

Testing the Australian Hazardous Waste Data and Reporting Standard

1 JUNE 2017

PREPARED FOR

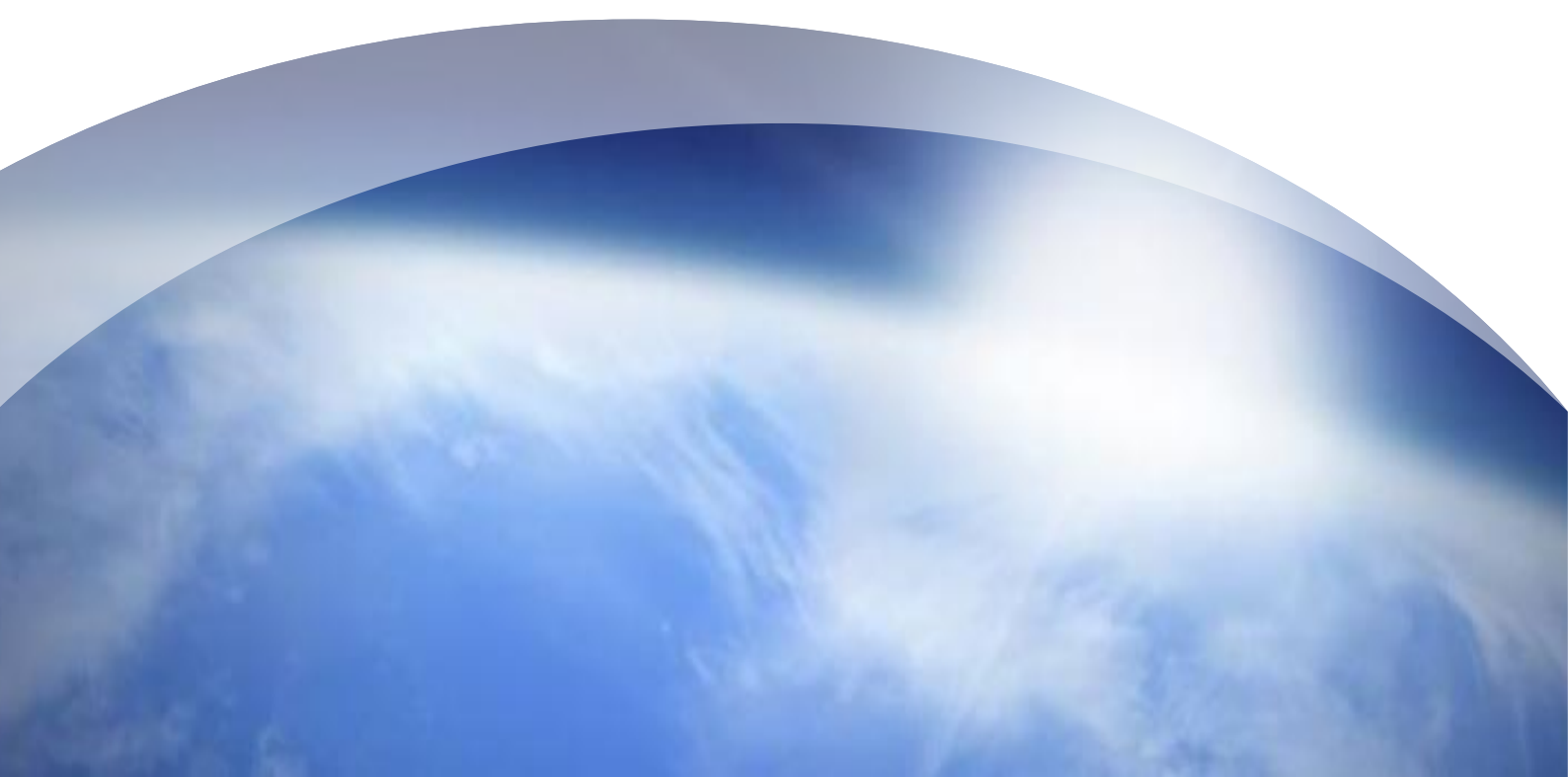
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Introduction

The Australian Government Department of the Environment and Energy (**DoEE**) commissioned Blue Environment, supported by Ascend Waste and Environment, to collect and compile hazardous waste data for developing:

- Australia's report to the Basel Secretariat for 2016
- *Hazardous Waste in Australia (HWiA) 2017*, a report providing an authoritative snapshot of hazardous waste generation, sources and management in Australia for 2014-15.

This work (**the project**) was to be carried out consistent with the content of the *Australian Hazardous Waste Data and Reporting Standard (Test Version 2)* (**the standard**), which had been previously prepared by the same consultants¹. The consultants were required to test the standard – that is, to record, consider and report the difficulties and successes in applying the standard in collecting, compiling and reporting hazardous waste data.

This document reports the outcomes of testing the standard.

The standard comprises 31 items, only some of which were relevant to the project work. The relevance of each item to the work is shown in Table 1 overleaf, based on whether the standard piloted a change from the previous similar compilation of the Basel report and HWiA.

Each relevant item is discussed in this report. In each case we:

- reproduce the item as it is stated in the standard (in a blue box)
- discuss and comment on our findings from using the standard in the project
- make recommendations in relation to the item, including specifying proposed changes to the standard (in a pink box with pre-existing text shown in grey to highlight the proposed new text).

We propose at the back of this document that two further items are added to the standard.

In addition, we provide two recommendations that are not directly related to the standard. These are:

1. Conduct a short study on coal seam gas (**CSG**) wastes to identify the range of wastes, relative volumes, identification of hazards and appropriate waste coding.
2. Conduct a study to back-cast estimates of hazardous waste quantities using current methods to obtain a sound national trend.

¹ Together with Randell Environmental Consulting

Table 1 Item-by-item assessment of how the standard affected the Basel report and HWiA project

Item number & description	Did the standard pilot a change from previous compilation of Basel & HWiA?	
Key terms and definitions	Yes	Used throughout
1 Classification method	No	
2 Guidance for classifying hazardous waste	No	
3 Classifying new hazardous wastes	No	
4 Classifying problematic hazardous wastes	No	
5 Classifying hazardous waste treatment outputs	No	
6 Hazardous waste codes for national reporting	Yes	A new system was used for collating hazardous waste. Biosolids were included
7 Principles for codifying hazardous waste	No	
8 Guidance for codifying hazardous waste	Yes	Enhanced guidance may be needed.
9 Gradual conversion to <i>National Environment Protection (Movement of Controlled Waste between States and Territories) Measure (NEPM)</i> codes	No	
10 Sources of hazardous waste tonnage data for national data set	Yes	There were small differences
11 Scope of hazardous waste tonnage data for the national data set	Yes	Focus was waste 'managed' rather than the previous 'generated'
12 Onsite wastes in the national data set	No	But given the concurrent stockpiles study future relevance is worth discussing
13 Unit conversion factors	Yes	Unit conversion factors developed & used
14 Converting waste arisings data to waste generation data – multiple count adjustments	Yes	There were small differences
15 Recording source sector	No	
16 States and territories to use Australia and New Zealand Standard Industrial Classification (ANZSIC) codes	No	
17 Recording source sector where there are multiple sources	No	
18 Recording source sector where there is a chain of handlers	No	
19 Hazardous waste management terminology	Yes	New terminology to be used
20 National reporting of hazardous waste management (short-term)	Yes	Minor change
21 Hazardous waste management codes (long-term)	No	
22 Hazardous waste infrastructure groups	No	
23 Adoption of national hazardous waste infrastructure typology	No	
24 Populating national database of hazardous waste infrastructure	No	
25 Data validation	Yes	A report on apparent validation is needed
26 Electronic tracking systems	No	
27 Data confidentiality	Yes	Guided data access negotiations
28 Info on national reporting to be kept up-to-date in this standard	No	
29 Quantity data to be provided in six-monthly blocks	No	
30 Transparency in national reporting	Yes	A new system was applied
31 Recording data methods and backdating changes	Yes	Some backdating was applied

Key terms and definitions

The standard provides key terms and definitions that are “intended to provide clear and consistent terminology for national conversations on hazardous waste, and to clarify terms used” in the document. Three terms are worth discussing.

Management

The standard (p.6) states that “for the purposes of this document, management of hazardous waste comprises the activities through which it is dealt with in infrastructure approved to receive it. The types of management are recycling, energy recovery, long-term storage, disposal, treatment and short-term storage. The first four of these are a type of fate; the last two are a type of pathway.”

‘Management’ remains an imprecise term, widely and broadly used in contexts such as ‘waste management’ and ‘environmental management’. We had some concern in using it in HWiA 2017 because readers may miss its specific meaning in context. ‘Management’ was inserted in the standard to supplant ‘treatment’, which is confusing because:

- much infrastructure does not ‘treat’ waste in the normal sense of the word
- it is inconsistent with general waste terminology – ‘treatment’ via landfill, for example, is not used for non-hazardous waste.

While this term caused some concern during the preparation of HWiA 2017, we do not have a better alternative. The term ‘fate’ may be more understandable but is inaccurate because some ‘management’ is not a final destination. No change to the term and definition is proposed.

Pathway

The standard (p.7) states that pathway is “the various steps in the route between hazardous waste generation and fate, potentially including transfer, storage and/or treatment”. ‘Pathway’ could also refer to other aspects of the ‘journey’ of a waste from start to finish, such as the transport route and method. There is potential for use of this term in accordance with the standard to be misinterpreted.

While this term caused some concern during the preparation of HWiA 2017, we do not have a better alternative. No change to the term and definition is proposed.

Storage (of hazardous waste)

Accumulation in approved infrastructure, typically while awaiting the development of appropriate and cost effective infrastructure or processes, or while building economically viable quantities for transfer and management. Storage can be considered ‘long-term’ when at least 10 years of storage is planned. Long-term storage can be considered a fate. ...

In the case of some CSG wastes, the industry could argue that storage of less than 10 years is planned and therefore allocate the waste to ‘short-term’ storage. In our methods for converting from waste arisings to waste generation, this would, by default, mean this waste should be subtracted to avoid multiple counting. This would be inappropriate, and we therefore propose to change this definition.

Accumulation in approved infrastructure, typically while awaiting the development of appropriate and cost effective infrastructure or processes, or while building economically viable quantities for transfer and management. Storage can be considered ‘short-term’ only when there is a plan and reasonable expectation that the term of storage will be less than 10 years. Long-term storage can be considered a fate. ...

Item 6 Hazardous waste codes for national reporting

NEPM codes will be used for most national reporting. Jurisdictional waste codes will be converted to NEPM codes using the mapping process illustrated in Appendix B [of the standard]. The national data set encompasses current Qld regulated waste; NSW trackable waste; Vic prescribed waste; SA and NT listed waste; and ACT, Tas and WA controlled waste with the following exceptions:

- NSW, Qld, SA and WA code K130 *Sewage sludge and residues including nightsoil and septic tank sludge*
- WA code K210 *Septage wastes*
- Vic and WA codes L100 *Car and truck washwaters*
- Vic and WA codes L150 *Industrial washwaters from cleaning, rinsing or washing operations, NOS.*

Where it considers it appropriate, the Australian Government may:

- include additional hazardous wastes
- collate NEPM codes into other groups for convenient reporting.

Review of NEPM codes

There are several instances in HWiA 2017 where NEPM waste codes describe more than one significant waste type, and where there may be merit in further disaggregation or code change. The major instances are discussed below.

Asbestos

Blue Environment and Randell Environmental Consulting are currently undertaking work for the Asbestos Safety and Eradication Agency. A draft recommendation in that work is that a new code is created, N221, for waste contaminated with asbestos containing materials. This would distinguish these wastes from 'pure' asbestos containing materials, which would remain as N220. This would:

- improve data on asbestos waste quantities
- more readily enable states to apply differential levy rates between these two material types, as is currently done by WA.

Biosolids

We were instructed to include biosolids as a hazardous waste in the project. A problem in doing this is its inclusion as N205a. The sister project of developing the *National Waste Report* draws on the collated Basel data and, by including it as an 'N' code (soil/sludge) it is not readily added as an organic waste. This means the data collation is less intuitive and the calculation of landfill gas recovery is more awkward.

One approach is that biosolids or 'contaminated biosolids' could be allocated to the K group as a new code, such as K400, rather than N205a. However, unlike other 'K' wastes, contaminated biosolids are not characterised as hazardous due to their organic nature but due to other contaminants, which is consistent with its current 'N' classification.

We propose that this is reviewed.

Coal seam gas (CSG) industry wastes

Currently the primary waste code for CSG industry wastes of a salty nature is D300 Non-toxic salts. According to tracking data, non-toxic salts in Australia incorporate three quite different wastes:

- Qld CSG brine waters and sludges
- NSW aluminium smelting industry wastes, mostly aluminium dross but also other salty wastes (often called salt cake) from ingot rolling in the final production process

- other NSW metal smelting and refining industry slags, mostly furnace slags from lead acid battery recycling processes.

It is also possible that D300 could include high-salt wastes from desalination processes, such as from the two large seawater desalination plants in WA, but WA tracking data is not provided with sufficient detail to confirm this.

In addition, major volumes of CSG industry wastes are recorded in C100 (alkalis) and N205. Consequently, arriving at a total figure for CSG salty wastes requires the summing of the proportions of C100, D300 and N205 that are CSG-related.

Given the significance of CSG wastes now and into the future, it is recommended that the arisings, pathways and fates of wastes from the sector are examined more closely in a study focusing on the range of wastes, relative volumes, identification of hazards and appropriate waste coding. The results from this study could inform whether a new waste code or codes would better categorise wastes from the industry.

It is noted that industry source code is distinct from waste code, but source codes are poorly reported and there is no specific ANZSIC code for CSG as distinct from the broad category of 0700 *Oil and Gas Extraction*.

Recommendation 1: Conduct a short study on CSG wastes to identify the range of wastes, relative volumes, identification of hazards and appropriate waste coding.

Spent potliner (SPL) waste

The obvious 'home' for this waste would appear to be D110, due to its fluoride content. However, C100 is also used and, due to explosivity hazard, even E100. This suggests confusion on which is the most appropriate code to use. SPL is a significant waste in the scheme of Australian hazardous wastes, but due to the issues described in Section 8.4 of HWiA 2017, tracking figures are ignored in favour of an estimation method based on aluminium production data, which is likely to be more reflective of waste arisings. Consequently, a NEPM code change is probably unnecessary in this case, although the industry would benefit from clearer direction about uniform use of D110.

Other organic halogen compounds

M160 encompasses waste containing some form of organohalogen compound not mentioned elsewhere on the NEPM list. This code acts as an appropriate category for POP wastes such as those containing PBDEs, HBCD, PFOS and also other PFASs. The science and policy response to management of these chemicals/wastes is still emerging and their properties and hazards can be variable. This catch-all code may need to be further disaggregated as these wastes emerge in the future. No change is suggested at this stage however.

Conclusion

Some reconsideration of waste codes is required. Since this would involve regulatory change, we recommended a broader review of all codes.

Other

For comprehensiveness, HWiA 2017 incorporated a code titled 'other', in which wastes that were uncoded or reported in an unmapped code were allocated. The proportion of 'other' varied by year, and generally declines. For 2011-12 to 2014-15 it levelled at about 2% of the total. WA had the highest proportion in modern data, recording 7% in 2014-15. Over the historical record the highest

proportions are from WA and Vic. WA's highest proportion was 18% in 2008-09; Vic's highest proportion was 9% in 2003-04.

In the recent data, part of the problem is reporting in unmapped historical or spurious codes. This is particularly an issue in Qld and Vic, as shown in Table 2.

Table 2 Numbers of waste codes in Qld and Vic

State	# codes in historical data set	# codes used in 2015-16	# codes in state guidance
Qld	109	82	66
Vic	352	96	97

We suggest that:

- states should verify their historical record as recorded in the *National Waste Data Collation*, and that part of this task should be to map 'other' to modern waste codes where possible
- states should take steps to prevent reporting of historical or spurious waste codes.

Waste groups

Twenty-nine waste groups were used for the analysis within HWiA 2017 as tabulated below.

Table 3 Waste groups used in HWiA 2017

Waste code	Description
A	Plating & heat treatment
B	Acids
C	Alkalis
D110	Inorganic fluorine (spent potliner)
D120	Mercury & compounds
D220	Lead and compounds
D230	Zinc compounds
D300	Non-toxic salts (coal seam gas wastes)
Other D	Other inorganic chemicals
E	Reactive chemicals
F	Paints, resins, inks, organic sludges
G	Organic solvents
H	Pesticides
J100 & J160	Oils
J120	Waste oil/water mixtures
K110	Grease trap wastes
Other K	Other putrescible / organic wastes
M100	PCB wastes
M160	Other organic halogen compounds
Other M	Other organic chemicals
N120	Contaminated soils
N205a	Biosolids
N205b	Other industrial treatment residues
N220	Asbestos containing material
Other N	Other soil/sludges
R	Clinical and pharmaceutical
T140	Tyres
Other T	Other miscellaneous
Other	(Not classified)

These groups were expanded from the 'NEPM 15' grouping, with the disaggregations selected because they are significant in terms of tonnages, sources or other issues. The waste groups are different and more numerous than used in the 2015 iteration of HWiA:

1. D110, D230, J100 & J160, M100 and M160 were each disaggregated for the first time
2. K100 was merged with K140 & K190 into 'Other K'
3. Other (not classified) was included.

We do not believe there is a need to specify the waste groups in the standard. The existing text suffices.

Conclusion

We propose to amend item 6 of the standard and its supporting text consistent with this analysis. Our proposed revision to the item is set out below.

NEPM codes will be used for most national reporting. Jurisdictional waste codes will be converted to NEPM codes using the mapping process illustrated in Appendix B. The national data set encompasses current Qld regulated waste; NSW trackable waste; Vic prescribed waste; SA and NT listed waste; and ACT, Tas and WA controlled waste with the following exceptions, **which are excluded**:

- NSW, Qld, SA and WA code K130 *Sewage sludge and residues including nightsoil and septic tank sludge*
- WA code K210 *Septage wastes*
- Vic and WA codes L100 *Car and truck washwaters*
- Vic and WA codes L150 *Industrial washwaters from cleaning, rinsing or washing operations, NOS.*

Where it considers it appropriate, the Australian Government may:

- include additional hazardous wastes
- collate NEPM codes into other groups for convenient reporting.

The Australian Government, in concert with the states and territories, will review the list of wastes under the NEPM for relevance, including the potential for new waste codes. In order of priority, those most relevant for review include:

- N220 to be augmented with the addition of N221, for wastes contaminated with asbestos contaminated material.
- N205 biosolids (as N205a, N206 or K400).
- CSG wastes (currently reported against C100, D300 and N205). CSG wastes should be examined more closely through a follow-up study, which focuses on classifying the range of wastes, relative volumes and the identification of specific hazards of each.

States should verify the historical record of their hazardous waste arisings reported in the *National Hazwaste Data Collation*, including mapping of historical and spurious state waste codes to modern state waste codes where possible.

Item 8 Guidance for codifying hazardous waste

Through consultation with industry, the Australian Government and the states and territories should develop guidance on how industry users should code wastes. The principles and examples in Appendix C should form the basis of such guidance. Existing jurisdictional approaches and insights, such as those published by NSW and WA should be utilised.

In working on HWiA some insights were obtained into the need for appropriate coding, particularly in relation to CSG and SPL wastes (both discussed in more detail elsewhere in this document).

No changes are proposed to this item, but we propose to review the guidance in the Appendix C of the standard to ensure it encompasses the scope of the lessons learned during preparation of HWiA 2017.

Item 10 Sources of hazardous waste tonnage data

Where available, tracking system data will be used as the primary source of national data on hazardous waste tonnages (with appropriate adjustments – see below). Gaps in the primary data set will be filled using additional data that the jurisdiction is able to provide from NEPM, facility or survey data. The tracking system and other data from jurisdictions may be supplemented or adjusted using other sources of data, such as from industry bodies, based on the considerations illustrated in Figure 2 (of the standard).

Unlike the first version of HWiA, the quantities of D110 *Inorganic fluorine* (spent potliner) were estimated using production estimates multiplied by a factor. This was because of concerns that the quantities of this waste generated was missing from the data because it is mostly stored on site. However, this is consistent with the standard.

No changes to this item are recommended.

Item 11 Scope of hazardous waste tonnage data

For the collection of data from 2015, the Australian Government will ask states and territories to provide data on the tonnes of waste managed in their jurisdiction rather than generated in their jurisdiction. If this process works easily and the resulting data set is of sufficiently high quality, this process will be used for collecting data in subsequent years.

The states did not engage strongly with this distinction, forwarding a ‘data dump’ consistent with the previous iteration of this work. The work in distinguishing between waste managed and waste generated in a jurisdiction fell to the consultant analysts. The results were mixed, shown in Table 4.

Table 4 Management of inter-jurisdictional transfers in the National Hazardous Waste Data Collation

State	% from interstate	% source jurisd. blank	Waste sent interstate	Adjustments made
ACT	Assumed 0%	n/a	100%	Subtracted ACT waste recorded in other jurisdictions' data.
NSW	8%	0.04%	Excluded	Subtracted waste recorded in NSW data as produced elsewhere. Added data from other states recorded as produced in NSW.
NT	Assumed 0%	n/a	100%	Subtracted NT waste recorded in other jurisdictions' data.
Qld	1.1%	15%	Not provided	Subtracted waste recorded in Qld data as produced elsewhere. Added data from other states recorded as produced in Qld.
SA	<i>Not recorded</i>			Subtracted some data from NT & Tas to avoid risk of double counting.
Tas	Assumed 0%	n/a	100%	Subtracted Tas waste recorded in other jurisdictions' data.
Vic	0.5%	20% ¹	Included ²	Subtracted waste recorded in Vic data as produced elsewhere. Added data from other states recorded as produced in Vic.
WA	<i>Not recorded</i>			Added data from other states recorded as produced in WA.

Notes: 1 Some of this quantity is likely to be exports to NSW that are reported back to Vic and included in the data, therefore representing a double-count. This issue came to light late due to some work undertaken for Victoria.

2 Logically this should have been excluded. However the data on exports to NSW was wildly inconsistent with the data recorded under the National Environment Protection (Movement of Controlled Waste between States and Territories) Measure and considered unreliable.

Accounting for interjurisdictional movements remains a troublesome area of the collation task and there remains potential for error, particularly in relation to waste groups disaggregated beyond the ‘NEPM 15’ level.

Capturing waste ‘managed’, rather than ‘generated’, was done on a trial basis. The trial was not particularly successful, and made the analytical task slightly more complex. The distinction, in tonnes, between waste generated and managed is not large for those states with tracking systems. In addition, the net result was inconsistency:

- data for states with tracking systems comprised waste managed in that jurisdiction and was possibly incorrect in some areas
- data for jurisdictions without tracking systems comprised waste generated in that jurisdiction.

We propose that future work should aim for consistency across all states and territories, with reporting of waste generated, rather than managed, by jurisdiction. There is little difference in the amount of effort and about the same risk of error.

Work to understand and resolve the potential for double-counting wastes should continue.

We propose to amend item 11 of the standard as set out below.

The Australian Government will ask states and territories to confirm how their data represents hazardous waste the was transported to, or received from, interstate. Appropriate adjustments will be made. The adjustment methods will be transparent to enable state and territory review.

Item 12 Onsite wastes in the national data set

The Australian Government will consult with the states and territories to attempt to identify and seek data on significant on-site stockpiles of hazardous waste, including through workplace health and safety regulators. Significant and quantifiable additions to such stockpiles during the reference year may be included in national hazardous waste data.

A consultancy project on stockpiles was undertaken at the same time as HWiA 2017 but its output was not ready in time for substantial inclusion. The one input related to that process was that tracking system data on *D110 Inorganic fluorine* was discarded and replaced by an estimate based on aluminium production multiplied by a factor from the literature. This was considered more accurate given that most of this waste is put into stockpiles. Use of this factor may represent a template and precedent for subsequent work in this area.

No changes to this item are recommended.

Item 13 Unit conversion factors

The Australian Government will develop a set of waste type specific factors for converting volume measures and numbers of items to tonnes. These will be used for converting state and territory hazardous waste data to a consistent tonnage basis, either by the states and territories themselves or subsequently by the Australian Government. The standard factors will be included in a revision of this standard.

Unit conversion factors were generated as part of the project and were applied in the *National hazardous waste data collation*. Not all the states with tracking systems provided data in raw units allowing for these conversion factors to be used, as illustrated in Table 5.

Table 5 Use of standard conversion factors in collating tracking system data

	Units in the data provided	Conversion factors applied to ...	Comments
NSW	Weight, volume, no. drums	Volumetric data, no. drums	
Qld	Weight, volume	Volumetric data	Drums and tyres are reported by weight or volume
SA	Weight, volume, no. drums	Volumetric data, no. drums	
Vic	Weight	None	Volumetric data and any data on numbers of drums are converted to tonnes by Vic. Tyres are not tracked.
WA	Weight, volume	Volumetric data	Drums and tyres are reported by weight or volume

Note: While tyres are reported by some jurisdictions (as described above) these figures are removed and replaced with alternative figures from a national study deemed to be of higher quality.

The Vic data set contains only data in tonnes but it is apparent that some data is submitted in volumetric units. It appears that a standard assumption is made across all waste types that the density is one per cubic metre. This is likely to exaggerate the quantities of some wastes and undermines the consistency of national waste reporting.

There is a need for the new factors to be applied by Victoria, or for their certificate-recorded quantities to remain in their original units of measure for adjustment in the national data collation.

We propose to amend item 13 of the standard as set out below.

A set of waste type specific factors for converting volume measures and numbers of items to tonnes is included in Appendix [to be determined] of this standard. These factors should be used by all states and territories and the Australian Government for converting hazardous waste data to a consistent tonnage basis.

Item 14 Converting waste arisings data to waste generation data

Hazardous waste arisings are the sum of waste tonnages sent to all types of hazardous waste infrastructure. In using arisings data to estimate hazardous waste generated, the Australian Government will exclude (to the extent the relevant tonnes can be identified):

- hazardous waste sent to facilities for short-term storage or transfer
- hazardous waste outputs of hazardous waste infrastructure – only inputs will be counted.

This is consistent with the definition of hazardous waste ‘generation’ given in Section 2.

...

The following techniques can be used for identifying the tonnages for subtraction (assuming Items 21 and 22 of the standard are adopted and implemented):

1. Waste sent to facilities for short-term storage or transfer is equal to the tonnes sent to management codes D13, D14, D15 and R13 (see Appendix F of the standard for descriptions).
2. Hazardous waste outputs from facilities that receive hazardous waste for recycling, energy recovery, treatment or long-term storage can be identified when these infrastructure groups are the source of the hazardous waste (see Item 22 and Appendix G of the standard). Alternatively, where this information is not available, NEPM code N160 *Encapsulated, chemically-fixed, solidified or polymerised wastes referred to in this list* provides an estimate of the hazardous waste outputs of treatment, which is likely to represent the bulk of the outputs from hazardous waste infrastructure.

Short-term storage or transfer

Only Qld and Vic data record management codes that, where used correctly, identify short-term storage or transfer. In these states, except for CSG wastes as described below, these amounts were deducted to derive estimated waste generation. In other words, short-term storage and transfer were assumed to represent ‘multiple counts’ of waste that would already be in the data.

For the other states, initially, for each waste type, waste generation was estimated by multiplying reported arisings by the ratio:

$$(Vic\ generation + Qld\ generation) / (Vic\ arisings + Qld\ arisings) = multiple\ count\ correction\ factor.$$

This approach to correcting for multiple counts was pioneered in the reporting of the Basel data for 2014.

With the greater level of analysis occurring for HWiA 2017, an anomaly of using this approach was detected. For some wastes in NSW and WA, application of the multiple count correction factor, resulted in an estimate of waste generated that was less than the quantity recorded as sent to recycling and disposal. In these cases, the multiple count correction factor was clearly too large. This effect was not observable for SA, where management type is not recorded. In these cases, generation was estimated using a different correction factor:

$$(waste\ to\ codes\ D13,\ D14,\ D15\ and\ R13\ in\ Qld\ and\ Vic) / (waste\ to\ storage\ codes\ in\ Qld\ and\ Vic).$$

The multiple-count correction approach for short-term storage or transfer only works if the data is accurate. The data should represent wastes that go to storage for a short period then ‘arise’ again into the hazardous waste management system. CSG industry salty wastes, represented by codes C100, D300 and N205, enter storage infrastructure in large quantities, and little evidently re-emerges. Applying this multiple-count correction results in large under-estimates of CSG wastes, because 57% of the CSG component of D300 arisings is allocated to short-term storage. Totals are likely to be already underestimated due to the prevalence of onsite storage, which is not captured in

tracking data. Care and attention is needed to ensure CSG wastes are appropriately counted. The methods for this are not necessarily consistent with the arithmetical formulas shown above.

We note that this issue is likely to be resolved in the long-term assuming:

- the states implement the long-term hazardous waste management typology given in Appendix F of the standard
- 'long-term' and 'short-term' storage can be appropriately identified.

We are not satisfied that the second of these conditions is properly reflected in the test version of the standard and consequently propose the change to the 'key terms and definitions' given on page 6.

Treatment outputs

Item 14 of the standard states that "... the Australian Government will exclude (to the extent the relevant tonnes can be identified) ... hazardous waste outputs of hazardous waste infrastructure ...". It provides two methods of identifying these tonnes, including using NEPM code N160 *Encapsulated, chemically-fixed, solidified or polymerised wastes referred to in this list*. Unfortunately this was not implemented, and N160 data was not subtracted. This exaggerates national generation by about 29kt or 0.4%.

Conclusion

While there were difficulties in the methodological detail for converting waste arisings to generation, these are best covered externally to the standard. No changes to this item are recommended.

Item 19 Hazardous waste management terminology

Application of the term 'treatment' to refer generally to management of hazardous waste should be phased out. The definition of 'management' given in this standard should be applied. 'Treatment' should be considered a type of hazardous waste management.

Figure 4 of the standard illustrates how this revised terminology fits with the overall system of describing and coding the activities that occur in hazardous waste infrastructure.

The term 'management' was used throughout HWiA. No problems were reported at the draft stage. No changes to this item are recommended.

Item 20 National reporting of hazardous waste management

National reporting of hazardous waste management will apply the following typology, which is similar to that used by NSW and SA:

- recycling
- chemical/physical treatment
- landfill
- biodegradation
- thermal destruction
- storage or transfer
- other.

The different typologies for 'treatment type' will be mapped to the national set of hazardous waste management types as shown in Appendix E of the standard.

As expected, NSW, Qld, Vic and WA provided data on management of hazardous wastes. Their management codes were translated to the 'short-term' management list given above using the mapping out in the standard. A few difficulties were experienced:

1. About 4% of the waste received could not be mapped, typically because no management code, or a spurious management code, was provided. It is likely that much of this material is associated with waste that was transported interstate. This issue was greatest in Vic, where management of 7% of the waste was listed in one of 29 management categories not referenced in its guidance document (including blank entries).
2. We remain uncertain that the codes mapped to 'biodegradation' are consistent in all states.
3. Appendix E is inconsistent with Item 14 of the standard because the Qld and Vic management codes D13 and R13 are not mapped to 'storage or transfer'. This should be changed.

No changes to this item are recommended, but Appendix E and the National Hazardous Waste Data Collation tool should be corrected.

Item 25 Data validation

Prior to provision to the Australian Government, states and territories should ensure hazardous waste data is validated through data quality checks and cleaning. The checks should consider completeness, accuracy, consistency and reasonableness. In particular, checks should be made to look for:

- unit errors (such as mistaking kilograms for tonnes)
- inconsistent coding of wastes from the same company or of the same type
- major gaps (for example, hazardous wastes that are not included in tracking systems)
- major differences from previous years (e.g. in the quantity of a particular waste type)
- use of historical reporting codes (these should be converted to modern codes).

Significant errors should be identified and removed, and significant gaps should be filled to the extent practicable. Suspect data should be identified in the submission.

The project experienced major problems with data quality, especially in relation to Qld and, to a lesser extent, Vic.

Qld submitted its data noting that:

- “The data has not been cleansed prior to its release.
- The data contained within these reports may contain gaps where data has not been verified and uploaded into the departmental system.
- The data contained within these reports may contain typographical errors that have occurred during the verification process.”

The result was major problems in Qld’s data, including approximately 700,000 tonnes of gross errors most likely caused by reporting unit errors, that suggested physically impossible single truck waste load sizes². Adjustments were necessary to total hazardous waste generation numbers to produce reasonable trend estimates, since an anomaly this size implies a large trend spike, but individual waste totals were left unchanged, to retain consistency with the submitted data.

In the Vic data, the proportion of the tonnes with a valid source code was much lower than in the previous version of HWiA: only 16%, compared with the previous 94%. This was apparently due to improper processing of paper certificates in the new Vic data storage system.

We are unsure of the extent to which the checks listed in the standard were undertaken by states other than Qld. It is clear that care was taken in providing the data. SA’s data was provided collated as previously.

While no immediate changes to this item are recommended, it is noted that HWiA 2017 recommendation D7 suggests that “Independent validation of jurisdictional hazardous waste data on a routine basis should be considered”, for example quarterly. Should this recommendation be adopted, resourced and found to be practical (given the disparate state-based tracking systems), it could be included as part of this item in a future revision of the standard.

No changes to this item are recommended.

² Qld EHP stated via email that “... Queensland operators have developed what is called a paper manifest where one certificate can contain multiple waste movements. The data on the paper manifest is not individually listed, instead only the total is used. This may account for some (but not all) of the tonnages where it exceeds one vehicles limit. Please note this submission process was not lawful and the department has since put a stop to it.”

Item 27 Data confidentiality

The Australian Government will negotiate a memorandum of understanding with the states and territories in relation to the confidentiality of hazardous waste data. The types of confidentiality covered will include:

- commercial-in-confidence information
- regulator-in-confidence information.

The Australian Government may consider hazardous waste data commercial-in-confidence if either:

- a state or territory specifically advises the Australian Government to that effect and provides supporting information, or
- each of the following apply
 - public release of that data could reasonably be expected to have significant adverse impacts on the commercial interests of one or more of the original providers of that information
 - the damage to those commercial interests outweighs the public interest in publication of that information
 - the information is not available elsewhere in the public domain
- collated data is attributable to less than three facilities or companies.

Hazardous waste data may be considered regulator-in-confidence if a state or territory specifically advises the Australian Government to that effect and provides supporting information.

Notwithstanding the above, state and territory data collated by NEPM or Basel Y-code is not considered confidential.

The proposed memorandum of understanding will specify, for each state and territory, the data fields that the Australian Government is allowed to access without further negotiation.

The states provided data in similar forms to the previous version of HWiA, that is:

- pre-collated – SA (no confidentiality risks based on the standard)
- company names removed – Vic, WA (no confidentiality risks based on the standard)
- all fields – NSW, Qld (confidentiality risks exist).

SA advised that more detail could be provided for future reporting years, which would fall within the scope of their new data reporting and storage system.

HWiA was written to avoid naming specific companies. However, Qld requested removal of references to industry types ('large electricity network', 'iron and steel manufacturing company', 'waste water treatment plant') in three places in the report. We acquiesced to those requests. No other confidentiality concerns were raised.

No changes to this item are recommended.

Item 30 Transparency in national reporting

The Australian Government will ensure that manipulations, adjustments and substitutions applied to state and territory data are transparent, so that states and territories can follow the logic, assumptions and calculations linking their data to the corresponding national data.

For the previous version of HWiA, transformations to national codes for waste types, sources and management types was undertaken within the very large workbooks provided by the states. These were not readily transferable or comparable by the states due to their large size. The data collation shared with the states included data pre-converted to national codes.

For HWiA a *National Hazardous Waste Data Collation* was produced in which the data inputs were collated using the 'language' of the individual states. That is, the input data were collated in each state's waste codes, source codes, management codes and units (weight, volume, numbers of units and numbers of transactions). Only the summing was undertaken in the large workbooks supplied by the states. Within the collation provided to the states, transformations were undertaken to:

- national codes – by applying transparent mappings contained in the worksheet 'Transform'
- tonnes – by applying transparent conversions contained in the worksheet 'Densities'.

The collation subsequently transforms the national codes in tonnes to include:

- conversion from NEPM codes to waste groups
- conversions from 'arising' to 'generation'
- manipulations to adjust for inter-jurisdictional transfers
- substitution and addition of alternative and national data (gap filling etc.).

The collation also included a historical record of arisings.

We believe this satisfies the requirements of the item. WA checked and confirmed the collated data but the other states did not appear to engage strongly with the workbook. Qld's historical record differed from the 'cleaned' data set provided for the previous version of HWiA (albeit in numerous difficult-to-analyse worksheets).

No changes to this item are recommended.

Item 31 Recording data methods and backdating changes

The Australian Government will record the sources, methods and assumptions it applies in compiling hazardous waste data. To the extent practical, where changes occur, it will retrospectively apply those changes to previously reported data in order to maintain an accurate record of trends.

HWiA 2017 found numerous instances of previous years' data differing from what was previously supplied, and without apparent reason. States with tracking systems should review their historical annual data in the *National Hazardous Waste Data Collation* (the data record for this project) and sign off on its veracity for indefinite reuse, so the dataset remains consistent for trend analysis in future years.

Since the 2010-11 dataset, national methods for collecting, collating, enhancing and adjusting data on hazardous wastes have evolved substantially. Annual compilation sets are difficult to compare across the years of 2010-11 to 2014-15, due to methodological changes across this time-series. Consideration should be given to 'back-casting' the annual compilation set of Australian hazardous waste data using current methods, once a jurisdictional verification and 'sign-off' of the historical record has occurred. This could cover the period over which hazardous waste quantities have been published and studied in detail (2010-2015) or extend more broadly over the time series of national Basel reports.

Data sources, methods and assumptions would be recorded along with the adjusted data in the National hazardous waste data collation data file, or similar data record used in future years.

In adjusting for 'generation', to remove possible multiple-counting from 'arisings', beyond those historical years where full 'data dumps' are available, it is likely that recent year proportions of those management types that require subtraction will need to be back-casted, as representative of those years where detailed data does not exist.

Recommendation 2: Conduct a study to back-cast estimates of hazardous waste quantities using current methods to obtain a sound national trend.

Proposed new items

We propose that the Department should consider incorporating additional items into the standard as follows:

Recording soil contaminants

Victoria requires reporters to record the contaminants of contaminated soil, in order of significance. To our knowledge, other states do not. This information should be easy to report because an assessment must have been made to determine the soil is contaminated. It would provide important additional information, for example on the extent of asbestos contamination in soils and trends in rehabilitation of particular types of contamination.

We suggest a new item should incorporate recording of soil contaminants into the standard.

Contaminant-based hazard classification frameworks

There is demand from states and territories for national guidance on setting contaminant-based hazard classification frameworks, which are used by many jurisdictions in classifying (characterising and categorising) whether a waste is hazardous. This includes a clearer evidence base for the choice of which contaminants to assess, how the levels of contaminants (thresholds) are set, and how these thresholds correspond to different allowable levels of management for the waste. It is noted that Vic EPA has recently undertaken further work in this area, as part of its review of its hazardous waste framework and key legislation.

We suggest a new item should flag Australian Government interest in this issue, stating, for example that: 'The Australian Government may endorse classification frameworks, including risk-based contaminant thresholds, that specify whether a waste should be deemed hazardous'. Further levels of commitment, such as timelines, may be appropriate.