

PROGRESS TOWARDS THE ESTABLISHMENT OF A NATIONAL WASTE DATABASE

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SUMMARY : The National Waste Database (DATABASE) project was initiated in response to the need to provide a monitoring mechanism for Commonwealth and State policies aimed at minimising waste by certain amounts within specified time frames. An outline of these policies is provided in this paper before the objectives of the National Waste Database project are described. The DATABASE project is now half way through a three year program and the reports described in this paper will become available in trial form in the first half of 1994.

1 INTRODUCTION

1.1 Background

A series of Conventions, Regulations and policies relating to waste management require the collection and reporting of solid and hazardous waste generation data at the international, national, regional and firm level. These are detailed in Moore et al (1993a) and include:

- ♦ The National Waste Minimisation and Recycling Strategy (CEPA, 1992) , which includes a target of reducing the quantity of waste (on a per capita basis) being disposed to landfill by 50% of 1990 levels by yr 2000.
- ♦ The National Kerbside Recycling Strategy, (1992) which includes recycling targets for particular materials by 1995.

1.2 Project Need

There is a wide spectrum of requirements for the collection and reporting of information on waste generation and management. The danger is that, through a lack of coordination and standards, information will be collected in forms that do not facilitate aggregation and comparison across industry sectors, nor across State and National borders.

The National Waste Database (DATABASE) project was initiated by the CRC for Waste Management and Pollution Control Ltd and the Commonwealth EPA to meet the need for such a system. An outline of the objectives and scope of the DATABASE project are described in the following section before describing the program made to date.

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2 THE NATIONAL WASTE DATABASE PROJECT

2.1 Aim and Objectives

The aim of the project is to establish a database on waste generation in Australia which can be used by State and Commonwealth environmental and waste management agencies, and other interested organisations to set and monitor the achievement of national waste minimisation targets.

To achieve this aim, the following objectives will need to be met:

- (a) Review and establish nationally agreed classification systems for various groups.
- (b) Establish a protocol for sampling and characterising urban solid wastes.
- (c) Establish a national waste generation database to provide fundamental information on the generation of different types of waste by region and in relation to relevant parameters.
- (d) Review Australian and overseas waste generation trends and suggest waste minimisation benchmarks for each waste type by region.

The waste management process is illustrated in detail for solid wastes in Figure 1, and for hazardous wastes in Figure 2. The points in the system at which data will be collected for the solid waste and hazardous waste generation database modules of the DATABASE are indicated in Figure 1 and Figure 2 with a " * ".

The Database will cover both solid waste (non-hazardous waste arising from municipal, commercial, industrial, building and demolition activities) and hazardous waste (generally liquid industrial wastes which are precluded from disposal to the sewerage system) disposed to off-site treatment and disposal facilities. A summary of the two major components of the DATABASE project and the progress that has been made to date are provided below.

2.2 Solid Waste Component of the National Waste Database

In relation to the above objectives of the project, the major tasks that need to be completed for the solid waste component of the project are outlined below.

2.2.1 Establish a National Solid Waste Classification System

Following a review of classification systems in Australia, NZ and other OECD countries a Technical Review Group was established from representatives of Local, State and Commonwealth waste and environment agencies to formulate a National Solid Waste Classification system. This system has been submitted for ANZECC endorsement and will be used on a trial basis for 12 months before final revisions are made. The proposed Draft National Solid Waste Classification system is provided in Table 1 and Table 2. A detailed description of how the tables should be used in practice is provided in Moore et al (1993a) and CRCWMPC (1993).

Existing classification systems in use in Australia and overseas will be translated to the new system to enable existing Australian data to be used and to enable comparisons with OECD waste data to be made.

Table 1
Draft Solid Waste Classification: Waste Streams

Proc./Disposal Route	Waste Stream Principal Source	Sub - stream 1 Secondary Source	Sub - stream 2 Measurement/Transport mode	Sub - stream 3 Material composition
1 Recycling 2 Composting 3 Incineration	A : Municipal Waste	1 Domestic waste 2 Other Domestic 3 Other Council	0 All, Weighbridge Standard Vehicle Types	0 Mixed Standard material types, a subset of Table 2
4 Landfill 5 On-site	B : Comm. & Ind. C : Bldg. and Demo.	0 Unknown A-L Standard ANZSIC Categories X Waste Processing Facility		

Notes :

- 1 Those descriptors in bold to be the preferred minimum data collected on a daily basis at the gatehouse of the landfill.
- 2 Other descriptors to be used selectively to suit local needs, or in total for intensive surveys or as technology becomes available to make comprehensive routine data collection feasible.
3. Refer Moore et al (1993a) for details of the waste stream classification system.

2.2.2 Establish a Protocol for Sampling and Analysing Solid Waste

Following a review of sampling and analysis methods for solid waste composition studies in Australia and overseas, an assessment of their usefulness for a Manual on waste composition studies will be made. Guidelines on the conduct of waste composition studies for the three major waste streams will be prepared, including :

- Guidance on the sampling technique (answering, "where from?, how many?, what size?")
- Guidance on equipment and procedures for waste sorting
- An OH & S guideline

There are currently no Standard methods or procedures for the chemical analysis of refuse samples although there are Standards for coal. However, in the US, analytical procedures for refuse samples have been issued by the ASTM. In general, the ASTM methods are derived directly from the equivalent ASTM methods for coal analysis.

The project is comparing ASTM Standards for RDF and the "equivalent" standard from the AS which are derived from the BS for coal. The Standards are compared, not only in terms of process and equipment, but also in terms of the level of detail provided on aspects such as sampling, sample preparation, choice of equipment, etc. This comparison is being carried out to obtain Standard Procedures for solid waste analysis most suited to Australian conditions.

As part of the DATABASE project, undertake waste sampling, sorting and analysis from the Municipal, and Commercial and Industrial waste streams in the Eastern suburbs of Sydney;

building on the work of Ho (1981), van den Broek (1969) and others to prepare and test drafts of the Guidelines described above.

2.2.3 Establish a National Waste Generation Database

A trial database for waste stream data and waste composition data is being established using Microsoft ACCESS for Windows. Existing data translated to the Draft National System and data being collected by the NSW EPA according to the National System is being used to produce trial reports for comment. Feed-back from potential users on report formats will be

obtained, and the database structure and reports will be refined. An Operating Manual for the ongoing maintenance of the Database will be prepared.

Entities (tables in ACCESS) in the database includes solid waste streams (eg. t/month of Municipal Waste), hazardous waste streams (eg. kL/month of acid waste), solid waste stream composition (eg. % paper in Domestic Waste Stream) and locational data (eg. population employment etc in each LGA). Attributes (fields in ACCESS) of these entities are derived from the Waste Classification System and, for the locational data, from ABS. The major relationships are between the locational data and these waste entities, and between solid waste streams and solid waste composition.

ACCESS is able to access data files from most commonly used commercial database software including dBASE, EXCEL and PARADOX.

2.3 Hazardous Waste Component of the National Waste Database

Hazardous wastes for the purpose of the DATABASE are those wastes which are not allowed to be disposed of to the sewer or to municipal solid waste landfills; if the generator has no means or treating and disposing of them on-site, they must be tankered to an off-site treatment plant. Most of the major metropolitan areas in Australia have established manifest systems which track and record the transport of these hazardous wastes from the generator to the off-site treatment plant, and in so doing build up a database of information on their generation.

Different classification systems have been used to characterise the manifested wastes, with the 1986 AEC system being the basis of the systems used in Sydney, Victoria and S.A., and simpler lists being used in Brisbane and Perth. ANZECC is currently revising the AEC classification system for use in a National Manifest System which will facilitate the transfer of hazardous wastes between States and which will enable data from different States to be compared.

The DATABASE project, in the hazardous waste field, will :

- ◆ Contribute to the revisions to the hazardous waste classification system being undertaken by ANZECC.
- ◆ Obtain aggregated monthly data on the generation of each type of hazardous waste in each region covered by a manifest system and using the national hazardous waste classification system. Data will be aggregated by industry type using 4 digit ANZSIC (Australian New Zealand Standard Industry Classification) codes, which are entered onto the manifest forms and subsequently into the manifest database.
- ◆ Transfer the monthly data into a relational database (ACCESS), with the hazardous waste entity having attributes of waste type (using the revised ANZECC classification system), waste quantity, month generated, ANZSIC code of generator, treatment type provided, and region in which generated.
- ◆ Generate standard reports on the generation of waste types in each region on a routine basis and prepare special reports on request. The design of these reports will be developed through initial consultation with users, followed by trialing and refinement.

With the exception of leaching tests for determining the hazardous characteristics of wastes, sampling and analysis protocols for hazardous wastes are unlikely to require the attention and development that will be devoted to solid wastes.

2.4 Project Liaison and Networking

A Technical Advisory Group has been established with representatives from each State to provide a focus for liaison with organisations in each State. This Technical Advisory Group will assist with trialing of components of the DATABASE and will facilitate implementation of the final products.

As the project gains definition and evolves from a concept to reality, further presentations and consultations will take place with Local Government and with Industry. Presentations at relevant waste conferences will be made, information will be distributed to a mailing list of interested individuals, and information will be posted in networks such as CouncilNet, and be accessible via ERIN. All these activities are now well underway.

2.5 Linkages to Other Databases

The hazardous waste database will be a sub-set of the proposed National Pollutant Inventory (NPI), which will attempt to record all emissions from facilities in a similar manner to the US EPA Toxics Release Inventory.

3 SELECTED PROBLEMS IN WASTE MANAGEMENT

As discussed in the introduction to this paper, the DATABASE project was initiated to solve some specific problems relating to monitoring the achievement of waste minimisation targets in recent waste policies developed at the Commonwealth and State government level.

In addition to these primary uses of the DATABASE, it is possible that solutions to a range of other waste management problems experienced by industry, local government, and State and Commonwealth governments may be assisted by application of the reports from the DATABASE. A selection of such problems and an indication of how the DATABASE can assist in their solution is provided in Moore et al (1993b).

In summary, these problems are:

- Waste Problems in Industry
 - What measures or indices for environmental performance are appropriate in Environmental Management Plans?
- Waste problems in Local Government
 - Which set of policies, able to be implemented by Local Government, are most effective and efficient in achieving particular waste management goals such as waste reduction and waste recycling ?
 - How can Local Government most efficiently obtain the data required to design waste management facilities such as transfer stations and Materials Recovery Facilities ?
- State and Commonwealth Government
 - How can waste minimisation targets, and incentives/penalties to achieve these targets, be fairly and rationally set ?

- How can Australia's performance in waste management be assessed against international practice ?
- Which mix of industries should be encouraged in a region to maximise contribution to GNP, while at the same time ensuring that ESD principles are not compromised ?

4 CONCLUSIONS

The DATABASE project will enable monitoring of waste minimisation targets set by government and industry. Once established, there are a range of waste management problems currently facing industry and all levels of government that will be more efficiently and reliably solved by application of the reports from the DATABASE. In many instances, however, considerable additional development work, utilising the ABS statistical databases, will be required.

5 ACKNOWLEDGMENTS

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Table 3
Annual Quantity of Each Waste Type per Production Employee in Each ASIC Group
in Sydney, 1990
(Source ; Moore & Chelliah, 1992)

Table 4
Total hazardous wastes to manage by country in 1990
(Source : OECD, 1993)

Figure 4
Example Reports from Trial Solid Waste Database

Figure 5

Operation of Manifest System in Australia

(Source : Maunsell, 1991)

Figure 6
Example Reports from Trial Hazardous Waste Database

(These are preliminary figures and are subject to alteration as source data is checked and the Database becomes refined. They are provided to illustrate the sort of information that will become available from the Database. This data should not be used for any purpose other than that noted herein.)