by the regulator, contact the telephone helpline or study other guidance materials made available by the regulator.

The costs relate to labour inputs by engineers and technical staff to familiarize themselves with the definitions, exemptions and threshold requirements under a PRTR programme, including attending workshops, studying the guidance materials and making enquiries, to review the list of chemicals and to conduct a preliminary assessment of reporting requirements.

These costs are imposed on facilities that would not necessarily report under the system if, after performing this task, they established that they were not exceeding the set threshold.

Generally, companies could be expected to already have an approximate idea of whether they are using, releasing or transferring the listed substances, and, if so, in what approximate quantities.

Therefore in many cases, the task of determining whether there is an obligation to report should not be too onerous.

Performing Calculations, Measurements and Estimations

Reporting requires the facility to perform in-depth measurement, calculation or estimation of emissions or transfers. The facility must also validate these determinations. Measurement involves actual monitoring of a substance, at the facility, via a given discharge route. This can involve either continuous measurement or short-term spot measurements. Calculations are based on data gathered at the facility and may be derived through a mass-balance approach. Finally, estimations are based on more generic data, derived from similar facilities or processes and are based on the use of emission factors.

The costs of this activity depend on which method is used to assess emissions and transfers and on the specific chemicals that need to be evaluated. The cost of this task encompasses the labour inputs required to search data sources, to perform detailed measurements, calculations or estimations in order to assess the legal reporting obligations under the instrument, to review this information and to report the data for submission to the regulator. These costs are recurrent but could be expected to reduce over time with experience.

The costs of this task might not be fully attributable to a PRTR, since most firms may perform many of the required measurements, calculations or estimations to comply with other legislation or for their own internal purposes.

Completing Reports

The costs of filling in and submitting the PRTR reporting form are likely to involve small labour inputs to transcribe data to the form and submit it. Subsequently, the facility may incur costs associated with audits or other similar reviews of the reporting process.

Keeping Records and Filing

Reporting facilities are typically required to maintain records for a specified number of years. This means that they may need to file documents, calculations and other information used to prepare their submissions, such as prior years' data, inventory data and purchase records, process diagrams that indicate releases and waste management activities, monitoring records, flowmeter data, and manufacturer's estimates of efficiencies, worksheets, engineering calculations and other notes.

The cost of this activity involves mainly labour costs to organize the filing system and progressively supplement it with the correct documents. Materials inputs would be likely to include filing materials, computers and office furniture. Such costs are expected to be negligible.

Confidentiality Claims

During the reporting process, a facility might establish that making some information required by a PRTR public may cause commercial harm. In this case, it will need to apply for a specific portion of the information it submits to the regulator to remain barred from public access. The facility must substantiate this. Where such cases arise, the costs of such a burden can be quite substantial.

Participation in the Consultation Process

Facilities may also request an exemption such as changes to either add or delete a chemical from the substance list. This would entail collecting information that purported to prove that the chemical meets or does not meet the criteria for inclusion in the list. This can be an expensive task for a facility, as it would likely involve a literature search and compilation and presentation

of the finding to the regulator. Mostly, scientific labour inputs would be required for this activity. On the other hand, this represents an opportunity rather than an obligation for a company.

Possibly Notifying Suppliers in the Supply Chain

Suppliers of facilities may (under other codes) be required to develop and distribute a notice if the mixtures or the trade-name products that they manufacture or process, and subsequently distribute, contain listed toxic chemicals.

This task includes the time required to inform customers, either by letter or through a pre-determined reporting form.

Extracts from the Japanese Environmental Accounting Guidelines, (2005, Ministry of the Environment, Appendix D) also serve to illustrate that costs emanate from more than one source.

For jurisdictional authorities, the OECD Guide (1996) lists the following activities and required resources:

- Developing, testing and implementing the PRTR system;
- Software and hardware for the information management system including selection and testing;
- Database development and maintenance or adapting a system currently in operation;
- Training;
- Preparing and distributing report forms – electronic distribution is likely to conserve resources;
- Validation of incoming data (QA/QC);
- Updating of data;
- Modelling and statistical evaluation if a calculated component is included in the PRTR;
- Analysing and interpreting data;
- Data entry and any subsequent data handling;
- Dissemination of outputs; and
- Aiding the public (including the media) in interpreting the data.

2.4 Definitions

The OECD Guide (1996) emphasized the need to have clear definitions when establishing (or changing) a PRTR. Such definitions are not always applied rigidly and this contributes to the difficulty in predicting costs of compliance.

The OECD Guide also elaborated on the meaning of the terms 'disposal' and 'recovery' operations. Given the variety of operations under these umbrella terms it would be extremely difficult to match predicted costs, for any category of facilities, with any precision.

Disposal Operations

- Deposit into or onto land (e.g. landfill)
- Land treatment (e.g. biodegradation of liquid or sludgy discards in soils)
- Deep injection (e.g. injection of pumpable discards into wells, salt domes or naturally occurring repositories)

- Surface impoundment (e.g. placement of liquid or sludge discards into pits, ponds or lagoons)
- Specially engineered landfill (e.g. placement into lined discrete cells which are capped and isolated from one another and the environment)
- Release into a water body except seas/oceans
- Release into seas/oceans including sea-bed insertion
- Biological treatment not specified elsewhere in this annex which results in final compounds or mixtures which are discarded by means of any of the operations specified in this part
- Physico-chemical treatment not specified elsewhere in this annex which results in final compounds or mixtures which are discarded by means of any of the operations specified in this part (e.g. evaporation, drying, calcination, neutralization, precipitation)
- Incineration on land
- Incineration at sea
- Permanent storage (e.g. emplacement of containers in a mine)
- Blending or mixing prior to submission to any of the operations specified in this part
- Repackaging prior to submission to any of the operations specified in this part
- Storage pending any of the operations specified in this part

Recovery Operations

- Use as a fuel (other than in direct incineration) or other means to generate energy
- Solvent reclamation/regeneration
- Recycling/reclamation of organic substances which are not used as solvents
- Recycling/reclamation of metals and metal compounds
- Recycling/reclamation of other inorganic materials
- Regeneration of acids or bases
- Recovery of components used for pollution abatement
- Recovery of components from catalysts
- Used oil re-refining or other reuses of previously used oil
- Land treatment resulting in benefit to agriculture or ecological improvement
- Uses of residual materials obtained from any of the recovery operations specified above in this part
- Exchange of wastes for submission to any of the recovery operations specified above in this part
- Accumulation of material intended for any operation specified in this part

Definitions agreed to at the Aarhus Convention are given in Appendix D. The OECD Guide (1996) provided the following example of the importance of proper definitions relating to double counting of substances.

Double counting could occur, for example, if lead and zinc in electric arc furnace steel-making dusts were lumped into the total quantity of materials classed as "wastes" by the steelmaker, but were later recycled by another firm which in turn reported releases of lead and zinc emissions to air and/or solid waste. In this case, nearly 300 kg of lead and zinc per tonne of furnace dusts would be reported to the PRTR by the steelmaker while the recycler might report a further 15 to 30 kg of these metals as released. In reality, after the recycling process, between 270 to 285 kg of lead and zinc per tonne of furnace dusts would have been reconverted to saleable metals. A proper PRTR accounting for the entire situation would be a report by the steelmaker indicating transfer of the recyclable amounts plus unrecyclable wastes. The recycling facility would report actual releases and quantity of material sent to final disposal. And the total reported to PRTR, by both steelmaker and recycler, should not exceed total steel-making dust quantity less recycled

content plus any additional releases from the recycling process. This example illustrates the importance of having good clear definitions which help to minimise double counting.

2.5 Cost estimate examples for environmental reporting

The future costs likely to be incurred by compliance with changes to environmental reporting regulations can be predicted by models. These would be based on a set of assumptions and knowledge of past costs that arose from compliance with previous regulatory legislation. However, "*Retrospective empirical analysis is difficult, and expensive. More to the point, it requires relatively free access to company financial information of the sort that regulated entities are not likely to provide voluntarily*" (McGarity & Ruttenberg, 2002). It is not surprising that such models have not been undertaken.

Additionally, *"Environmental economics is a new discipline and experience in a number of Western countries shows that – even where there is a surfeit of PhD economists –estimates of economic impacts of regulation on business often far exceed the actual costs."* United Nations Environment Programme (UNEP, 2004)

2.5.1 UNECE analysis model

In 2005 the European Union (EU), to comply with the Kiev agreement, and the Aarhus Convention Protocol, (Appendix D) agreed to expand their EPER to include offsite transfers of waste, and offsite transfer of pollutants in wastewater (as well as including releases from diffuse sources, e.g. road traffic and domestic heating). The new EU Regulation created the European Pollutant Release and Transfer Register (E-PRTR). This is being implemented now with Member States being required to deliver their first reports by 2009 (for the reporting year 2007), and annually thereafter.

A comprehensive, and authoritative, source of information concerning the cost burden imposed by PRTR reporting regulations was an *Analysis of costs and benefits of pollutant release and transfer registers* prepared by the UNECE Economic Analysis Division (2002). Its purpose was to assist the Working Group on PRTRs (established after the Aarhus Convention) in their discussions and progress towards international implementation of expanded PRTRs.

The model was developed to assist the Working Group on implementation of PRTRs to decide, amongst other things, what the possible cost to industry would be of adding 'offsite transfers of waste and pollutants' to the existing PRTR (which applied to only a the early members of the EU and not too the much enlarged EU). This model is then highly relevant to the Australian situation.

The modelers (who were also constrained by budgetary and time issues) built the additional costs (for offsite transfers) into '*the overall burden on stakeholders*'. It was deemed too difficult to separate out potential costs of just one aspect of environmental reporting.

The estimates provided by the model therefore include transfer costs. The change (addition of 20 chemicals) could be used as an indication of the effect of an additional burden (such as transfer costs). It would need to be used with caution: perhaps taken as an upper estimate of the additional costs.

It should be noted that 68% of companies in the UK do not bother to estimate the cost of environmental reporting (DEFRA study): presumably the cost of doing so would not make the exercise worthwhile. Whilst government agencies might like to gather and collate such data, the data might, simply, not exist. In such circumstance use of economic models is the only option to estimate costs. As the UNECE modelers point out '*Estimates are likely to be overestimates of real costs*'.

The analysis used both a qualitative approach to costs and benefits and a quantitative approach to costs, and built various plausible scenarios that captured a basic system, over time, for countries with different characteristics, as well as expansions to that system.

The 'Analysis' was prefaced with a statement of limitations:

- the short time frame for completing the work
- the limited amount of information received in response to a questionnaire
- the lack of a budget for detailed research
- the small number of simplified scenarios selected from a theoretically enormous array of permutations
- the difficulty in deciding what constituted a 'baseline' in terms of a pre-existing regulatory framework

Consequently, the study was only intended to be used as general guidance.

The model incorporated several types of economies but only the Advanced Market Economy is considered to be pertinent to the Australian context. Key elements for this sub-model were:

Basic Inclusions

- Annual reporting
- Off-site transfers
- Multi-media Instrument
- Reporting forms would be submitted electronically
- Data validation would be minimal

Disclaimers were:

- It was not possible to map the list of substances, or the activities/facilities, covered by the instrument to the exact number of facilities that would be reporting.
- It was therefore not possible to estimate exact costs.
- The model did not differentiate the costs of off-site transfers individually but included them in the overall burdens on stakeholders.
- Estimates (from the model) are likely to be overestimates of real costs.

Scenarios

- The scale of reporting was set at three levels
  - Small: 500 facilities
  - Medium: 2,000 facilities
  - Large: 8,000 facilities
- Reporting was modelled to run for three years and then one of two changes imposed:
  - **Change 1**: 20% increase in the number of substances reported per facility
  - **Change 2**: change 1 plus a 20% expansion of the number of facilities reporting

Cost estimates from the UNECE Model are presented in the table below. Year '0' costs are start-up costs in the first year of reporting. The increase in 'Year 3' costs is reflects expansion of the PRTR requirements.

Table 2.1 Cost estimates from the UNECE model

Scenario	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
500	28,702	16,325	17,190	18,077	18,987	19,917
2000	28,686	16,304	17,167	18,054	18,961	19,889
8000	28,671	16,291	17,154	18,039	18,945	19,872
Change 1	28,683	16,304	17,167	25,598	26,990	28,428
Change 2	28,683	16,304	17,167	39,068	32,388	34,113

Under these scenarios the average cost per facility in the first year were about US$29,000 and fell to $17,000 in the second and third years.

Changes to the PRTR requirements increased the average cost per facility from about $17,000 to about $25,600 (expansion in the number of substances to be reported) or from about US$17,000 to $39,000 (both substance and activity expansion). These predictions suggest that an increase the number of substances reported per facility (Change 1) increased costs less than an increase in the number of facilities required to report (about US$8,000 compared with about US$14,000). This should be treated with caution. Effectively, the model predicted that these higher costs would not diminish substantially in years 4 and 5.

The model also indicated that by far the largest cost component is the one borne by the private sector. Regulators typically bear a small fraction of the system's costs.

Explanatory notes provided with the model are presented in Appendix D.

2.5.2 USEPA cost estimates

Another authoritative source of estimates was the USEPA. This organisation gathers information about the cost to business of PRTR compliance.

In 2003 estimates of average annual total cost per facility were:

- Compliance Determination Only: $183
- Compliance Determination and 1 form: $2,757
- Compliance Determination, 1 form and Supplier Notification: $3,467

Estimates in 2005 averaged costs over submission of three forms, and further partitioned costs according to whether Persistent Bio-accumulative Toxic Substances (PBTs) were involved.

Estimates of average annual total cost per facility were:

- Compliance Determination only: $187
- Compliance Determination and 3 forms – PBTs: $7,251
- Compliance Determination and 3 forms – Non-PBTs: $4,229
- Compliance Determination and 3 forms and Supplier Notification –PBTs: $7,966
- Compliance Determination and 3 forms and Supplier Notification – Non-PBTs: $4,944

2.5.3 Small business cost impacts

An assessment of the impact of compliance costs for small firms in the USA (Crain, 2005) claimed that the total compliance costs imposed by environmental legislation across all businesses amounted to US$144 billion (2004): and for other reporters the total cost was US$77 billion.

When expressed as costs (to small business) per employee the average for all firms was US$1,249.

For small, medium and large businesses the annual cost per employee was:

- <20 employees US$3,296
- 20-499 employees US$1,040
- 500+ employees US$710

Information concerning the possible or actual additional cost of adding transfers to PRTR reporting requirements does not exist. The data on total costs can be used as an indication of the relative cost burden to industry. If the total cost of reporting to PRTR, for a company, is insignificant then any additional burden could be assumed to be insignificant too.

2.5.4 Japanese PRTR pilot trial

The PRTR Pilot Project in Japan was initiated in June 1997. The aim of the project was to test out the process of cataloguing releases and transfers of potentially harmful chemicals. This was the first ever attempt to catalogue such information in Japan and comments were solicited from all levels of society through the end of June 1998, and the project evaluated in 1999.

The target areas of the study were Kawasaki City, another area in Kanagawa Prefecture and an industrial area near Nagoya. About 1800 medium-to large- scale business establishments in these areas were asked to provide information on releases into air, water, and soil and transfers as waste of 178 chemical substances deemed harmful. The response rate was 52%, of which 53% reported they were handling "target chemical substances." Bigger companies were more likely to respond and also more likely to report the release and transfer of the substances.

Business facilities in Japan handled, on average, the same number of target chemical substances as their counterparts in the U.S. and Canada. For the businesses, the PRTR system required the most time at the beginning for investigating the chemical substances contained in the products being handled, and incurred the greatest financial cost for analysis and measurement, but the average cost per facility was only about 140,000 yen (US$2,400).

2.5.5 NPI Review cost estimates

Comments on the cost associated with the addition of transfers to the NPI were made in the report for the *Review of the NPI* (Environment Link, April 2005), including:

The cost of including transfers could be considerable. These would include costs for documentation, training costs for industry and jurisdictions, and costs for system changes. The total costs cannot be

estimated with any degree of confidence because interdependence of various system changes and enhancements make it difficult to apportion costs. Changes and enhancements to NPI systems are for example necessary to cater for increased computer traffic (increased access for various uses, and for increased reporting), developing and testing a web based reporting tool and improving the efficiency and robustness of data handling and data transfers.

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

The *Review of the NPI* commented on the costs to industry for current NPI reporting; the comments included:

> Estimates from a limited number of larger companies & industry associations ranged between $2,000 and $60,000 per year.
>
> - The lower end costs were for report preparation based on estimation only, and with an established reporting system in place.
> - The higher end costs involved stack testing and monitoring, multiple sites and consultant fees.
> - NPI costs would have been incurred (in many cases) for other reporting requirements.
> - A plausible estimate of ongoing cost per annum per facility was $2,000 to $10,000.

For 23,000 (US) reporting facilities the reporting costs are approximately $US15,000 per facility for industry, and approximately $US1,300 per facility for governments, a ratio of 11.5. For Australia, the comparative numbers are $3,000 AUD for industry, $640 for governments, and a ratio of 4.7.

2.5.6 UNITAR cost estimate

A UN study (1998, UNITAR Series) quotes the cost to a USA facility which reported on 4 chemicals per year to comply with environmental TRI (Toxics Release Inventory) regulations would spend US$5,170 per chemical for the first year and half that in subsequent years (assuming that there were no changes to the legislation). A total cost of US$20,680 per facility in the first year and US$10,340 per year thereafter.

2.6 Waste tracking systems

The proposed transfer variation has some overlap with the State-administered waste tracking systems. The two regulatory activities are similar in that they both include the collection of data (waste volumes, waste description) on the transfer of waste.

A key objective of waste tracking is to help ensure that the parties involved all take a responsible waste management approach for each load. Being primarily an annual event, NPI transfer reporting is more aligned towards the big picture issues, such as providing community right-to-know data and considering whether the transfer represents the best option according to the waste management hierarchy.

While both systems monitor waste volumes, a fundamental difference is that the waste tracking systems use waste classification codes, derived from the Movement of Controlled Waste between States and Territories NEPM. The NPI transfer is not as concerned with the waste classification as it is the annual mass of NPI substances – an aspect that the tracking system cannot provide.

The systems employed by the different States are not fully aligned. Trackable wastes are also called controlled wastes, regulated wastes and prescribed wastes. There are small differences in the operational aspects as well as the relationship between generator, transporter, receiver and government. Nonetheless, all of the State systems have a similar main goal – to prevent the improper disposal of wastes.

The full integration of transfer reporting and waste tracking into one system would be difficult. The 'waste type' that is reported to the NPI could utilise the waste classification codes where appropriate, but confining the nomination of waste type to only waste classification codes would be problematic as the codes were not designed for the range of wastes transferred.

Some wastes that require tracking could be assessed on an aggregated basis. Contaminated soils are tracked and in general, the volumes and NPI substance concentrations would be available to the State environmental agency. Only the very massive remediation projects would trigger the 10 tonne category 1 threshold. However, an aggregated response would capture the bulk of contaminated soil transfers. Data quality and cost efficiency may both be enhanced by a more central compiling of data and reporting of contaminated soil transfers.

2.7 Costs of NPI reporting

The cost of reporting to the NPI has been compiled for several years. The current reporting forms contain two optional questions under the heading of 'Resources incurred in completing this form'. Amounts can be provided for 'Personnel costs' and 'External costs (Consultants, analysis)'. About 37% of reporters provided amounts for 2004/05. A summary of this data is presented in Table 2.2.

Table 2.2 NPI reporting facility costs reported across Australia

Year	Average cost ($)	Median cost ($)	$200 or below	$1000 or below	$10,000 or below	Above $10,000	Average substances per report
1998/99	6,507	250	44%	69%	87%	13%	5.8
1999/00	3,901	667	24%	63%	92%	8%	8.4
2000/01	3,437	320	29%	63%	94%	6%	9.1
2001/02	2,442	500	37%	66%	96%	4%	11.6
2002/03	2,489	600	26%	61%	95%	5%	10.6
2003/04	2,897	700	28%	61%	94%	6%	10.3
2004/05	2,895	650	28%	65%	96%	4%	10.0
Overall	$3,139	$600	28%	63%	94%	6%	n/a

The median costs are low in comparison with international PRTR reporting costs. Approximately 28% of reporters responded that they incur a total of $200 or less. This is less than the US estimate for firms determining whether they even need to report (US$187). The

US costs reflect the more difficult regulatory requirements and more cumbersome reporting (approximately 650 chemical compounds as opposed to 90 substances under the NPI).

Considering the standard activities required to report (refer Section 2.3), these low-cost responses must either be for very simple situations (eg emissions from a natural gas fired boiler) or the costs are being under-estimated. A contribution to the latter possibility may be associated with the way respondents estimate costs. For cost estimation purposes, companies may place a multiplier on the base salary of employees to cover overheads, expenses and profit. Individual respondents may merely multiply their base salary times the hours they spent completing the form. Also, time spent over the course of the year gathering data or reviewing NPI manuals/guidelines may be omitted, and only the time taken to fill in the form included.

A comparison of the median costs with the average costs shows a significant difference. This is due to some of the facilities being much higher than the median. For example for 2004/05, the average of the highest 10 costs from each of the five major jurisdictions (fifty facilities) is $28,000. In one State for 2004/05, the highest cost 3% of reporters incurred 50% of the State's total costs. This polarised cost structure would be difficult to model.

Table 2.2 also reinforces a finding of overseas research that in the second year of a program, the costs drop dramatically. This trend would be expected in the second year of transfer reporting.

3. Survey background

Cost estimates may be developed by constructing a model to represent the stakeholders and their relevant activities. Costs can then be assigned based on labour or capital expenditure. The UNECE analysis model (Section 2.6) is one such example. This approach relies on assumptions and cannot explore the true complexity of the activities or their costs. The purpose of the survey was to provide some actual, empirical industry data that can be used to counter-balance the cost estimates and other data from the literature review and case studies.

3.1 Survey development

The survey was undertaken to obtain information directly from NPI reporters about the expected financial impacts of the proposed transfer variation.

The survey form was designed to balance the need for information (quantity and quality) with the need to minimise the response time and effort. Previous experience suggested that if the survey took too long to complete, it would not generate a good response rate. Additionally, given the limited timeframe of the project, the survey respondents were given about a week in which to respond. Therefore, the survey form had to be concise, well presented and non-intimidating. To achieve this, the survey form was designed so that:

- it could be completed on the respondent's computer, in MS Word®, and returned by email.
- it included a short background section, simple instructions and contact details for help.
- most responses simply required 'mouse clicking' to select an answer from a check box or a drop down list.
- where possible, options to skip sections that were not applicable were provided.
- a few responses required direct data entry and these were all site specific – e.g. the site name and products manufactured.
- an opportunity was provided at the form's end for comments, notes and suggestions.

Rather than just ask about the expected costs of transfer reporting, the survey included related information on topics such as current waste generation and current costs associated with waste management and NPI reporting. This information was collected to enable better 'in-context' understanding of the expected costs of transfer reporting and to allow comparisons with existing costs and comparisons between responses. A copy of the survey questionnaire is provided in Appendix C. It consists of 33 questions grouped into nine sections. The sections and their purpose are shown in Table 3.1.

Table 3.1 Questionnaire structure and purpose

Section	Information requested	Purpose
1. Facility Details.	Facility name(s), location(s), industry type and size.	To identify the facility(s) that the response is for and allow classification.
2. Production and wastes.	Product production, waste production quantities and costs (categorised) and waste management costs (categorised).	To provide a background for comparison with estimated NPI transfer costs.

Section	Information requested	Purpose
3. Current NPI reporting.	NPI reporting thresholds triggered, costs of NPI reporting (categorised).	
4. Current waste tracking details.	Quantities of wastes tracked, costs of waste tracking (categorised).	
5. Current waste transfers.	Quantities of off-site and on-site transfers (categorised).	To enable cross comparison of estimated costs between responses (based on categorised waste quantities) and to allow comparison with literature values.
6. NPI substances in waste transfers.	Opinions on the current level of understanding of NPI substances in waste transfers and if / how this level of understanding needs to be improved.	To estimate how the current level of understanding may affect costs – especially in the initial year(s) of implementation.
7. Activities and costs associated with reporting waste transfers to the NPI.	Whether or not the facility is likely to have to report transfers. If so, which types of transfers and what the expected costs are (ongoing and initial year).	To provide facility based estimates of the costs of implementing waste transfer reporting with enough supporting data on types of reporting to compare results between facilities and with literature data.
8. Guidance and concerns.	Opinions on the level of help required with implementing waste transfer reporting and the importance of related issues.	To help identify the support that industry would need for implementation of waste transfer reporting.
9. Comments, notes and suggestions.	Other relevant information.	To allow respondents to make additional comments unrestricted by the questionnaire structure.

3.2 Conducting the survey

Originally it was intended that approximately 100 questionnaires would be sent out as part of a survey targeted at representative industry classes and waste-stream generators. However, in discussions with representatives from the DEH Project Team, it was agreed that the State NPI Teams would assist in sending the survey to a wider audience. The State NPI Teams had existing registers of NPI reporter email addresses.

State environmental agencies emailed the survey to current NPI reporters in New South Wales (including the Australian Capital Territory), Queensland, South Australia and Western Australia. Approximately 1,400 questionnaires were sent on 30 March and 31 March. Most of the 140 responses were received by the due date of 06 April 2006; many late responses were included in the analysis. The apparent 10% response rate was actually higher as some national reporters received multiple emails but responded once. These responses were collected by the State NPI Teams and collated by the Queensland NPI Team. The survey forms were designed so that the data in them could easily be loaded into MS Excel® for analysis and the Queensland NPI Team undertook most of this work.

3.3 Analysis of the survey responses

The collated results were organised and analysed in a project-specific spreadsheet that was developed to produce the statistics and graphics for this report. The spreadsheet was broadly divided into four sections as shown in Table 3.2. The first section was used to screen and verify the survey responses, the second section was use to calculate the proportions of response types to each of the questions, the third section was used to present graphical outputs and the fourth section was for administration.

Within each section, separate worksheets were used for storing data and calculations. Within these worksheets the questions follow the order of the questions in the original survey questionnaire. However, for ease of display the worksheets relating to survey analysis (Spreadsheet section 2) and graphics (Spreadsheet section 3) were divided into three separate worksheets based on question format:

1. 'Yes-No' questions
2. 'Drop Down List' questions and
3. 'Strongly Agree to Strongly Disagree' questions.

Table 3.2 Spreadsheet structure and purpose

Section	Spreadsheet	Purpose
1. Survey Responses	Original	Uploaded data is stored as originally submitted. Section includes an administrative section that identifies the response file and the person who entered the data into the spreadsheet. Includes an option for selecting whether to use the response or not and a reason (drop down list) for this decision.
	Screened	Responses that are chosen for use are manually copied to and stored in this worksheet. If changes need to be made to the data they are done manually in this sheet and the changes are highlighted.
	Screened-Check	This worksheet provides a simple check of the numbers of responses to each of the questions. Questions with the right number of responses are highlighted green. Questions with too many (eg both Yes and No) or too few responses are highlighted orange and red respectively.
	Final	This worksheet stores the final survey data to be used for analysis. It is automatically calculated from the 'Screened' worksheet and contains checks to highlight the following types of data and exclude them from the analysis: NA (not applicable) – applies to questions within a section that follow on from a respondent's choice that that section is not applicable. NR (no response) – applies where none of the subsections of a question have been answered / selected and at least one was required. IR (invalid response) – applies when more than one subsection of a question has been answered / selected and only one was required.
2. Analysis of Questions	Yes-No	This worksheet counts the responses to 'Yes-No' questions in the 'Final' workbook in each of the following categories: Yes, No, NA, IR and NR. The total applicable and valid responses (TAAVR) is then calculated as the sum of 'Yes' and 'No' answers. This total and the proportions of 'Yes' and 'No' responses within it are then used in the worksheet "Yes-No_Charts".
	DDL-NUM	This worksheet counts the responses to the 'Drop Down List' questions in the 'Final' workbook and calculates the total applicable and valid responses (TAAVR). The allowable responses vary with the questions.
	DDL-PRO	This worksheet uses the response data for each question within the 'DDL-NUM' worksheet to calculate proportional data for graphing in 'DDL_Charts'.
	SA-SD	This worksheet counts the responses to 'Strongly Agree to Strongly Disagree'

Section	Spreadsheet	Purpose
		questions in the 'Final' workbook in each of the following categories: SA (Strongly agree) A (Agree) N (Neutral Option) D (Disagree) SD (Strongly Disagree) NA, IR and NR. The total applicable and valid responses (TAAVR) is then calculated as the sum of the 'SA', 'A', 'N', 'D' and 'SD' answers. This total and the proportions of the response types within it are then used in the worksheet 'SA-SD_Charts'.
3. Outputs – Charts	Yes-No_Charts	This worksheet presents the TAAVRs to each Yes-No question and graphs these responses by type as a proportion of the TAAVRs.
	DDL_Charts	This worksheet presents the TAAVR to each Drop Down List question and graphs these responses by type as a proportion of the TAAVRs.
	SA-SD_Charts	This worksheet presents the total number of applicable and valid responses (TAAVR) to each Strongly Agree to Strongly Disagree question and graphs these responses by type as a proportion of the TAAVRs.
4. Adminis-tration	Read Me	Provides instructions for uploading survey responses into this workbook.
	Lists	Contains lists for use in formulas in the rest of the workbook.

Bar charts were created from the aggregated responses. Combined summary charts were developed from selected questions.

3.4 Industry associations

Seven national industry associations were contacted during the course of the survey. Most industry associations were interested in the NPI transfer variation but none elected to complete a questionnaire as a representative composite of their membership. Comments were provided and they were not dissimilar to the comments provided by industry (section 4.7). The comments are summarised below:

- An association was concerned that its members would find the information requested was commercially sensitive,
- An association would have like to have been contacted prior to members receiving the survey,
- The survey timeframe was too short to fully consider the issues,
- While not opposed to community-right-to-know regulations, the inclusion of transfers is not seen as a cost-effective improvement to the NPI,
- An association received comments that members were concerned that they would need to undertake monitoring to complete the questionnaire, and
- One association actively opposed its members participating in the survey, while a second encouraged responses.

It is important to note that this consultancy is not part of any formal regulatory consultation phase. Nonetheless, the survey and contact with industry associations has increased awareness of the NPI NEPM variation. Also the timeframe for questionnaire completion was tight, but the response exercise was not intended to be onerous nor should it have required gathering new data.

4. Survey results and discussion

This section explores the survey results and the sub-sections follow the general flow of the questionnaire (Appendix C):

1. Facility details and activities
2. Current NPI reporting
3. Tracked wastes
4. Transfer reporting and estimated costs
5. Combined cost summaries
6. Issues and guidance
7. Industry comments

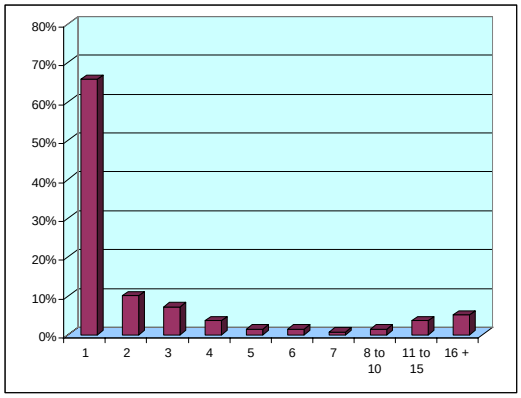
The figures are colour coded as follows:

- General – purple,
- Volumes or mass estimates – orange,
- Cost estimates – green,
- Opinion (agree/disagree) – grey, and
- Combined summaries from more than one question – blue.

4.1 Facility details and activities

Questions on facility details were asked of the respondents to provide better context to their cost estimates and to the survey as a whole. Facility details allow a better breakdown of the responses by the characteristics shown to be important in the literature review, such as facility size or whether the questionnaire is for multiple facilities. The following Figures display the composite responses. The small number at the end of the Figure caption provides the number of respondents contributing to that particular chart.

Figure 4.1 – Number of facilities represented by the response (140)



Even though two-thirds of the responses were for a single facility, the one-third that responded for multiple facilities actually represent a greater number of reporting facilities. If the category 16+ is assumed to be 20, then the approximate total number of facilities captured in the survey was 422. Those reporting for multiple facilities had to pool their cost estimates and consider their answers/opinions as they applied to the group. Although respondents *could* complete several responses, that was not the intention of the survey.

The responses formed a classic 'diminishing return' pattern with the responses becoming steadily fewer as the number of facilities increased. The questionnaire utilised drop-down menus to reduce the response effort and the higher brackets were grouped, such as the '8 to 10' bracket.

Figure 4.2 – Industry sector (137)

The questionnaire asked for the ANZSIC code and a description of the main activity.

Figure 4.2 shows that the response covers a range of industry sectors.

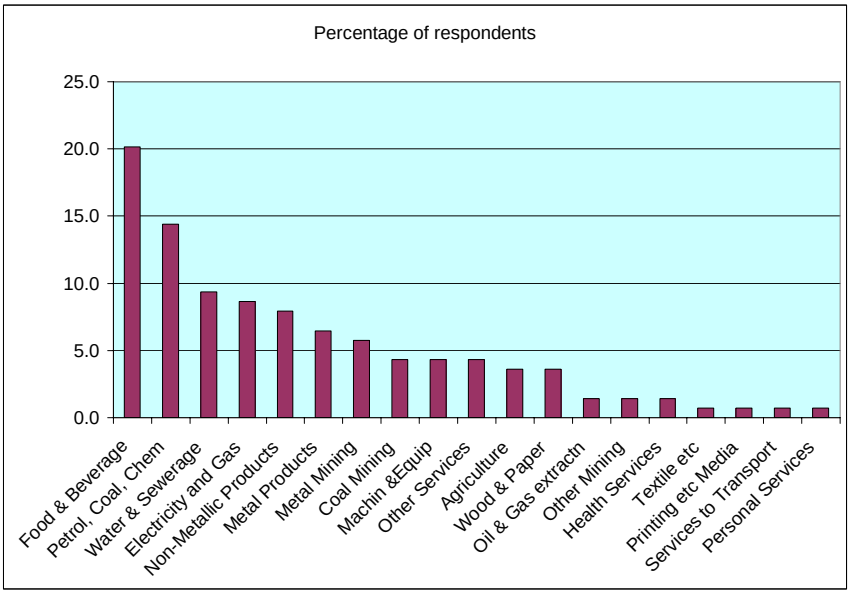


Figure 4.3 – Locations (140)

As discussed in Section 3.3, the State NPI Teams participated in the survey at their discretion and this influenced the origin of the responses. The responses gave good representation for each of the participating States: NSW (incorporating ACT), QLD, SA and WA. The responses that represented national groups are designated 'AUS'. National groups represented 9% of the total responses. Although some States/Territories are not represented, this should not significantly affect most aspects of the survey with the possible exception of comments (if unique situations exist in those locations).

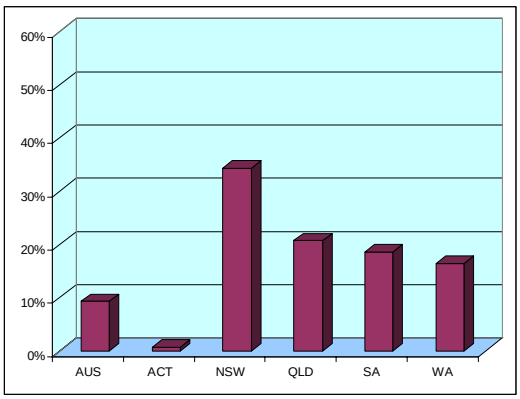


Figure 4.4 – Relative size within industry sector (137)

Respondents were given four choices for their size within their industry sector. Respondents used their own knowledge of their sector to decide, rather than pigeonhole respondents according to statistics such as total employees, annual revenue or product throughput. Given the range of facilities surveyed, there would be cases where any of these statistical categories would be unsuitable.

The Figure shows that a good distribution of responses was captured. Note that very small facilities would be unlikely to be current NPI reporters and therefore would not receive the questionnaire.

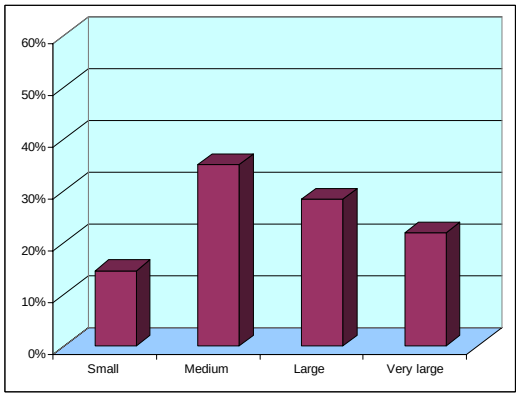
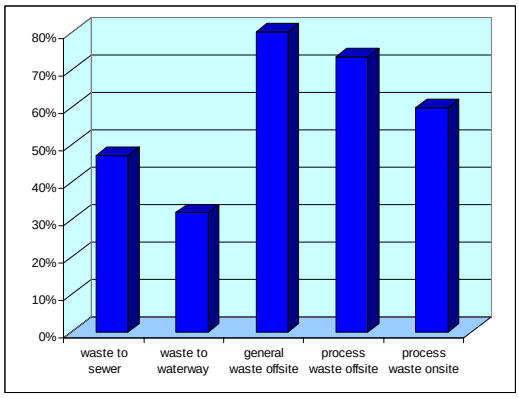


Figure 4.5 – Flow of waste materials from the facility(s) (132)

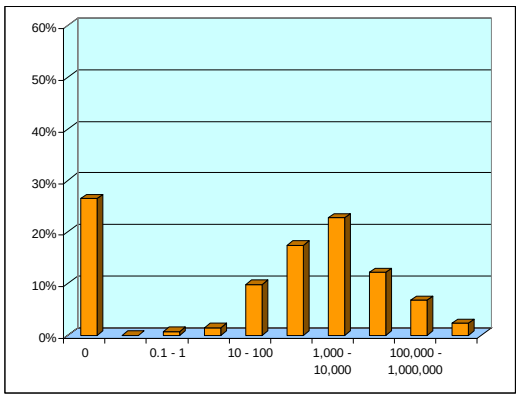


Respondents were asked to provide their annual flows of waste materials in five categories:

- wastewaters discharged to sewer,
- emissions to surface waters,
- general wastes transported offsite,
- process wastes transported offsite, and
- process wastes contained/managed onsite.

From these responses, Figure 4.5 was developed to show the more common types of flows. General wastes transported offsite should encompass all sites so its 81% forms a hypothetical maximum for the other categories. 73% of respondents had process wastes transported offsite; 60% had process wastes contained or managed onsite and 47% has process wastes discharged to sewer.

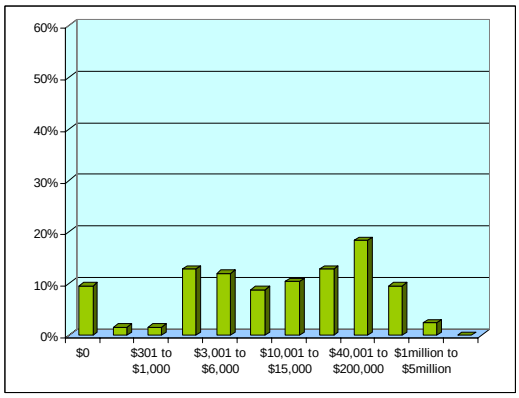
Figure 4.6 – Estimate of process waste (tonnes/a) transported offsite (132)



The shape of the graph for the estimates of process waste transported offsite shows that few facilities transport small amounts of waste or huge amounts. The most common positive response at 23% was the range from 1,000 tonnes/annum to 10,000 t/a.

The shape of this curve is similar to that for wastewaters discharged to sewer, general wastes transported offsite and process wastes contained/managed onsite. The response curve for 'emissions to surface waters' was flat with approximately equal response at low volumes and very high volumes.

Figure 4.7 – Annual cost of waste management – Technical staff (125)



Respondents were asked to provide their annual costs for waste management in five cost categories:

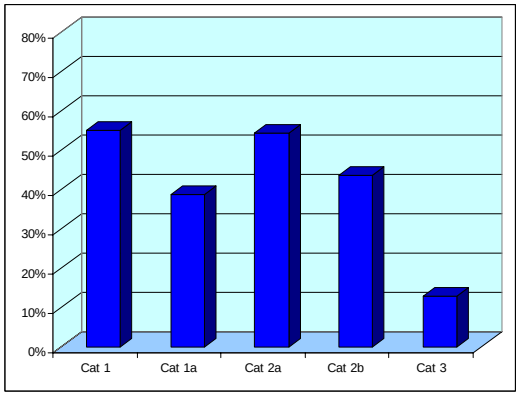
- Staff – technical,
- Staff – administration / other,
- Equipment and consumables,
- Service providers – waste contractors, and
- Service providers - other.

The technical staff cost category (shown in Figure 4.7) had the fewest $0 responses (10%). The response is fairly flat over the range from '$1,000 to $3,000' (13%) up to '$200,000 to $1m' (10%).

The only waste management cost category with a pronounced peak was for *Waste contractors* where the range '$40,000 to $200,000' drew a 32% response. In the category *Service providers – other* over 50% responded that they had no costs in this area.

4.2 Current NPI reporting

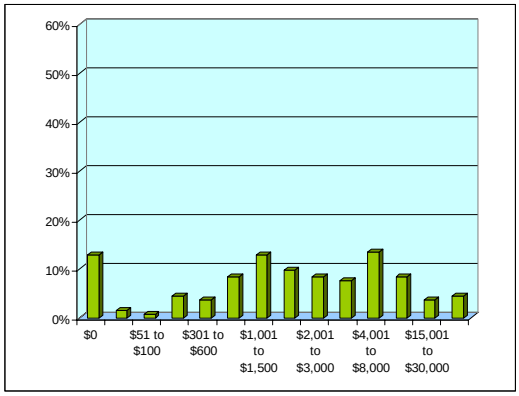
Figure 4.8 – Which NPI reporting thresholds are currently exceeded? (137)



Many respondents triggered more than one category. Fifty-five percent of respondents exceeded a Category 1 threshold (eg use of 10 tonnes or more of NPI substances). Only thirteen percent of respondents exceeded a Category 3 threshold relating to total nitrogen or total phosphorus discharges to water, excluding groundwater. Transfers of nutrients (for irrigation or trade waste discharge) may capture a significant number of new reporting facilities in the areas of sewage treatment, food processing and agricultural manufacturing/processing.

The current preferred option for the transfer variation is to *not* require transfer reporting for substances that are only triggered by exceeding the thresholds for Category 2a or 2b for fuel combustion/electricity consumption. The transfer reporting costs may be slightly overestimated if the respondents considered reporting Category 2a or 2b substances.

Figure 4.9 – Annual cost of current NPI reporting – Technical staff (133)

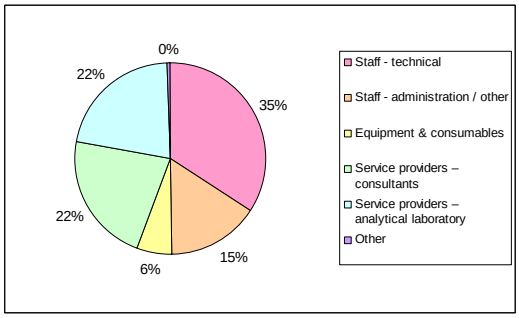


Respondents were asked to provide their annual costs for NPI reporting in six categories:

- Staff – technical,
- Staff – administration / other,
- Equipment and consumables,
- Service providers – waste contractors, and
- Service providers – analytical lab, and
- Other.

The technical staff category is shown in Figure 4.9; it had the fewest $0 responses at 13%.

Figure 4.10 – Current NPI reporting cost breakdown (133)



This figure is a composite of several questions including the one shown in Figure 4.9 above. It presents the cost breakdown for current NPI reporting. The main cost area at 35% is for technical staff. Consultants and analytical laboratory services are equal second at 22% followed by staff – administration/other and equipment/consumables. Costs under the heading 'other' are insignificant.

The average total cost was $4,900 for current NPI reporting corresponding to this figure. The median cost was $1,100. The NPI reporting costs

discussed in Section 2.7 also had a median value well below the average. This is due to a large number of low-cost reporters offset by a few reporters with very high costs.

4.3 Tracked wastes

Many State-based waste tracking systems have been operational for several years. Industry comments highlight the fact that transfer reporting requires some of the same data to that collected by the tracking systems. Two-thirds of respondents answered 'Yes' to *Does your facility transport process wastes offsite under a waste tracking system? (transport certificate / manifest system).* This subsection explores the scale of waste tracking among those that answered 'Yes'.

Figure 4.11 – Estimated annual total mass (tonnes) of tracked wastes (84)

The total annual mass of tracked wastes has a median value of just under 1,000 tonnes.

The shape of the curve shows that few facilities have extremely low or extremely high amounts of tracked wastes.

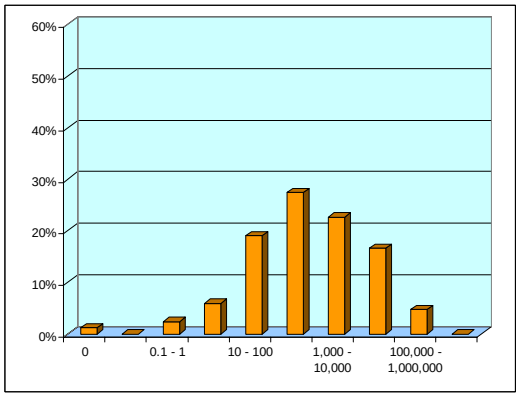


Figure 4.12 – How many loads of process wastes per year does your facility transport offsite under a waste tracking system? (84)

Transporting waste offsite and using a waste tracking system are common activities for NPI reporters with two-thirds responding yes. The shape of the curve for the number of loads is flat with more than 30% below 20/yr and more than 40% above 100/yr.

The number of waste types transported is also a flat curve with nearly 40% at 2 or less and 30% at 6 or more. This indicates a diversity of activities generating the waste.

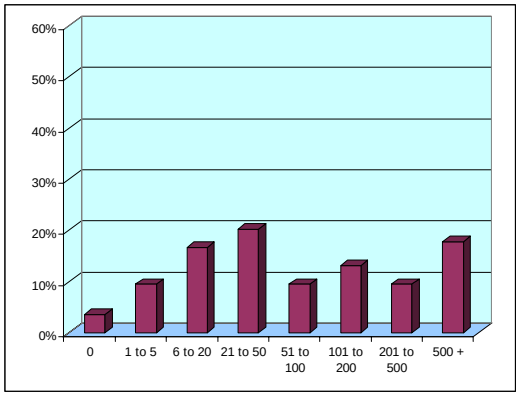
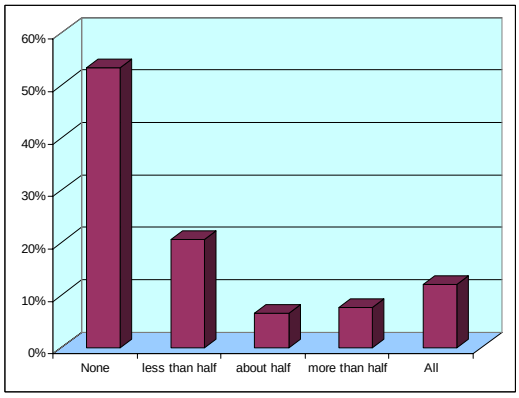


Figure 4.13 – What proportion of the tracked waste types are analysed? (92)

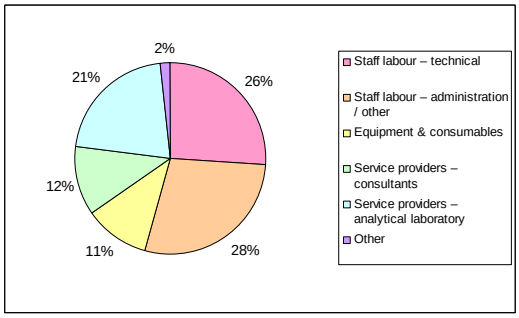
Only 12% said that all of their tracked wastes are analysed, while 53% responded that none of the tracked wastes are analysed. This indicates that the data generated by the waste tracking systems could support transfer reporting, but could not replace it and still provide the same information. For example, a facility transferring waste under the waste classification



code N190 – Filter Cake could compile and use the annual waste volume data, but the total annual mass of NPI substances is unlikely to be derived from the waste tracking certificates or similar on-line system.

Waste tracking systems help ensure that each waste load is handled responsibly. The purpose of annual transfer reporting is more holistic and includes community right-to-know and recognition of waste management improvement opportunities. Because of the differences between waste tracking systems and transfer reporting, a full integration could compromise the desired outcomes. Nonetheless, partial integration would be an important future step to streamline the interrelated data requirements.

Figure 4.14 – Waste tracking cost breakdown (74)



The highest cost area for waste tracking is staff – administration/other. This may indicate that waste tracking tasks are conducted by the operational staff who supervise waste collection and/or by administrative staff for accounting and record-keeping.

In general, the cost breakdown is similar to that for current NPI reporting (Figure 4.10).

4.4 Transfer reporting

Figure 4.15 – Proportion of facilities expecting to report transfers to OFFSITE categories (78 to 93)

Respondents were asked what types of offsite transfers they expected to have to report. The response for *reuse or recycling* had the highest 'Yes' tally at 51%. All categories had a significant response. Several respondents expect to report transfers for more than one purpose.

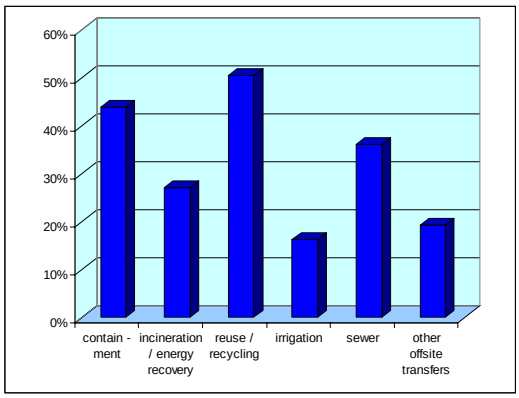


Figure 4.16 – Proportion of facilities expecting to report transfers to ONSITE categories (79 to 89)

Respondents were asked whether they expected to be required to report onsite transfers in four categories. The *containment* category had the highest 'Yes' response at 29%. (As a comparison, offsite *containment* was higher at 44%). Again, some respondents expect to report transfers for more than one purpose.

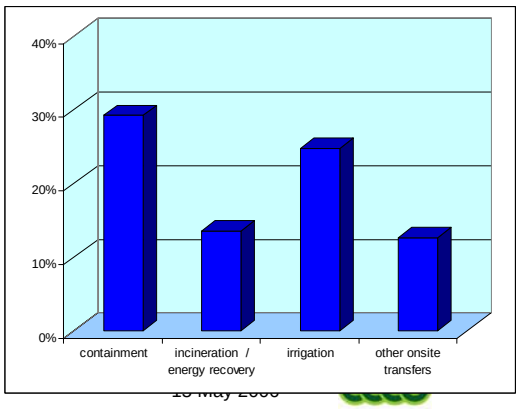


Figure 4.17 – Transfer reporting additional set-up costs for the first year (88)

Thirty-three percent of respondents provided $0 as a value for the set-up costs during the first year, however, even cursory calculations whether the facility needs to consider the variation would require some reading and consideration (and thus incur some costs). A significant proportion of the positive responses are $4,000+.

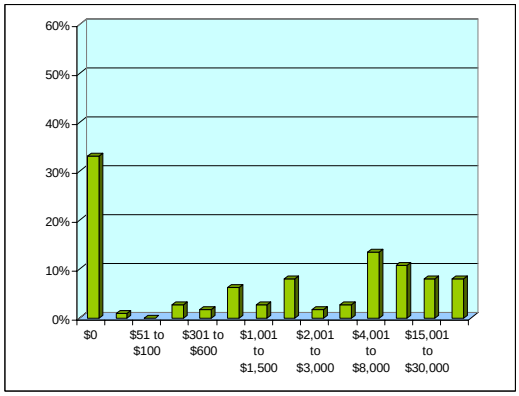
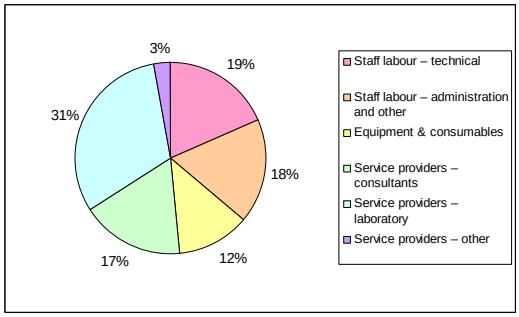


Figure 4.18 – Transfer reporting cost breakdown (88)

The expected cost breakdown for transfer reporting shows that respondents expect laboratory analyses to be the largest single cost. It is 10% more than the laboratory component for waste tracking or current NPI reporting. Governmental assistance efforts could focus on this area to reduce analytical costs through the provision of transfer factors to aid reporters. After wastes are characterised in the first year, analyses may become less essential and used mainly to test process changes or to check seasonal variations in waste composition.



4.5 Combined cost summaries

The following charts and discussion focus on the transfer reporting costs as estimated by the questionnaire respondents. Information on waste tracking costs and current NPI reporting costs are intended to provide some context with which to assess the transfer reporting estimates.

Figure 4.19 – Average costs per facility

Figure 4.19 shows the average cost per facility for their current NPI reporting ($4,900), waste tracking ($4,600), transfer reporting ($8,300) and additional transfer reporting set-up costs ($2,200).

Although the literature review unearthed only a limited number of costs for reporting to a pollution release and transfer register, the values shown in Figure 4.19 do fall within the range that was found.

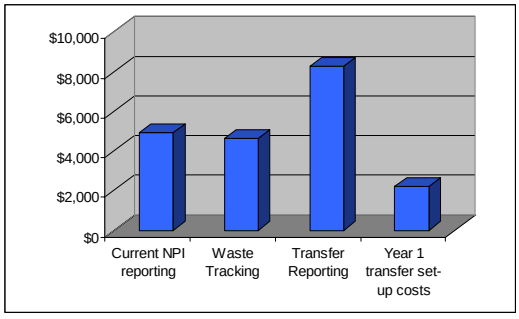


Figure 4.20 – Average costs per facility, including overall waste management

This figure shows the average costs per facility for current NPI reporting, waste tracking and expected transfer reporting are all dwarfed by the overall average cost for waste management ($430,000), which is itself a subset of a facility's environmental management costs.

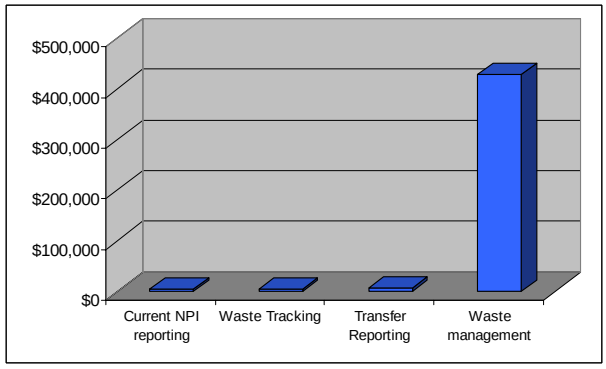
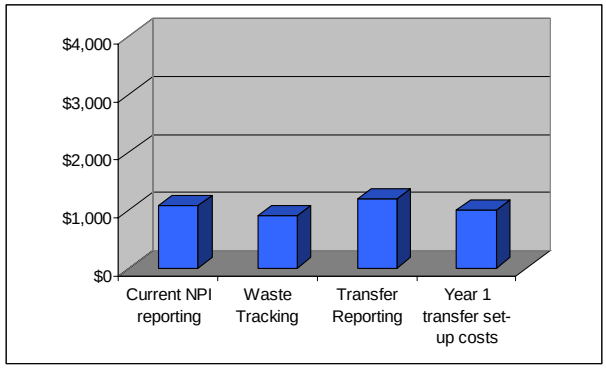


Figure 4.21 – Median cost per facility



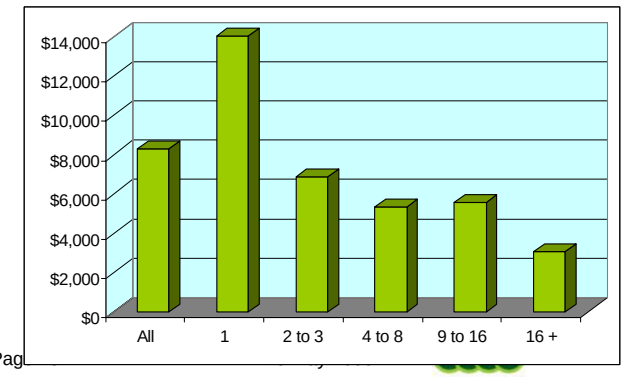
The median costs per facility are very closely aligned for the same four categories shown in Figure 4.19. The median cost per facility for their current NPI reporting was $1,100, waste tracking $900, transfer reporting $1,200 and additional transfer reporting set-up costs $1,000. The median values represent the mid-point position where there are an equal number of higher and lower costs per facility. The majority of facilities are expected to have costs below the average costs and thus these median values are lower than the averages. A small number of facilities have costs significantly higher than the average.

Figure 4.21 shows that the estimates for annual transfer reporting are similar in scale to the costs for current NPI reporting and waste tracking.

The predicted cost of transfer reporting has been compared to the costs of current NPI reporting and waste tracking. Both the cost magnitude and the breakdown patterns indicate the similarity of the three tasks for most facilities. The facilities that would be most impacted are those that have several waste streams that have not been characterised for NPI substances. There would also be new reporters that trigger based on a Category 3 threshold for total nitrogen or phosphorus discharged to sewer or to irrigation. Although the transition from a position of not needing to report could be viewed as a major financial impact, these facilities should have the required analytical data through the existing trade waste permits or irrigation licences.

Figure 4.22 – Average transfer reporting cost– breakdown by facility number

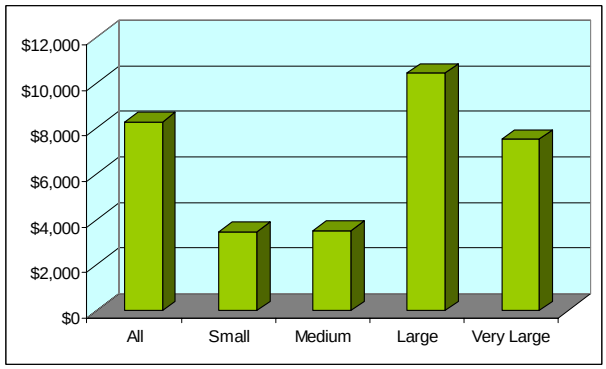
The average transfer reporting cost per facility is $8,300 and this is shown in the 'All' column in the figure at right. This average cost is further analysed according to the number of facilities represented by the response. Those responses for a single facility were higher than the average while those responses representing multiple



facilities show a lower cost. This indicates that certain reporting efficiencies are not achievable by companies reporting for a single facility. It is also possible that those reporting for very large numbers may be limited by the upper bounds of the questionnaire drop-down menu choices.

Figure 4.23 – Average transfer reporting cost– breakdown by facility size

The size of the respondent was given in Figure 4.4 and that showed that the responses formed a good mix of small, medium, large and very large. The costs incurred on a facility size basis shows that the small and medium sizes incur less costs. This is not unexpected as the waste stream complexity should generally be less for the small and medium sizes in comparison with the large and very large.



4.6 Issues and guidance

The following charts examine transfer issues and the importance of possible forms of guidance and assistance. The figure captions in this subsection contain the statements to which the respondent would select – strongly agree (SA), agree (A), neutral opinion (N), disagree (D), or strongly disagree (SD). For example, if the facility generated waste for which the respondent had no idea whether it contained NPI substances, then they would select 'Strongly Disagree' for the statement *We can identify all waste that contains NPI substances.*

Figure 4.24 – We can identify all waste that contain NPI substances (137)

The chart shows some uncertainty about waste characteristics. Only 60% of respondents agreed or strongly agreed that they could identify all wastes containing NPI substances. This is an area where assistance could be made to industry sectors, possibly through the relevant industry associations, to classify the common process wastes as to their potential for containing NPI substances. Where the processes and wastes are consistent between facilities, a transfer 'factor' could be developed and applied for simplified estimation.

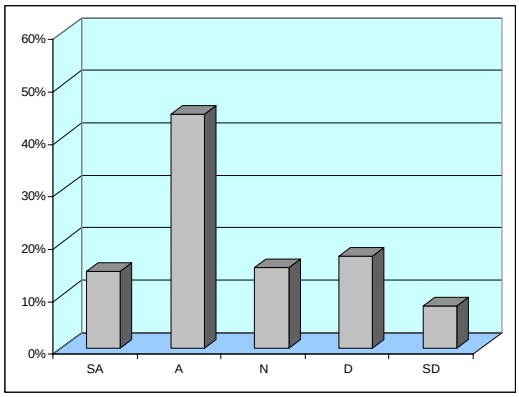


Figure 4.25 – We know the proportion of NPI substances in our waste. (137)

This statement is a subset of the previous one (Figure 4.24). Even if the wastes containing NPI substances can be identified, transfer reporting would require knowledge of the proportion (concentration) of NPI substances in the waste. Only about one-third of respondents agreed or strongly agreed that they knew the proportion of NPI substances in the waste. The response indicates that there is more 'disagreement' than for the previous statement, which is to be expected. This is an area where site specific analyses may be required. Only where the processes and wastes are consistent between facilities could a transfer 'factor' be applied for simplified estimation.

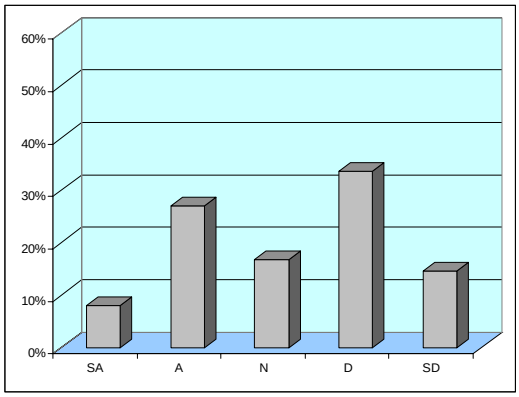


Figure 4.26 – Additional chemical analysis will be required to determine NPI substance concentrations in our wastes transferred to: containment (eg landfill, tailings dam). (129)

The response to this statement indicates that most facilities that transfer waste to containment structures would require additional analyses. The response to the same statement for *recycling or reuse* is almost identical.

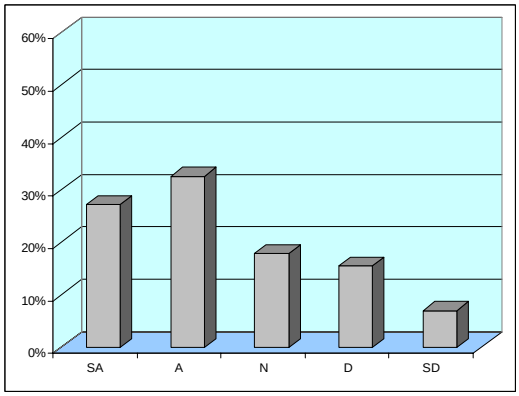


Figure 4.27 – Additional chemical analysis will be required to determine NPI substance concentrations in our wastes transferred to: sewer (eg trade waste). (115)

The response to this statement indicates that the facilities that transfer waste to sewer (eg as trade waste) would be less likely to require additional analyses than the situation above. The response to the same statement for *irrigation* is almost identical.

These transfers are more likely to have existing analytical programs. Local governments usually require testing as part of trade waste permits and irrigators may be licensed and test for nutrients to determine optimal application rates.

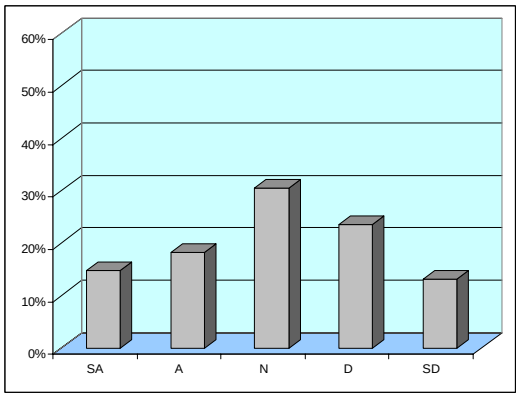


Figure 4.28 – The following items would help us with waste transfer reporting: written guidelines / manuals about waste transfers. (140)

The level of governmental guidance would impact on industry costs and data quality.

The response to this statement is overwhelming – nearly all respondents either agree or strongly agree that written guidelines or manuals would be helpful.

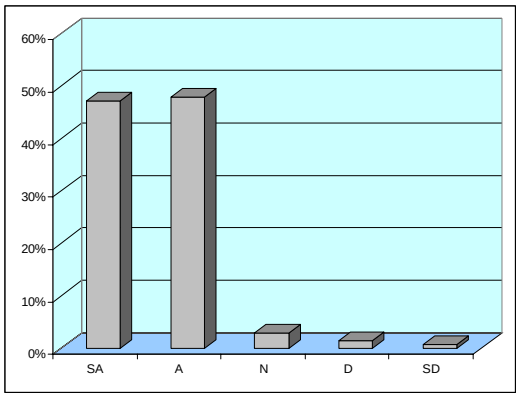


Figure 4.29 – The following items would help us with waste transfer reporting: a ½ day training seminar / workshop about transfer reporting. (140)

The response to this statement is also very strong, albeit slightly less positive than the response above. The charts for *Interactive web-based help (eg reporting tutorial) with examples* and *Discussions with the State-based NPI team members* closely match this response. Each of the four options for assistance had a strongly positive response indicating a strong need for educational materials and related assistance.

Additional reporting costs are important to 79% of the respondents that answered either strongly agree or agree.

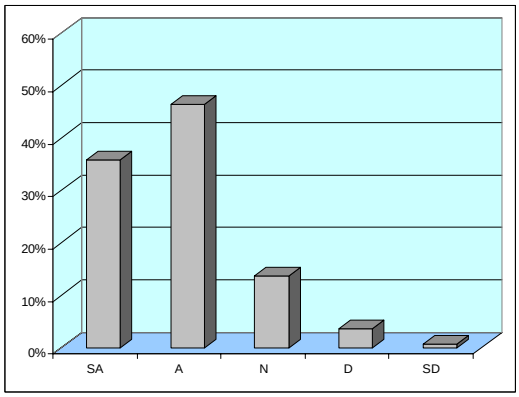


Figure 4.30 – The following aspects of transfer reporting will be very important: ensuring waste tracking requirements are integrated with NPI transfer reporting. (135)

The statement met with strong agreement, although not quite as strong as for additional costs. The chart for *Industry-specific assistance from the State-based NPI team and relevant industry association* is nearly identical. This reinforces the earlier figures showing strong support for a range of assistance methods.

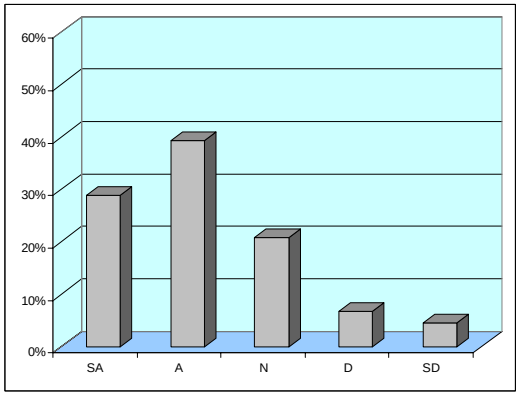


Figure 4.31 – The following aspects of transfer reporting will be very important: receiving data summaries on facility waste transfers from waste transporters / receivers. (136)

The response was again very positive. This aspect is particularly important to some facilities with many tracked wastes; the questionnaire comments (Appendix D) also support the importance of this statement quite strongly.

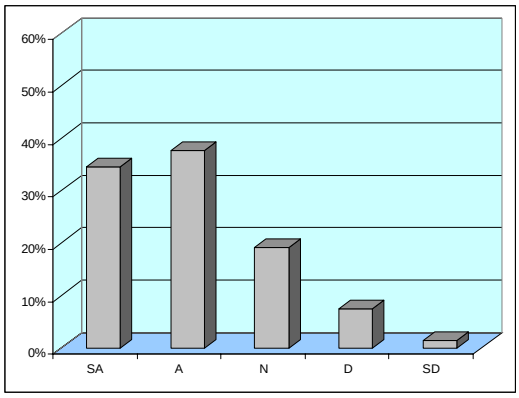
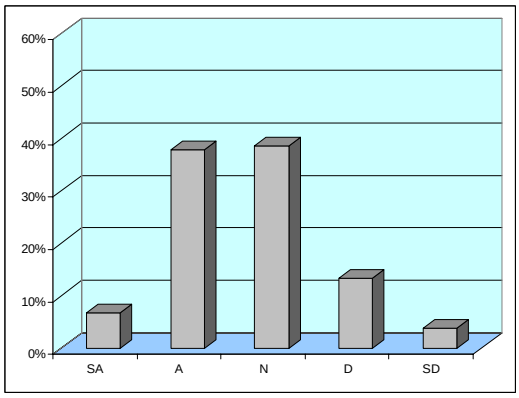


Figure 4.32 – If required in the waste transfer report, we would be able to: nominate the 'grade' of the waste receiving facility (eg meets best practice, meets minimum regulatory requirements). (135)

The response was much more neutral than the preceding statements. Nonetheless, only 4% strongly disagreed that they could manage to nominate the grade of the receiving facility. The strongly agree response was only 7% which may indicate that some assistance would be necessary for reporters to properly complete this task.



4.7 Excerpts from questionnaire comments

Section 9 of the questionnaire invited comments, notes and suggestions. This section is essential as the respondent has become familiarised with the subject through the previous eight sections and can now express opinions outside the necessarily restrictive closed-question approach. The following excerpts are representative of the overall comments (Appendix C) or they elucidate a particular issue.

a. *Our wastes are not analysed for NPI substances.*

b. *All answers are estimates only as the timing didn't allow for accurate data collection across the nation.*

c. *Would be easier (and probably more accurate) if data was collected directly by NPI from waste transporters, or coalated by State EPA's from submitted waste transport certificates etc. I can not see the need for two reporting systems: waste tracking and NPI. It should be the one. Is there a more efficient approach to servicing community right to know about key wastes which is main are tracked through some state Govt systems already for hazardous wastes?*

d. *We still have a great concern that the NPI would be better to spend its time getting all companies to report the basic NPI information before getting into this level of detail. Currently many companies including government entities do not do even basic reporting to the NPI !!!!!!*

e. *In terms of assessing NPI substances the substance may be a very small proportion of an overall flow stream which when coupled would report a large emission via NPI even though the potential for harm from the substance due to its low proportion may be negligible. In addition, some substance may be in an inert state when transferred, even though an analysis may indicate it soley as an elemental form (which may not be inert). This may cause undue concern.*

f. *7 days consultation to complete the questionnaire is unreasonable, given some people may be on duty travel for this period.*

g. *This survey is really too long to answer: it does require much more than 20 minutes to answer.*

h. *It is difficult to separate and account for specific costs associated with waste tracking and waste transfer reporting. These costs are well integrated into our business and not categorised in this manner.*

i. *New record keeping, tracking and reporting procedures would need to be implemented to enable us to report waste transfers with any accuracy.*

j. *Ethanol and acetaldehyde are both foodstuffs and are to our knowledge on the NPI list because as VOCs they have air pollution potential. As dilute solutions in tradewastes they pose no risk to health or the environment and are not relevant to NPI purposes in our view.*

5. Case studies

The survey responses have been combined to provide generalized information regarding waste management, NPI reporting and predicted transfer reporting costs. Case studies are, nevertheless, required to gain insights into the processes of specific types of enterprises. The case studies were developed through face-to-face interviews using the survey questionnaire and other available transfer documentation to elicit consideration of the potential financial impact of NPI transfer reporting. Two jurisdictional assistance scenarios (minimal and strong) are assessed to show the cost impacts of the assistance program including the quality and industry-specific nature of the supporting publications, web-based materials, workshops, presentations and telephone support.

Although the case studies are based on actual facilities, much of the information necessary to build a case study is commercially sensitive. Therefore the information presented (including but not limited to procedures, personnel costs, reporting situations and the operational decisions depicted) is sometimes typical of the industry sector but not facility-specific and is presented for indicative purposes only.

The case study procedures and tasks follow the general format of the UNECE PRTR reporting procedures presented in Section 2.3.

5.1 Food processing facility

Business description: The Company manufactures hundreds of food products including canned fruits and vegetables, jams, juices and other beverages.

Approximate base number of employees: 700+ (employees can increase by a factor of 2½, due to seasonal increases in production).

Environmental reporting overview: The Company has several current environmental reporting requirements. Databases are used for tracking wastes and maintaining the fuel and chemical inventories. Water monitoring is extensive and approximately 50 flowmeters have been installed throughout the plant. Environmental monitoring data is used in external reports to the NPI, local Council (water use), State (environmental license) and the industry association (Australian Food and Grocery Council's Environmental Report).

NPI transfer reporting process:
Understanding regulatory requirements: The current NPI emission reporting is primarily done by the Environmental Manager, who would also gather and learn the transfer requirements. Under a strong assistance scenario, this would involve reviewing the information packet that would be sent to all current NPI reporters and other prospective facilities. The packet would provide generic and industry-specific information with some worked examples. In addition, a web-based tutorial would explain the regulatory requirements. Under a low assistance scenario, the Environmental Manager would gather and read publications from the NPI website. Data gathering would not be as efficient or as complete in the low assistance scenario. Industry costs would be slightly higher and data quality would be lower. For both scenarios, discussions would be held with the State NPI team and the industry association. The frequency and duration of these activities during the first year of transfer reporting would be more intense than subsequent years.

Determining reporting obligations on a preliminary basis: The facility currently triggers on Category 2b fuel burning and Category 1a total Volatile Organic Compounds (VOCs) and reports on the substances shown below.

Arsenic & compounds	Magnesium oxide fume
Beryllium & compounds	Mercury & compounds
Cadmium & compounds	Nickel & compounds
Carbon monoxide	Oxides of nitrogen
Chromium (III) compounds	Particulate matter 10.0 µm
Chromium (VI) compounds	Polychlorinated dioxins and furans
Copper & compounds	Polycyclic aromatic hydrocarbons
Fluoride compounds	Sulfur dioxide
Hydrochloric acid	Total Volatile Organic Compounds
Lead & compounds	

Some of the category 2b emissions (ie oxides of nitrogen, carbon monoxide and sulfur dioxide) exceed 10 tonnes, and the use of these substances would be reviewed. The review finds that these substances are not part of any transfer and therefore further consideration of these substances is not required. VOCs may be present in transfers. The three main types of transfers are treatment plant effluent discharged to sewer, waste fruits and vegetables that are provided to various parties for animal feed and dewatered treatment plant sludge that is provided to various parties as a soil conditioner.

The Environmental Manager determines that the Category 3 thresholds for total nitrogen loads (15 tonnes/a) and total phosphorus loads (3 tonnes/a) for transfers may be exceeded. The facility's wastewater is discharged to sewer under a trade waste permit and monthly records are kept of the volume and nutrient concentrations. A preliminary calculation based on the monthly data confirms that the Category 3 thresholds are exceeded.

Performing calculations, measurements and estimates: The Company conducts annual tests on wastewater for approximately 20 analytes. The Council conducts monthly tests that include nitrogen and phosphorus, but not VOCs. The trade waste data from the Council would be sufficient to characterise the nutrient content without further analyses, however further work would be done to correlate nutrient loads with the seasonal operations. There is no existing analytical data associated with the animal feed or soil conditioner (dewatered treatment plant sludge). The annual soil conditioner mass must be determined manually from the waste transfer certificates. Although the effect of seasonal variation of raw materials on nutrient content is not known, three sampling and analysis events are scheduled in the first year. Operational staff would be used to sample the wastes, but this could easily be outsourced. The analyses would determine total N, P and VOCs in soil conditioner and VOCs in wastewater. A quality control sample would be also sent for analysis. Depending on the variability of the results, subsequent years' analyses would be reduced to one per year. Due to the unique wastewater treatment system, it would be unlikely that transfer factors can be applied.

A spreadsheet would be developed to calculate the cumulative, annual nitrogen and phosphorus loads from the flowmeter readings and Council analyses (trade waste charges) as well as VOC calculations. Work procedures are modified and training given to instruct on data gathering and spreadsheet data entry. The QA procedures are modified to allow an independent check on the work procedures. A literature review would be conducted to determine the nitrogen and phosphorus content of the animal feed. From this, a mass-based, transfer factor would be developed.

There are also minor quantities of waste oil that are transported for recycling by others. The total VOCs are unknown and under a strong assistance scenario, a generic transfer factor would be applied and an estimate calculated. Otherwise, two additional sampling and analysis events would be conducted.

Reporting transfers: The main reporting functions are conducted annually. The regulatory requirements are revisited briefly, the forms (NRT) are downloaded and discussions are initiated with the State NPI team, the industry association and Council's trade waste officers. A draft transfer report would be completed and distributed to senior management for approval. The transfer report would be then submitted and records of the transfer reporting process are filed.

NPI transfer reporting costs:
The Environmental Manager's hourly rate is $130 and this covers items including the base salary, insurances, leave, building rental and company profit. Administrative and operational staff have an average hourly rate of $65, which includes a similar multiplier. Equipment and consumables include items such as computers, software, ISPs, standard office equipment (photocopiers) and telephone charges. As these are not specific to NPI reporting, they are assessed at 10% of the hourly rates.

Table 5.1 Food processing case study

	Cost components – strong assistance scenario						
	Staff – Environmental Manager ($130/hr)	Staff – admin., operational ($65/hr)	Equipment & consumables	Consul-tants	Service providers - analytical laboratory	Subtotal	Additional set-up costs for transfer reporting (first year)
Understanding regulatory requirements	$650	$0	$65	$0	$0	$715	$780 staff $78 equipment
Determining reporting obligations	$390	$0	$39	$0	$0	$429	$260 staff $26 equipment
Performing calculations, measurements & estimates	$1,300	$715	$202	$0	$200	$2,417	$2,015 staff $202 equipment $850 analytical
Reporting transfers	$390	$65	$45	$0	$0	$500	$325 staff $32 equipment
Total	$2,730	$780	$351	$0	$200	$4,061	$4,568
Additional costs incurred under a minimal assistance scenario	$390	$325	$72	$0	$240	$1,027	

The food processing facility would likely have a first year set-up cost of $4,600 and on-going costs of $4,100. The $1,000 of potential additional costs for a minimal assistance scenario would be borne in the first year. These predicted costs can be compared with the facility's approximate waste tracking costs of $8,500. Current NPI reporting costs, computed on a similar case study basis, would be about $1,000.

The additional set-up costs of are basically equal to the annual reporting costs and this is consistent with the findings of the literature review for PRTR first year costs (Section 2.6). The majority of costs are attributable to technical staff. The operational staff costs for sampling

could be outsourced and although the costs would not change greatly, the amounts would be shifted to 'consultants' or 'analytical laboratory'.

5.2 Oil & gas extraction facility

Business description: The facility is one of a number of on-shore oil & gas facilities run by the parent company and based in central Australia. Activities carried out at the facility include oil and gas exploration, extraction and production.

Number of employees: Approximately 30 site-based employees (working on rosters) and 20 full time equivalent support staff. Contract construction and drilling crews can increase these numbers by a factor of 3 during peak times.

Environmental reporting overview: The facility meets corporate, industry association and government reporting requirements for environmental issues such as sustainability, greenhouse gasses and environmental licences. The primary issues for current NPI reporting are gas emissions and fuel burning. The introduction of transfers would be expected to add on-site storage of produced water in evaporation ponds to this list.

NPI transfer reporting process:
Understanding regulatory requirements: Primary responsibility for the current NPI reporting rests with an Environmental Engineer who is assisted by field staff, the final NPI reports are also reviewed by the HSE Manager. The Environmental Engineer would also be responsible for any additional NPI transfer reporting and would need to gather and learn the transfer reporting requirements. As the Environmental Engineer's responsibility includes three of the company's facilities in the immediate locality, the costs of understanding regulatory requirements would be shared between these facilities. Costs shown in Table 5.2 are 33% of the total for this heading.

Determining reporting obligations on a preliminary basis: The facility currently triggers on Category 1, 1a and 2b. Category 1 and 1a substances that are currently included in NPI reports and are likely to be in transfer streams include:

- Cyclohexane.
- n-hexane.
- Benzene.
- Toluene.
- Ethyl benzene.
- Xylenes.
- Ethylene glycol.
- Total Volatile Organic Compounds.

There are transferred wastes streams that are likely to include NPI substances, these are:

- Waste oils / oily water mixtures.
- Waste hydrocarbons / sludges (tank cleaning, line pigging and pond skimming).
- Used filters and adsorbents.
- Spent glycol.
- Produced water.
- Contaminated soils.

Some of the transported wastes are collected on a routine basis (e.g. spent glycol), others are collected on an as needs basis (e.g. waste hydrocarbons from tank clean outs). Typically the facility would produce between 10 and 20 loads of transported waste in a year; some of these loads would be of mixed types (i.e. wastes transported in drums).

The Environmental Engineer determines that the NPI substances currently reported may be present in each of the listed waste streams. Although the concentrations in produced water may be minuscule, the volume of the produced water is very large.

Performing calculations, measurements and estimates: The status of available transfer data is:

- The composition of the transported wastes, particularly those collected on an as needs basis, would be variable and would need to be assessed on a case by case basis until compositions are established. The testing to meet current waste tracking requirements does not cover the NPI Category 1 and 1a substances triggered. Waste characterisation analysis would be required. Most costs are for the first year.
- A significant proportion of the transported waste quantities are estimated rather than measured directly and estimated as volumes rather than as mass. To report NPI substance quantities accurately these issues would need to be addressed.
- The composition and flow of produced water is measured on a routine basis and would provide adequate data for transfer reporting if required.
- Contaminated soils quantities are estimated and contaminant compositions are measured. The monitoring should be adequate for transfer reporting, if required.

The facility has existing NPI reporting systems that are included in the company's overall environmental reporting systems. To align reporting requirements and ensure that data would be prepared ahead of schedule, the main environmental reporting functions are conducted and reviewed internally on a quarterly basis. NPI transfer reporting would need to be included in this process. This would require development, implementation and ongoing 'system' tasks as detailed below:

Development

- Updating the waste management procedures to ensure appropriate analyses of wastes are undertaken.
- Updating the field data collection sheets for environmental monitoring and reporting.
- Updating the existing NPI monitoring and reporting procedure, spreadsheets (to match new NRT) and supporting documentation.
- Updating the relevant job descriptions to include the new reporting requirements.
- Preparing a management brief on the requirements and conducting a risk assessment based review of reporting requirements.
- Updating the project impact statement system to ensure that any future effects on waste transfers are considered and captured in future projects.
- The Environmental Engineer would attending external training if this available and would then develop a site-specific training package and train other staff in the new requirements.

Implementation

- Initial run of newly developed procedures and spreadsheets.
- Check of data collection systems and calculations.
- Review as required.
- Report to management on system implementation, review at management meeting.

Ongoing 'system' tasks

- Annual System maintenance (facility changes, new estimation factors / techniques).
- Comparison with previous years' data (to confirm data generated).
- Identifying and investigating irregularities.
- Auditing (as part of the environmental management system).

Reporting transfers: The facility currently reports using the national reporting tool (NRT). The new NRT forms that include transfers would be downloaded and reviewed. Data would be uploaded from the newly developed spreadsheets into the transfer forms. This process would need internal review in the first year. In the initial phases some time may also be needed for consultation with the State NPI team.

The draft transfer report would be reviewed and approved by the Health Safety & Environment (HSE) Manager. The transfer report would then be submitted and records of the transfer reporting process would be filed. When transfer data is published on the NPI website, this would be checked by the Environmental Engineer.

NPI transfer reporting costs:

The expected costs of NPI transfer reporting are based on the tasks described above and the expected time and resource requirements for these tasks. The costs for the personnel involved in NPI reporting are as follows: Environmental Engineer ($120/hr), field staff ($90/hr), administrative staff ($60/hr) and HSE Manager ($180/hr). Equipment and consumables are calculated at 15% and include items such as transport to site and on-site accommodation, communications, consumables and computers). Consultants would not be used. Table 5.2 presents a summary of the expected costs.

Table 5.2 Oil & gas extraction case study

	Cost components – strong assistance scenario							
	Staff – HSE Manager ($180/hr)	Staff – Environ-mental Engineer ($120/hr)	Staff – Field operators ($90/hr)	Staff – admin ($65/hr)	Equipment & consumables	Service providers - analytical laboratory	Subtotal	Additional set-up costs for transfer reporting (first year)
Understanding regulatory requirements	$0	$240	$0	$0	$36	$0	$276	$480 staff $72 equip
Determining reporting obligations	$0	$240	$0	$0	$36	$0	$276	$480 staff $72 equip
Performing calculations, measurements & estimates	$360	$1,800	$1,080	$130	$162	$400	$3,932	$2,880 staff $432 equip $2,000 lab
Reporting transfers	$360	$480	$0	$130	$72	$0	$1,042	$480 staff $72 equip
Total	$720	$2,760	$1,080	$260	$306	$400	$5,526	$6,968
Additional costs incurred under a minimal assistance scenario	$0	$360	$0	$0	$54	$0	$414	

The oil & gas extraction facility would likely have a first year set-up cost of $7,000 and on-going costs of $5,500. These predicted costs can be compared with the current NPI reporting costs of

$7,000/a for this facility. Waste tracking costs are integrated into operational costs and cannot easily be identified, these are estimated to be $2,000/a.

Most of the costs are related to data collection and systems and not regulatory understanding, therefore the additional costs for a minimal assistance scenario would be only about $400. A high quality assistance program should help produce better information, but would lead to only minor cost savings.

5.3 Metal manufacturing facility

Business description: The Company specialises in metal products and is vertically integrated to include mining, processing, production, marketing sale and distribution. The company has several divisions and operates nationally with some overseas facilities. Many sections of the company have an environmental management system accredited to AS/NZS ISO 14 001. The case study facility is a major metal manufacturing facility.

Approximate number of facility employees: 1000.

Environmental reporting overview: The Company currently reports to the NPI for over 25 facilities, ranging from the very simple to this facility, which is very complex. Environmental reporting also entails contributions to corporate reports, such as the annual report; and annual submissions to the State environmental agency for licenses. Environmental monitoring for the facility's emissions is extensive, but monitoring is not conducted for NPI substances in waste destined for recycling.

NPI transfer reporting process:
Preface: The Company's divisional and cost centre structures do not align well with the data collection needs for transfer reporting. Environmental costs are integrated into divisional production costs. The transfer reporting cost estimates could not be quantified for the questionnaire or case history as the data collection would be prohibitively expensive. Qualitative analysis is provided.

Understanding regulatory requirements: This responsibility would be shared among the environmental team that currently undertake the NPI reporting for the facility. Efficiencies would occur in this area on a 'per-facility' basis as the Company reports to the NPI for over 25 facilities.

Determining reporting obligations on a preliminary basis: The facility currently triggers on Category 1, 1a and 2b. Category 1 and 1a substances that are currently included in NPI reports and may be in transfer streams include:

- Ammonia.
- Hydrochloric acid.
- Benzene.
- Toluene.
- Xylenes.
- Manganese & compounds.
- Phenol.
- Particulate matter 10 µm.
- Sulfuric acid.
- Total Volatile Organic Compounds.

Because of their 'use' in steelmaking, the following substances may be triggered for transfers even though they are more often associated with category 2a and 2b emissions.

- Chromium (III) compounds.
- Copper & compounds.
- Lead & compounds.
- Nickel & compounds.
- Zinc & compounds.

The transferred wastes streams (from USEPA (1995) Sector Notebook for the Iron and Steel Industry) that are likely to include NPI substances include:

- Slags.
- Collected process emission control dusts and sludges.
- Wastewater treatment plant sludges
- Treated wastewaters.
- Waste oils / oily water mixtures / oily sludges.
- Used filters.
- Acidic sludges.

Where possible, these 'wastes' are recycled. The volumes of some waste streams are quite large and the waste characterisation process would be complex. The Company would choose to perform more than the minimum required analyses to satisfy internal legal risk criteria. The transfer reporting requirements would be seen as a catalyst for a thorough waste characterisation, especially where the waste stream would be provided to third parties for recycling or treatment.

Performing calculations, measurements and estimates: A probable scenario would be that the composition of the transferred wastes would be analysed periodically until compositions are established. The analyses would cease when the variation range has been established. Most costs would be incurred in the first year.

The transported waste quantities are measured by various means and a database would be developed to compile and organise this data; and estimate mass from volumes where applicable. This would link with other spreadsheets with the NPI substance quantities to enable reporting.

The facility has existing NPI reporting systems that are included in the company's overall environmental reporting systems. NPI transfer reporting would need to be integrated into this process. This would require completing the following activities:

- Reviewing and compiling waste tracking data.
- Reviewing and compiling recycling contracts and related data.
- Preparing a waste characterisation status document to assess the existing information and identify the data gaps.
- Preparing a waste characterisation work plan to address the data gaps ensure sufficient analyses of wastes.
- Updating the environmental monitoring forms and associated reporting.
- Updating the NPI monitoring and reporting procedure and spreadsheets.
- Updating the EMS procedures to include the new reporting requirements.
- Conducting a risk based review and preparing a management brief on the requirements.

- Training would be undertaken by the environmental team and then they would train other staff in the new requirements.
- Implementing the new work plan, procedures and spreadsheets.
- Checking data collection systems and calculations.
- Reporting on system implementation at management meetings.
- Maintaining the system (process changes, facility changes, estimation techniques).
- Comparing with previous years data and data from similar sites.
- Highlighting / investigating irregularities.
- Auditing (externally and internally under the environmental management system).

Reporting transfers:
The facility currently reports using the NRT and the new forms for transfers would be downloaded and reviewed. Data would be uploaded from the newly developed spreadsheets into the transfer forms. Internal review would be conducted via the EMS; the draft transfer report would be reviewed and approved by senior management. The transfer report would then be submitted and records of the transfer reporting process would be filed. When NPI data is published this would be verified and corrected as required.

Although the manufacturing processes, wastes and substances are very different from oil & gas extraction, the case studies are similar and they illustrate that changes to the procedures established within large corporations must be systematic and can be time consuming.

5.4 Electricity generating company

Business description: The Company owns and operates small and medium sized power generation projects world-wide. The Company employs approximately 300 people.

Environmental monitoring overview: The Company currently completes NPI reports for approximately 25 facilities. This equates to approximately 10% of the annual workload for one person. The Company is heavily involved in greenhouse gas reporting and also has reporting obligations for licences and corporate publications. Although the NPI is focussed on facility based reports, industry reporting is usually undertaken on a company-wide basis.

NPI transfer reporting process:
Understanding regulatory requirements: The current NPI emission reporting is primarily done by the Environmental Scientist, who would have the primary responsibility for gathering and learning the transfer requirements. Responsibilities would extend to training several site based personnel the regulatory requirements that impacted their NPI data collection tasks. Written documentation would be required. The frequency and duration of these activities during the first year of transfer reporting would be more intense than subsequent years.

Determining reporting obligations on a preliminary basis: The 25 facilities currently trigger on Category 2a and 2b fuel burning substances. These are assumed not to trigger transfer reporting on their own. Category 1 and Category 1a substances are Formaldehyde and total Volatile Organic Compounds. In addition, the 10 tonne thresholds for other substances, such as hydrogen sulphide, are checked annually for some sites. The Environmental Scientist determines that the transfer thresholds are applicable for formaldehyde (5 sites) and total Volatile Organic Compounds (25 sites).

The primary waste transferred is waste oil. The level of VOCs in the waste oil is unknown for all sites but would probably depend on variables including process conditions, equipment, handling and storage practices. The Company would seek to exempt (as a product) transfers of NPI substances in gaseous form in a pipeline.

Performing calculations, measurements and estimates: About $100,000 is spent per annum on air quality testing – this is the basis for licence compliance and NPI emission reporting. Given the option, the Company would not conduct any analysis on wastes but would use transfer 'factors' to determine NPI substance estimates. Assuming a strong assistance scenario, transfer factors for TVOCs in waste oil would be provided. Investigative work would be completed to determine whether the formaldehyde content in the waste oil is inconsequently small.

Waste transport certificates are the only current mechanism that could be used to compile the transfer volume data. Data gathering would be an onerous exercise as the data is not readily available. Site environmental diaries (hard copy) would need to be compiled and entered into a database or spreadsheet model. The differences in State tracking systems would need to be catered for in the procedures. A spreadsheet would be developed to compile data including the VOC calculations. Work procedures are modified and training given to instruct on data gathering and spreadsheet data entry and the QA procedures are modified to allow an independent check on the work procedures.

Reporting transfers: The main reporting functions are conducted annually and the regulatory requirements are revisited briefly, the forms (NRT) are downloaded and a draft transfer report would be completed and distributed to senior management for approval. The transfer report would be then submitted and records of the transfer reporting process are filed.

NPI transfer reporting costs:
The Environmental Scientist's hourly rate is $110 and this covers items including the base salary, insurances, leave, building rental and company profit. Administrative and operational staff have an average hourly rate of $65, which includes a similar multiplier. Equipment and consumables include items such as computers, software, ISPs, standard office equipment (photocopiers) and telephone charges. These are assessed at 10% of the hourly rates.

Table 5.3 Electricity generation case study

	Cost components for 25 sites – strong assistance scenario						
	Staff – Environmental Scientist ($110/hr)	Staff – admin., operational ($65/hr)	Equipment & consumables	Consul-tants	Service providers - analytical laboratory	Subtotal	Additional set-up costs for transfer reporting (first year)
Understanding regulatory requirements	$1,100	$130	$123	$0	$0	$1353	$5,700 staff $570 equipment
Determining reporting obligations	$550	$0	$55	$0	$0	$605	$2,590 staff $259 equipment
Performing calculations, measurements & estimates	$1,100	$3,250	$435	$0	$0	$4,785	$7,650 staff $765 equipment
Reporting transfers	$550	$65	$62	$0	$0	$677	$1230 staff $123 equipment
Total for 25 sites	$3,300	$3,445	$675	$0	$0	$7,420	$18,887
Total per facility	$132	$138	$27	$0	$0	$297	$755

The energy facilities would likely have a first year set-up cost of $750 per facility and on-going costs of $300 per facility. These predicted costs can be compared with the current NPI reporting costs of $400/facility. Waste tracking costs are integrated into operational costs and cannot easily be identified.

5.5 Comments from the case history interviews

The face-to-face interviews addressed issues that were not limited to the process-based discussion of costs above. Additional comments were provided on a range of transfer reporting issues that are included below.

The current NPI manuals and default emission factors are rarely directly applicable to the actual operations.

The Company operates in many States and Reporting waste transfers to the NPI would be of little additional benefit as most of this data is already given to the States, albeit in a slightly different form.

The need for community-right-to-know inventories is recognised, but there is no clear need against NPI goals for the reporting of data that is not scientifically relevant to the community on environmental or health impacts, as opposed to say academic interest on waste arising. The company perceives that this proposed amendment is attempting to be a "catch-all" on waste data as opposed to focussing on a smaller set of priority or hazardous wastes, to which state environmental agencies already have certain waste tracking data reported to them under regulations. Already within that company some of the smaller operations technically trigger a need to report to the NPI even though the actual emission is miniscule and the substance is in a form that presents minimal risk to the environment. This sort of technicality must be avoided in future versions of the NPI NEPM. Onsite recycling should not need to be reported as a waste transfer, such as process materials flows between equipment being recycled/treated as part of the system.

The (transfer) proposal would technically require every waste to be analysed for the 90+ NPI analytes (whether believed present or not, as legal proof), over a frequency that provides a representative result with a reasonable level of error not yet specified. Then the results would have to be accumulated to test triggering against NPI thresholds taking into account issues with limit of detection accumulation that could cause inappropriate triggering.

The Company could not complete the questionnaire within the required timeframe of one week given the amount of data requested. The divisional structure and cost centres are not able to extract 'environmental' operating costs as they are integrated into operational categories. If costs were provided based on assumptions without this data extraction, the data quality would be very poor and the dollar values possibly misleading. Speculative costs are often underestimated. Therefore qualitative comments were provided together with the rough, overall comparison of four times the cost of existing NPI reporting and that is after a significant initial set-up cost in additional waste analyte analysis and data management.

The inclusions of waste transfers in NPI reporting would have an incremental impact as systems, databases and an analytical program are already in place.

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