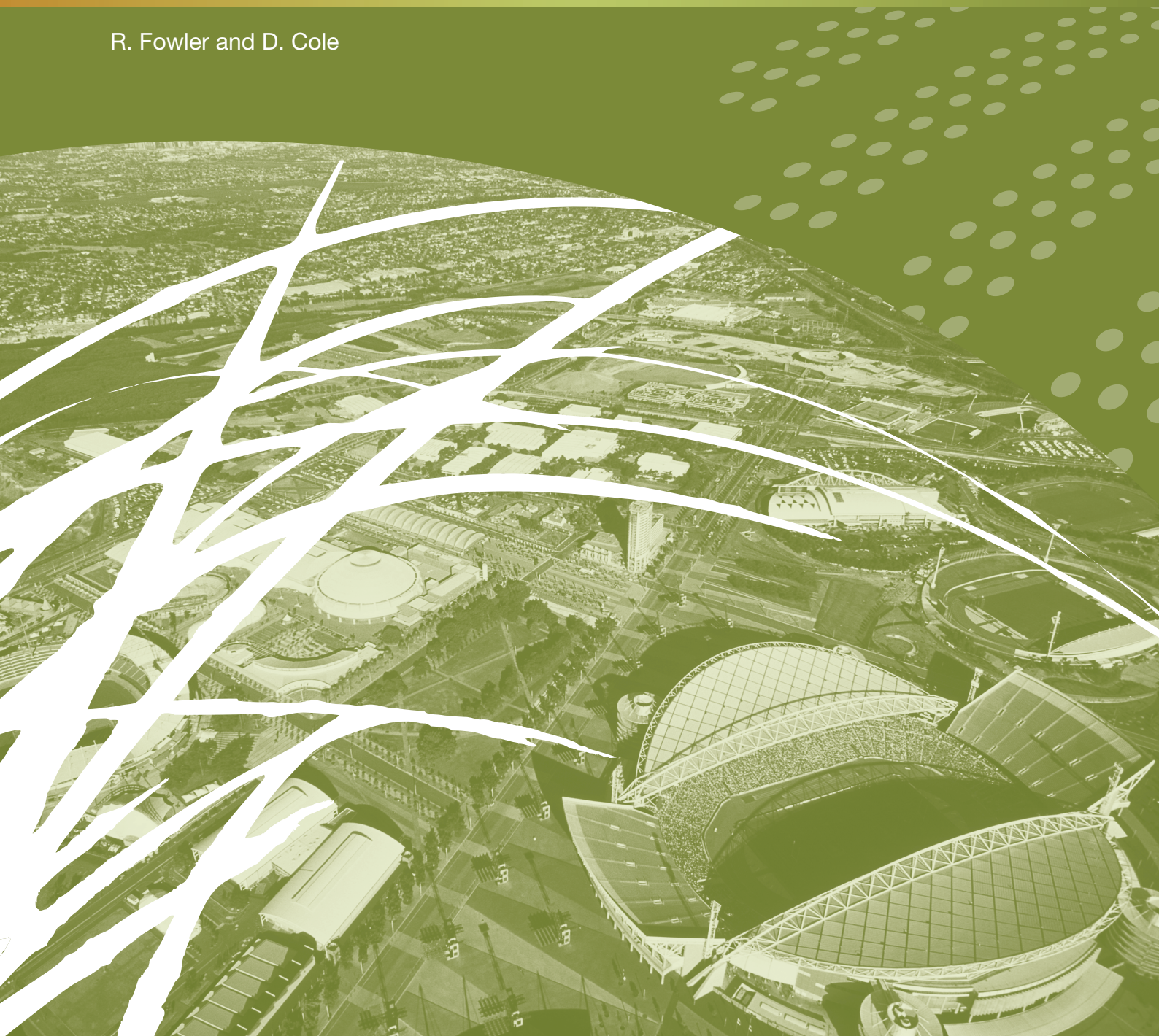




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report

Safe on-site retention of contaminants
Part 1: Regulatory approaches and issues
– a legal perspective

R. Fowler and D. Cole



CRC for Contamination Assessment and Remediation of the Environment

Technical Report no. 16

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Part 1: Regulatory approaches and issues – a legal perspective

R. Fowler¹ and D. Cole²

¹University of South Australia

²DLA Phillips Fox

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Enquiries and additional copies:

CRC CARE, PO Box 486, Salisbury South, South Australia, Australia 5106
Tel: (61) (08) 8302 5038
Fax: (61) (08) 8302 3124
www.crccare.com

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The remediation program for Sydney's Homebush Bay – the home of the 2000 Olympic Games – included the application of in situ retention. The preferred option, supported by the community, was the treatment and containment of contaminants on-site to minimise exposure rather than remove the hazard to another site. For more information visit www.sydneypark.com.au

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Adelaide
February 2010

Executive summary

Site contamination issues present potentially significant impediments to land redevelopment in Australia. As the pressure mounts to contain urban sprawl in Australian cities, the desirability of higher density, inner city residential development is becoming widely accepted. Former railway yards, docklands and industrial sites have become prime targets for redevelopment. However, such sites present significant challenges with respect to remediation of the contamination that is commonly associated with them.

The established practice of excavating contaminants and disposing of them to landfill ('dig and dump') now faces serious challenge as policies to reduce the flow of wastes, particularly of a hazardous nature, to landfill sites are adopted by state and territory governments. One alternative that is economically attractive to developers is to leave significant amounts of contamination on the site (commonly referred to as 'in-situ retention') with varying levels of physical containment provided. This approach is presenting as an alternative to 'dig and dump' or other remediation methods where site-based risk assessment indicates that the option poses no significant risks to human health or the environment, provided that the relevant containment measures are not breached.

Within the community the in-situ retention approach is likely to be met with the suspicion that it involves 'covering up' the problem. Regulators, in turn, are wary of endorsing an option that may be widely opposed by an affected community. Similarly, environmental auditors may be adopting a cautionary approach to the selection of remediation options, preferring to endorse clean-up to background values rather than retention in situ. This may, in turn, be discouraging the market for site remediation projects from operating in some instances. The remediation industry, developers and the community could all benefit from further clarity as to when it is appropriate to adopt the approach of in-situ retention for the purpose of remediation of a contaminated site.

This report examines a range of legal and policy issues that arise where in-situ retention is proposed as a remediation strategy. It surveys the current state of relevant law and policy across a number of jurisdictions within Australia, and explores how the same issues have been addressed in various jurisdictions in North America and Europe. Its conclusions are summarised in Section 7.

There are four specific issues that have been identified and addressed in this report:

- the adequacy of the current regulatory framework for dealing with contaminated sites in terms of providing appropriate guidance as to when in-situ retention is an acceptable remediation strategy
- the need for appropriate legal mechanisms (referred to commonly as 'institutional controls') alongside specific engineering measures to ensure that there is effective long-term management (or 'stewardship') of sites where contaminants are retained in situ
- the extent to which those parties undertaking remediation via the in-situ retention method (in many cases, voluntarily in the course of redeveloping land) may be exposed to a future, 'residual' liability for such sites – for example, if

unanticipated impacts occur, new treatment methodologies emerge or later owners do not comply with the relevant institutional controls

- the potential overlap between site contamination and waste management legislation where in-situ retention is proposed as a remediation strategy.

Our broad conclusion with respect to each of the above matters is that there is currently a lack of both sufficient specific policy guidance at the national level and appropriate guidance within relevant state/territory legislation and policy instruments. We found, in particular, that relevant state legislation has an ‘open-textured’ character that fails to provide specific guidance on remediation options generally, and with respect to in-situ retention specifically. This has the potential to result in inconsistencies in approach to remediation between similar cases, and reduces the degree of accountability of a range of decision-makers when determining the acceptability of proposed strategies. The resultant uncertainty is compounded by the degree of responsibility that has been vested in environmental auditors in most jurisdictions to determine the appropriate remediation strategy in any particular situation.

Conceivably, these shortcomings could be addressed collectively by policy-makers through the Environmental Protection and Heritage Council (EPHC) in the first instance. This could pave the way for each jurisdiction to implement the outcomes of the EPHC process through their respective legislative and policy mechanisms.

In addition, we identify a significant lack of specific legal measures, in the form of institutional controls, to address the challenge of ensuring sound, long-term management of sites at which contaminants have been retained in situ. In particular, no consistent approach to this important aspect of in situ retention has yet been developed in Australia, in distinct contrast to the United States experience with the Uniform Environmental Covenants Act. We also identify a similar lack of specific measures with respect to the question of residual liability for sites where contaminants have been retained in situ. In addition, we comment on a potential problem, based on recent experience in the European Union, with the possible overlap of waste management and site contamination laws where in-situ retention is envisaged.

Finally, we note a deeper, unresolved issue with respect to compatibility of the in-situ retention approach with the concept of sustainability that is now commonly enshrined (in the form of principles of ecologically sustainable development (ESD)) in the objects clauses of much environmental legislation in Australia. It may be argued that in-situ retention is simply deferring the resolution of site contamination problems to future generations, which is contrary to the principles of ESD—at least unless both the technical and legal controls applicable to sites treated in this way can be guaranteed to be effective. This issue, at the very least, heightens the need for development of the specific measures recommended in this report if the practice of in-situ retention is to gain wider acceptance as a remediation strategy in Australia.

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1. Introduction

1.1 Issues addressed in this report

Australia shares in common with many other countries a need to provide land for residential, commercial and recreational purposes in inner city areas in order to attempt to reduce the rate of expansion of the boundaries of its major cities.¹ In many instances the land that is most suitable for redevelopment for such purposes is likely to have had a prior use that has involved the discharge of contaminants into the soil and possibly also the underlying groundwater. These historical uses may have been industrial operations; commercial sites such as petrol stations; or, commonly, railway yards, docklands and similar transport facilities. Land contamination issues can also arise with respect to new development in peri-urban areas where prior urban land uses have involved the intensive use of agricultural chemicals.

Estimates vary widely as to the number of contaminated sites thought to exist in Australia², but the reality is that many sites within the existing boundaries of Australian cities that are proposed for redevelopment have contamination that requires prior assessment and remediation. The cost of treating contaminated sites can be significant, depending on the particular clean-up methodology employed. In Australia, by far the most common clean-up strategy until recently has been 'dig and dump'—the removal of contaminants from a site for disposal at a landfill facility. However, there is now significant pressure to reduce the volume and toxicity of wastes being disposed of at landfills³, as reflected, for example, in moves in Victoria to significantly increase its disposal costs.⁴ As a result, alternatives to the traditional 'dig and dump' strategy are being sought by those wishing to redevelop contaminated sites.⁵

In considering a range of clean-up options that might include physical or biological treatment of contaminants both on site and off site, those responsible for determining the most suitable remediation strategy in each particular situation have tended to act with considerable caution. It is widely accepted that the human, environmental and groundwater investigation levels (HILs, EILs and GILs) adopted under the National Environment Protection (Assessment of Site Contamination) Measure 1999 (the 'NEPM (Site Assessment)') have had a de facto application as clean-up standards.⁶ The 'dig and dump' approach has enabled the removal of most or all contamination, so as

¹ In the United States this need has been recognised through the emergence of the 'smart growth' movement: see Smart Growth Network 2006, *This is Smart Growth*; see also www.smartgrowth.org. For its Australian counterpart, reference can be made to the 'urban consolidation' strategy that has been promoted in most states over the past 15–20 years: see Randolph, B, Bunker, R and Holloway, D 2005, *The social impacts of urban consolidation: the case of Sydney, Australia*, City Futures Research Centre, The University of New South Wales (noting that 'an estimated 60–70 per cent of new dwelling provision in the next thirty years (in Sydney) will take place within existing suburbs through higher density redevelopment') at p. 1 (paper on file with authors).

² A recent estimate, reported in a Canadian government study, is that there are 160,000 contaminated sites in Australia: see Industry Canada, Environmental Industries 2005, *Soil remediation technologies*, at p. 4 (Table 3). It is not clear, however, what the source is for this estimate. Another recent survey suggests that 'the estimated total number of contaminated sites in Australia varies from 60,000 to 200,000': see Deegan, C and Ji, S 2008, 'Finding information about contaminated sites in Australia: there has to be a better way!', *Environmental and Planning Law Journal* 25(4), 284–297, at p. 284.

³ See State Government of Victoria 2005, *Sustainability in action: towards zero waste strategy*; see also *Waste Avoidance and Resource Recovery Act 2001* (NSW).

⁴ See Victorian Environment Protection Authority 2008, *Calculating the landfill levy and recycling rebates*, Information Bulletin (Publication 332.1).

⁵ There may also be a need now to consider matters other than safety and cost, including climate impacts and sustainability: see Barwood, J 2008, 'Remediation under review', *Waste Management and Review*, p. 42.

⁶ See National Environment Protection Council (NEPC), *National Environment Protection (Assessment of Site Contamination) Measure Review Report*, September 2006, noting (at p. 15): 'Most submissions suggested that there was misuse of investigation levels in site and risk assessments, e.g. use of investigation levels as clean-up criteria.'

to return sites to background levels that meet the relevant investigation values. Hence, this cautious approach has been generally accepted until recently but, as this option has become increasingly expensive or unacceptable in terms of state/territory landfill and waste management policies, the pressure to adopt other strategies has increased.

With the emergence and application of site-specific risk assessment techniques in recent years⁷, it has become possible to argue that there may be minimal or no risk associated with retaining some, or all, contamination on site ('in-situ retention') in some circumstances. This option has become of much greater interest to developers because the various strategies that involve the treatment of contaminants or their disposal to landfill may no longer be as economically attractive as in-situ retention.⁸ Thus, economics can also be a very important factor in driving the redevelopment of contaminated sites.

The option of in-situ retention has been open to consideration in Australia since the early 1990s⁹, and in fact was employed in one instance in Western Australia as early as 1995.¹⁰ Other notable applications of this approach have been Homebush Bay in Sydney and the Docklands in Melbourne. However, as will be seen in the detailed analysis of regulatory and policy guidelines provided in Section 2 of this report, neither national nor state/territory measures have afforded this particular approach a high priority as a remediation option.

State regulators have shown a growing interest in basing remediation strategies on the informal concept of 'clean up to the extent practical' (CUTEP), which could allow for greater reliance to be placed on in-situ retention. The application of this concept to date has focused primarily on sites where contamination of groundwater is concerned.¹¹

Nevertheless, there may be legitimate public health and environmental factors that support the in-situ retention option in particular cases. For example, there may be health and environmental risks that militate against transport of particular contaminated soils from a site. There may also be no suitable waste repository or there may be significant risks associated with deposition of a particular contaminant at a conventional landfill.

The diffidence of regulators with respect to in-situ retention is almost certainly linked to their wariness in terms of its public acceptance, and also possibly to a concern that the approach may be abused in the absence of an adequate regulatory system governing remediation choices. Communities in proximity to a contaminated site are likely to be cautious, if not openly hostile, to the prospect that a clean-up will result in some residual, long-term retention of contaminants on site, despite assurances that there will

⁷ See Ferguson, CC and Kasamas, H (eds) 1999, *Risk assessment for contaminated sites in Europe*, vol. 2, *Policy frameworks*, LQM Press, Nottingham.

⁸ For a recent articulation of this viewpoint in the Australian context, see Romain, M 2008, 'Manage it or move it?', *Property Australia*, p. 56, quoting Dr Ian Swaine (a site auditor), 'As the costs of cleaning up and concerns over emissions of greenhouse gases increase, the feasibility of some remediation options will change and the role of containment of contamination on site may actually increase.'

⁹ See ANZECC/NHMRC 1992, *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*.

¹⁰ Redevelopment of the McCabe Street site in Mossman Park, Western Australia; pers. comm., Dr Bruce Kennedy, Executive Officer, NEPC, 28 August 2007. Note that this is one of the earliest examples of in-situ retention in Australia that the authors have been able to identify.

¹¹ See, in particular, Victorian Environment Protection Authority 2002, *The cleanup and management of polluted groundwater*, Information Bulletin (Publication 840).

be no significant risk to health or the environment.¹² It is not surprising, therefore, that this option has not enjoyed strong support to date from state regulators.

The purpose of this report is to examine the manner in which the option of in-situ retention of contaminants is addressed by the regulatory system in Australia, and to draw conclusions concerning reforms that may be needed to accommodate a balanced appraisal of this option. In the course of its preparation, a number of significant issues have presented themselves to the authors, indeed more than were originally anticipated. These will be summarised in this introduction for the purpose of explaining the structure and content of the report.

1.1.1. Identifying the relevant regulatory framework and criteria governing in-situ retention

The investigation, assessment and remediation of contaminated sites in Australia is largely driven by the market; that is, if the economic benefits of redeveloping contaminated land outweigh the necessary costs, including the assessment and remediation of the site, then the redevelopment of that land is likely to proceed. This will normally occur within the context of the relevant land-use planning system.

A relatively small proportion of contaminated sites will be investigated and remediated through the application of dedicated contaminated sites legislation. This will generally occur i) where a site presents unacceptable health or environmental risks but is, for whatever reason, unattractive to the market, or ii) where, for other policy reasons, it is determined expedient for the government to intervene.

Despite the fact that in Australia, as in other countries, the market largely determines whether and when a contaminated site is likely to be remediated, the process occurs within a regulatory context, whether it be contaminated sites legislation or a development control process. Regulatory systems associated with contaminated sites are generally established in the public interest and are directed to achieving certain social and environmental outcomes, including protection of public health and the environment, and consistency and fairness in decision-making. Frequently, although not always, such systems express or imply that decision-makers should be publicly accountable for the outcomes of their deliberations and the application of the laws. In the case of contaminated sites assessment and remediation, it is the applicable regulatory system, rather than the market, that will or should determine the acceptability of the favoured remediation option.

One important tenet of this paper is the recognition that since the 1990s there has been a general acceptance that national consistency in site contamination law is highly desirable. There would appear to be no sound argument that processes and practices leading to the acceptance and implementation of remediation options in particular instances should not be nationally consistent. The Intergovernmental Agreement on the Environment reflected the need for such consistency in areas where principal regulatory responsibility for pollution and waste management laws lie primarily with the states and territories, and resulted in the establishment of the National Environment Protection Council (NEPC) to achieve this goal. The NEPM (Site Assessment) in 1999 was an outcome of this policy initiative.

¹² Note that CRC CARE is supporting several projects related to risk perception and communication, particularly in relation to in-situ retention; for further details, see www.crccare.com (Program 4: Social, Legal, Policy and Economic Issues).

The primary objective of this report, therefore, is to review the legal principles and underlying policy that determine whether, and in what circumstances, the option of in-situ retention of contamination is acceptable in Australian jurisdictions. These ‘rules’ may take the form of either statutory criteria governing the making of decisions or administrative/policy guidelines that operate alongside the relevant legislation. However, there are some significant practical considerations to be taken into account in undertaking what would appear, at face value, to be a relatively straightforward exercise.

First, there is a challenge in Australia in identifying ‘the’ relevant regulatory framework that governs the selection of an appropriate remediation strategy for each contaminated site as there may be more than one such framework. While it is logical to refer to the specific legislation¹³ and policies in each jurisdiction that govern site assessment and remediation, these may not be the relevant, or only, measures that are applicable to a particular site.

In particular, where redevelopment of a contaminated site is proposed, this will normally attract the operation of land-use planning laws that require the relevant planning authority (usually a local council) to approve the particular proposal. As a result, the clean-up of many sites in Australia is undertaken in the course of obtaining a rezoning and/or planning approval, requiring some oversight by the relevant planning authority, and may not necessarily involve application of the relevant site contamination legislation by the responsible environmental authority. That will depend largely on whether the particular state/territory planning and/or site contamination legislation prescribes a role for the relevant state environmental authority, or whether such involvement occurs as a matter of practice. The choice of a remediation option in these circumstances may therefore be influenced procedurally by planning policies or guidelines under the relevant planning legislation, and substantively by the proposals of consultants and the review role of the contaminated site auditors, if involved.

Second, site contamination legislation in most jurisdictions in Australia has ‘delegated’ the responsibility for reviewing the technical acceptability of the proposed remediation option to private professionals who are accredited by environmental authorities as ‘environmental auditors’. In these circumstances it is necessary to ascertain the rules that govern the performance of this function by environmental auditors, and to explore the extent to which they may act independently of the relevant environmental authority. Auditors will also frequently be involved in situations where clean-up is being undertaken as part of a planning approval process for a land redevelopment, where they will advise as to the acceptability of the proposed remediation option in the circumstances and oversee its implementation. It is therefore necessary to understand the legal and policy measures that apply to auditors and their responsibilities in this context.

Third, it is common in many jurisdictions, both within and outside Australia, that the decision-making criteria used to determine remediation approaches are very ‘open-textured’. As will be seen from the analysis provided below, the relevant statutory criteria are frequently quite broad and flexible, so that remediation and management options are determined essentially on a site-by-site basis. There is no ‘one-size-fits-all’ remediation formula that can be applied to all contaminated sites because of the variability in their environmental features. However, there are strong arguments for

¹³ For example, the *Contaminated Land Management Act 1997* (NSW); *Contaminated Sites Act 2003* (WA)

consistency of remediation approaches to sites with relatively common features, and for fairness and accountability in the decision-making process.

In preparing this report, it has not been possible to fully take into account each of these difficulties. In particular, there has been no attempt to cover in detail the approaches adopted under the relevant land-use planning regimes in each jurisdiction. This would require a detailed investigation beyond the scope of this project. Instead, a brief, general survey of this topic is provided. Accordingly, emphasis has been placed primarily upon the criteria designated in the relevant specific site contamination legislation and, where relevant, the related policy instruments. Also, it has been assumed that site auditors are conversant with and apply whatever relevant statutory and policy criteria exist in the same manner as would be the case if decisions were being made by the relevant environmental regulatory authority. No separate survey or specific analysis has been attempted of the practices of site auditors when performing their functions.

Therefore, the focus of the analysis of the regulatory framework in this report, particularly in the more detailed examination of a number of Australian jurisdictions, has been the actual criteria for determining the mode of investigation and remediation of contaminated sites under site contamination legislation and, in particular, the extent to which these criteria promote or discourage the practice of in-situ retention.

In addition to this fundamental issue, four other issues have been identified that the authors consider are relevant to the acceptability of in-situ retention as a remediation option. Each of these issues is addressed in more detail in the report and is summarised below.

1.1.2 Ensuring long-term stewardship via institutional controls

Where in-situ retention is pursued, there will of necessity be a need for measures, possibly of both a legal and engineering nature, to be put in place to ensure that the relevant site is maintained appropriately in the future and there is no interference with the retained contaminants. In the legal context this involves the nature and efficacy of what are commonly referred to in North America as ‘institutional controls’. It is through such arrangements that the underlying goal of ensuring long-term stewardship is sought.

1.1.3 Potential residual liability for remediated sites

Another issue that presents particular concerns for developers contemplating in-situ retention as a remediation option is the degree of finality attached to a clean-up following its completion. If there is an ongoing exposure to future responsibility for a site where contaminants have been retained in situ—for example, if unanticipated impacts occur or a new treatment technology emerges—this may act as a strong disincentive to pursue the in-situ retention option in the first place.

1.1.4 Potential application of waste management laws

Where in-situ retention is contemplated as a remediation option, the question may arise as to whether the site in question constitutes a de facto landfill facility and should therefore be governed also by the relevant waste management laws and policies. As will be seen below, this issue has given rise to significant debate and confusion within the European Union in recent years. It has not been possible to undertake a detailed examination of state and territory waste management legislation as part of this project,

but the issue is briefly reviewed in order to provide a preliminary indication of whether it might present similar difficulties in the future in Australia.

1.1.5 Sustainability and in-situ retention

Finally, attention is directed to a potential issue of compatibility of in-situ retention with the goal of sustainability that has been widely embraced in state and federal environmental and natural resources legislation, usually under the guise of ecologically sustainable development (ESD).¹⁴ The question that arises is whether it is consistent with the ESD concept to allow the retention of contaminants in situ and thereby leave a possible problem for future generations to deal with.

This report addresses all these issues through both a detailed analysis of relevant law and policy in a number of Australian jurisdictions and a comparative survey of equivalent measures and experience overseas (in North America and Europe).¹⁵ As noted above, its primary focus is on the identification and description of the regulatory framework that governs the decision as to whether, and if so by what method, contaminated sites may be remediated—including in-situ retention of contaminants. The report also addresses the several, additional policy issues just referred to that are raised by the option of in-situ retention, both from an Australian and international perspective.

1.2 Technical aspects of in-situ retention—the ‘retention continuum’

The risk assessment process that underpins the examination of a suspected contaminated site is designed to ascertain the nature and extent of contamination and the associated risks to health and the environment. It is common for a remediation plan to propose a suitable strategy after taking into account the findings of the risk assessment. A reasonable consistency of approach and terminology has emerged with respect to the risk assessment process employed in relation to contaminated sites. The two most common sets of terminology refer to Tier 1, 2 and 3 assessments and/or Phase 1 and 2 assessments.¹⁶

A Tier 1 or Phase 1 assessment involves a preliminary investigation by looking at the relevant site history and undertaking some elementary site inspection and testing. At the conclusion of this stage, a determination may be made that it is possible to leave contaminants undisturbed on the site, possibly subject to some management obligations and/or restrictions on future use of the land. However, where contamination is present in soil and/or groundwater at concentrations that could give rise to adverse health or environmental effects if not remediated in some way¹⁷, it is usual to undertake

¹⁴ For a discussion of this topic, see Preston, BJ 2008, ‘Ecologically sustainable development in the context of contaminated land’, *Environmental and Planning Law Journal* 164.

¹⁵ The authors have relied considerably in preparing this report on analysis of information collected for two CRC CARE projects in Australia and overseas respectively—a survey of Australian site contamination law and policy undertaken by David Cole, and a survey of site contamination law in selected jurisdictions in North America and Europe undertaken by Professor Rob Fowler. The results of these survey projects are being progressively presented by CRC CARE (see www.crccare.com and www.cslawpolicy.com).

¹⁶ In Australia the risk assessment process is outlined in Schedule A of the *National Environment Protection (Assessment of Site Contamination) Measure* (National Environment Protection Council 1999) and in more detail in Schedules B(4), B(5) and B(6). The process is essentially based on the Phase 1 and Phase 2 approach, although these terms are not explicitly used.

¹⁷ Typically, this is assumed where soil contamination is greater than the NEPM HILs, or groundwater contamination is greater than the NEPM groundwater investigation levels (GILs).

a Phase 2 or Tier 2/3 level site assessment. This process can allow for the consideration of more complex options with respect to in situ remediation, alongside those that involve removal and/or treatment of the contaminants. In this respect, the site assessment invariably extends to a consideration of remediation options, although the final determination is usually made through a remediation plan.

It is important to appreciate that, in practice, there is a range of scenarios that may be considered under the heading of in-situ retention—hence, the reference in the title of this section to a ‘retention continuum’. These scenarios have been summarised as follows in a short outline provided to the authors by GHD Consultants Ltd for the purposes of this report:

‘Various situations can be distinguished in terms of increasing levels of engineering or other control to ensure that the contamination is contained and does not affect persons or the environment. For each option, it is also possible to distinguish different levels of risk depending on the concentrations of contamination that remain in place, ranging from minor exceedences of guideline levels, through to very high levels of contamination that would give rise to an immediate adverse effect if persons were to come into contact with or be exposed to the contamination.’¹⁸

The outline then provides a chart (see Table 1) that summarises five levels of in-situ retention, each covering both soil and groundwater contamination. The first two categories involve leaving contamination undisturbed and untreated in circumstances where it poses no significant risk to persons or the environment. These options may be considered, as noted above, after a Phase 1 or Tier 1 assessment.

The remaining three levels each involve some form of physical intervention on the site to make the retained soil contamination safe. These range from covering the contaminants with a building; to excavation and relocation plus covering with a building or paving; and excavation and relocation in a specially designed and engineered repository on site. In the case of groundwater contamination, each of these options involves clean-up using the CUTEP approach, with only the fifth option involving an interception or containment system.

It is the fifth option, particularly with respect to soil contamination, that presents the most challenging scenario in terms of the acceptability of in-situ retention as a remediation strategy. It provides the most pressing context for the consideration of several of the policy issues identified in the introduction to this report, including the need for strong and effective institutional controls, the possible application of landfill regulations and the consistency of this option with sustainability principles. But it is also possible that these issues may arise with respect to any of the other levels of in-situ retention along the described continuum. This table assists in understanding how these particular policy issues have arisen in relation to the in situ retention option for remediation of contaminated sites.

¹⁸ The authors wish to acknowledge the assistance of GHD Consultants Ltd, in particular Dr Peter Nadebaum, in providing this unpublished summary of the various types of in-situ retention scenarios that exist within Australia.

Table 1. The retention continuum

	Soil contamination	Groundwater contamination
1	<p>Minor contamination that is present in the surface soils.</p> <p>It is proposed that the contamination be left in place on the basis that its nature (e.g. bioavailability) is such that it probably does not pose a risk to persons or the environment.</p>	<p>Contaminated groundwater both on site and off site.</p> <p>It is proposed that the contamination be left in place and no action taken on the basis that the groundwater is unlikely to be used (e.g. too saline for drinking).</p>
2	<p>Contamination that is present in soil at depth and remains undisturbed.</p> <p>It is proposed that the contamination be left in place on the basis that it is so deep (e.g. greater than 3 m) that it is unlikely to be exposed in the future, and is of a form that will not leach and contaminate groundwater.</p>	<p>Contaminated groundwater that remains on site but does not extend off site.</p> <p>It is proposed that the contamination be left in place and no action taken on the basis that it is not practical to clean up the groundwater and the site owner will undertake to not use the groundwater.</p>
3.	<p>Contamination that is present in soil and will be covered by a building proposed to be built as part of the site development.</p> <p>It is proposed that the contaminant be placed under the building on the basis that the building will contain the contamination and make it unlikely that the contamination will be exposed in the future, and that assessment shows that the contamination will not give rise to volatile gases that might migrate through the floor of the building and affect the health of persons in the building.</p>	<p>Contaminated groundwater that remains both on site and off site.</p> <p>It is proposed that clean-up will be limited to the on-site source material as far as is practicable, allowing the off-site contamination to gradually reduce naturally with time, with notification to potential users that they should not use the groundwater in the meantime.</p>
4.	<p>Contamination that is present in soil and has been excavated during remediation of the site, and will be relocated to a location and depth where it will be covered by a building or paving as part of the development of the site.</p> <p>It is proposed that this will be allowed on the basis that building or paving and management controls will be sufficient to avoid exposure in the future.</p>	<p>Contaminated groundwater and an ongoing source of groundwater that remains both on site and off site.</p> <p>It is proposed that clean-up will be limited to what is practicable, and source material will remain in place and give rise to ongoing groundwater contamination both on site and off site that will be controlled through notification and restrictions on use of the groundwater.</p>
5.	<p>Contamination that has been excavated during remediation of the site and is relocated to a specially designed and engineered repository on the site to be built as part of the site development (e.g. forming part of a road embankment, or a car parking area).</p> <p>It is proposed that this will be allowed on the basis that the design of the repository and its future management will be sufficient to avoid exposure in the future.</p>	<p>Contaminated groundwater and an ongoing source of groundwater that remains both on site and off site, where control is effected through an ongoing groundwater containment and/or treatment system.</p> <p>It is proposed that clean-up will be limited to what is practicable, and source material will remain in place and give rise to ongoing groundwater contamination both on site and off site that will be controlled by an interception or containment system coupled with notification and restrictions on use of the groundwater.</p>

2. The regulatory framework governing in-situ retention

2.1 National guidelines

As indicated elsewhere in this paper, there is a need for flexibility in the choice of remediation option to reflect site-specific circumstances. However, for the purposes of consistency, equitability and accountability, there is also a need for published criteria to drive the decision-making process. The need for a nationally consistent approach to management of contaminated sites is reflected in the development of a series of guidelines and other documentation prepared through national forums during the 1990s.

However, despite the introduction of the NEPM (Site Assessment)¹⁹, there are no national standards or criteria that provide detailed guidance to decision-makers across all jurisdictions concerning what is an acceptable approach to developing defensible remediation proposals for contaminated sites. The NEPM is limited to assessment rather than remediation, due to the wording of the Commonwealth *National Environment Protection Council Act 1994*, which limits the coverage of contaminated sites through the NEPM to 'general guidelines for the assessment of site contamination'.²⁰

In order to identify national policy on this matter in the absence of detailed guidance through the NEPM, it has been necessary for decision-makers to have regard to other national policy guidelines adopted during the 1990s. Inevitably, as will be seen below, jurisdictions have needed to develop their own, additional policy guidelines on this matter. This has been particularly necessary in light of the very general, 'open-textured' nature of the relevant national guidelines.

2.1.1 ANZECC/NHMRC Guidelines for the Assessment and Management of Contaminated Sites (1992)

The *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (1992)* was the first national standard on management of contaminated sites.²¹ The flexibility perceived as necessary in relation to remediating sites of different characteristics and circumstances is reflected in the following extract:

'The ultimate goal of a site clean-up is to select a socially acceptable and cost-effective management strategy which mitigates threats to and provides protection for public health, welfare and the environment as well as allowing flexibility in the future use of the land.'²²

¹⁹ op. cit., fn. 15.

²⁰ *National Environment Protection Council Act 1994* (Cwlth), ss. 14(1)(d). Nevertheless, the NEPM has had considerable influence in practice on the selection of remediation options. As noted above, it is generally acknowledged that investigation levels specified in appendices to the NEPM have been used conservatively as 'default' remediation standards.

²¹ Australian and New Zealand Environment and Conservation Council and the National Health and Medical Research Council, *Australia and New Zealand Guidelines for the Assessment and Management of Contaminated Sites 1992*. It should be noted that, although these guidelines were originally issued jointly by ANZECC and the NHMRC, the NHMRC has since rescinded them: see <http://www.nhmrc.gov.au/publications/synopses/eh17syn.htm>.

²² *ibid.*, at 41.

Clause 3.1.8 of the guidelines states the preferred order of options for site 'clean-up and management' to be:

- 'On-site treatment of the soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, and
- Off-site treatment of excavated soil which, depending on the residual levels of contamination in the treated material is then returned to the site, removed to an approved waste disposal site or facility or used as fill for landfill.'

In the event that neither of these options is possible, the guidelines suggest the following:

- 'Removal of the contaminated soil to an approved site or facility, followed where necessary by clean fill;
- Isolation of the soil by covering with a properly designed barrier;
- Choosing a less sensitive land use to minimise the need for remedial works which may include partial remediation, and
- Leaving contaminated material in-situ providing (sic) that there is no immediate danger to environment or community and the site has appropriate controls in place.'

The guidelines proceed to point out that 'the appropriateness of any particular option will vary depending on a range of local factors'²³, with the final decision lying with the responsible authority. Nevertheless, they do represent the nationally agreed preferences for remediation options in order of priority in 1992.

2.1.2 ANZECC guidelines re on-site containment (1999)

In 1999 the Australian and New Zealand Environment and Conservation Council (ANZECC) published additional guidelines that specifically address the subject of in-situ retention.²⁴ Having pointed out that the retention of contaminants on site may be justified at locations that might not otherwise be regarded as suitable for the development of a 'greenfield' landfill, these guidelines express several principles that apply in determining the appropriateness of a site for in-situ retention:

Principle 1

'In considering whether to employ on-site containment as a means of managing contaminated soil, the primary objective of the decision-making process must be to protect the health and safety of human and environmental receptors.'

Referring to the 1992 Australian and New Zealand Environment and Conservation Council / National Health and Medical Research Council (ANZECC/NHMRC) hierarchy of remedial approaches (see above), the 1999 guidelines suggest that the hierarchy does not indicate that treatment options are necessarily 'safer' than the option of on-

²³ *ibid.*, at 5.

²⁴ Australia and New Zealand Environment and Conservation Council 1999, *Guidelines for the Assessment of On-Site Containment of Contaminated Soil*

site retention, but rather that the preference for treatment options is based on the following two principles:

Principle 2

‘Remedial options should minimise the need for on-going management and regulatory scrutiny of the site.’

Principle 3

‘Remedial options should minimise constraints on reasonable and usual use of the land.’

Recognising that competing interests exist between localised impacts arising from on-site retention options and broader or more global impacts associated with the option of disposal to landfill, the 1999 ANZECC guidelines enunciate a fourth principle:

Principle 4

‘The preferred remedial strategy should support the best use of available waste treatment and disposal facilities (and other public resources) while providing an agreed appropriate level of safety and environmental protection.’²⁵

In addition to applying the above principles when assessing any proposal for the on-site retention of contaminated soils, the guidelines also acknowledge other factors that may influence the choice:

- the time required to implement the proposed remedial measures
- cost
- public perception (stakeholder acceptance).

2.1.3 National Environment Protection (Assessment of Site Contamination) Measure 1999²⁶

While it is not specifically directed to remediation, the NEPM (Site Assessment) nevertheless contains some statements that address this matter, in recognition of the relationship between the site assessment process and the ultimate remediation that has been referred to above. It observes, for example, that:

‘....the process of the assessment of site contamination should be placed within the context of the broader site assessment and management process. In particular, in assessing the contamination, the site assessor and others should take into account the preferred hierarchy of options for site clean-up and/or management which is outlined as follows:

- if practicable, on-site treatment of the contamination so that it is destroyed or the associated risk is reduced to an acceptable level; and
- off-site treatment of excavated soil, so that the contamination is destroyed or the associated risk is reduced to an acceptable level, after which soil is returned to the site; or,

²⁵ *ibid.*, at 3–4.

²⁶ National Environment Protection Council 1999, *National Environment Protection (Assessment of Site Contamination) Measure*.

if the above are not practicable,

- consolidation and isolation of the soil on site by containment by a properly designed barrier; and
- removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material;

or,

- where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy'.²⁷

The NEPM also notes that:

‘...the appropriateness of any particular option will vary depending on a range of local factors. Acceptance of any specific option or mix of options in any particular set of circumstances is therefore a matter for the responsible participating jurisdiction’.²⁸

These statements reinforce the observation made above that the current national guidelines fail to provide specific and detailed advice with respect to the selection of remediation options, while at the same time according a low priority to in-situ retention as an option.

2.1.4 ANZECC Position Paper on Financial Liability for Contaminated Site Remediation (1994)

Finally, reference needs to be made to the ANZECC Position Paper published in 1994, which set out agreed national principles for the imposition of financial liability for the remediation of contaminated sites.²⁹ The paper identified 15 general principles that ANZECC believed should underpin such a liability scheme. These principles included:

- endorsement of the ‘polluter pays’ approach, except where the polluter or original site owner is insolvent or unknown, in which case the current site owner/occupier should be liable
- provision of a statutory right to recover costs incurred in the clean-up of a risk site
- government responsibility for remedial action at ‘orphan sites’.

The Position Paper also suggests that government intervention in directing remediation should only be taken in circumstances where it is intended to put contaminated land to a more sensitive use for which the present contamination poses unacceptable risks; and that appropriate land-use planning measures are required to ensure that potentially contaminated land is not rezoned to allow a more sensitive use without adequate assessment.³⁰

In producing this paper, ANZECC acknowledged that regulatory responsibility lies with individual state/territory governments, and that each government needed to consider

²⁷ *ibid.*, at 8.

²⁸ *ibid.*

²⁹ Australia and New Zealand Environment and Conservation Council 1994, *Financial liability for contaminated site remediation: a Position Paper*.

³⁰ *ibid.*, at 2.

how best to adopt the stated principles within its particular administrative and legal framework.³¹ The aim of the paper was to promote a consistent approach to liability issues across jurisdictions. In addressing, in this report to CRC CARE, several legal issues arising from the practice of in-situ retention, the need to update the Position Paper will be considered.

2.1.5 Conclusions regarding national guidelines

The overall effect of these national guideline documents, to which reference is regularly made by environmental authorities, site auditors and consultants, is to provide only the most general level of guidance in the choice of remediation options. With respect to in-situ retention specifically, there is recognition that the practice may be appropriate in particular circumstances, but generally only where most other options have been dismissed for technical or economic reasons.

It is arguable that these national guidelines are substantially out-dated and fail to take account of emerging understandings arising from the now-extensive experience with site-based risk assessment. This experience indicates that, in particular circumstances, health and ecological impacts can be managed safely and effectively through in-situ retention. It is not at all surprising that regulators and auditors may find difficulty in justifying a decision to approve in-situ retention on the basis of these guidelines, or that individual jurisdictions have found it necessary to develop their own more-detailed guidelines on this matter.

It is significant also that the recent review report concerning the NEPM (Site Assessment) included a recommendation to update the 'management components' of the 1992 ANZECC/NHMRC Guidelines.³² While this recommendation is not necessarily based on the in-situ retention issues that are the subject of this report, it does reflect more generally the need for better guidance nationally on remediation strategies and contaminated sites management.

2.2 The regulatory process and criteria under Australian site contamination law and policy

The assessment and remediation of contaminated sites in Australia is subject to regulation through state/territory legislation. This has occurred through two avenues—specific contaminated sites legislation and the land-use planning systems developed in each jurisdiction. In some jurisdictions these two systems are formally integrated to varying degrees by specific statutory requirements. In others the involvement of state/territory contaminated sites agencies in the land-use planning process, which operates principally through local government decision-making, is more informal and not necessarily based on any specific statutory requirement.

This section of the report focuses on the assessment and remediation regimes administered through state environmental agencies under their relevant contaminated sites legislation. The next section (Section 2.3) addresses in relatively broad terms the role of the relevant land-use planning process in several states in relation to the assessment and remediation of contaminated sites (including the degree of association

³¹ *ibid.*, at 4.

³² *op. cit.*, fn. 6, recommendation 2.

with any requirements of state agencies responsible for contaminated sites management).

2.2.1 Risk assessment

In practice, the selection of in-situ retention as a remediation option is invariably preceded by a site-based risk assessment. Therefore, it is important to understand both when such an assessment is likely to be commissioned and the way in which it will be undertaken. It is likely that the option of in-situ retention will only be considered if there has been a preceding decision to commission a site-based risk assessment, and if the scope of that assessment is such that this option has been properly examined in the course of the assessment.

(i) Criteria for determining when risk assessment is required

In Australia the determination of whether a site-based risk assessment is required is not based on specific statutory requirements. Contaminated sites legislation generally adopts a series of administrative guidelines to assist in a range of decision-making processes, including the need for site-based risk assessment. Schedule B(4) of the NEPM (Site Assessment)³³ is one such guideline generally adopted by jurisdictions across Australia. However, some agencies also require the use of other guidelines (see below).

Schedule B(4) suggests that ‘where there are exceedances of the health-based investigation levels, site-specific health risk assessments may be used to determine whether further action is needed for a site.’³⁴ In practice, it appears generally accepted that, where an initial investigation indicates the presence of contaminants significantly above the NEPM-prescribed investigation levels, a risk assessment of some form or other will be required.

(ii) Risk assessment methods for proposed in-situ retention

The various contaminated sites legislation and guidelines relied on by the different Australian jurisdictions generally indicate that risk assessments must comply with the NEPM (Site Assessment), in particular Schedule B(4). However, Schedule B(4) does not generally prescribe any specific risk assessment method. It states:

‘This document provides an approach to site-specific risk assessment. Due to the complexity and scale of the health risk assessment process, a concise ‘cookbook’ is not practicable. Similarly, the site-specific issues are often sufficiently complex and ‘site-specific’ for a particular site that a manageable and complete algorithm for decision-making cannot be drafted: the document provides a series of guidelines (and prescriptions) to assist the decision-making process’.³⁵

It follows that there is considerable latitude concerning the methodology to be used in conducting a site-based risk assessment. Sources other than the NEPM (Site Assessment) are recognised by some jurisdictions as a basis for determining risk assessment methodology. For example, the *Draft Guidelines for the Assessment and*

³³ op. cit., fn. 16.

³⁴ ibid., at 1.

³⁵ ibid., at 3.

Management of Contaminated Land in Queensland (Draft Guidelines)³⁶ specify that health and environmental risk assessments must also follow the publication in the Contaminated Sites Monograph Series entitled *Health Risk Assessment and Management of Contaminated Sites*.³⁷ The New South Wales Environment Protection Authority (EPA) specifies that risk assessments must comply with, in addition to the NEPM, the *Commonwealth Guidelines for Assessing Human Health Risks from Environmental Hazards*.³⁸

In addition to the NEPM (Site Assessment), the Australian Standard AS/NZS 4360 provides a generic framework for risk assessment in a range of circumstances.³⁹ However, its breadth does not lend itself to application to any risk assessment associated with in-situ retention of contaminants.

Furthermore, whether there is any requirement for regulatory approval of a specific risk assessment method will depend on the relevant contaminated sites legislation and the administrative processes adopted under it, or appropriate development control legislation. For example, under the Victorian State Environmental Planning Policy (SEPP) (Prevention and Management of Contaminated Land), any site-specific risk assessment not conforming to the NEPM (Site Assessment) must be approved by the EPA.⁴⁰ In New South Wales there is no specific statutory approval process for a risk assessment. Rather, guidelines⁴¹ require the consultant undertaking the risk assessment to contact the EPA to discuss the appropriate procedures. At present, therefore, developers, consultants, auditors and regulators have little specific guidance as to what is an acceptable risk assessment method when in-situ retention is being considered as a viable remediation option.⁴² It follows that the acceptability of any proposal for in-situ retention of contaminants may be based upon a risk assessment undertaken without clear guidelines as to what is an acceptable risk assessment method.

2.2.2 Procedures and criteria for determining the acceptability of in-situ retention

If a particular approach to contaminated sites remediation or management, including in-situ retention, is to be approved under relevant site contamination legislation, the issue arises as to what administrative processes and criteria are involved in making that determination. That is, on what basis is in-situ retention able to be deemed acceptable? It is these aspects of the regulatory process that will be critical to a determination of the suitability or otherwise of the option of in situ retention in any particular instance.

³⁶ Queensland Department of Environment, *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland*, May 1998. Although referred to as 'draft' guidelines, this document appears to have operated as the relevant policy guidance in Queensland since its introduction in 1998.

³⁷ *ibid.*, at 28.76.

³⁸ See New South Wales Department of Environment and Conservation 2006, *Guidelines for the NSW Site Auditor Scheme* (2nd edition) (referring to the enHealth Monographs—Soil Series: Imray and Langley 2001; Taylor and Langley 2001).

³⁹ AS/NZS 4360:2004, *Risk Management*, SAI Global, Sydney, 2004.

⁴⁰ Victorian Environment Protection Authority, *State Environment Protection Policy (Prevention and Management of Contaminated Land) 2002*, cl. 23.

⁴¹ New South Wales Environment Protection Authority 2000, *Guidelines for Consultants Reporting on Contaminated Sites*, at p. 3.

⁴² The incapacity of current risk assessment guidelines and criteria to provide appropriate guidance on a risk assessment methodology that may form the basis of any proposal to retain contaminants on site significantly above specified HILs, EILs or GILs is being addressed by GHD Consultants Pty Ltd as part of a related CRC CARE research project.

In terms of process, it will be seen below that Australian jurisdictions possessing specific contaminated sites legislation generally rely on or 'delegate' to auditors of contaminated sites the responsibility for determining the acceptability or otherwise of any proposed remediation or management strategy. Generally speaking, regulators do not formally assume responsibility for determining the acceptability or otherwise of any proposed remediation option although, through various notification requirements and the capacity for involvement in exceptional cases, this may occasionally occur. Even where legislation does specify an approval role for an environmental agency with respect to remediation options, the agency tends to depend heavily on the findings and recommendations of the contaminated sites auditor involved.

(i) New South Wales

Under the *Contaminated Land Management Act 1997* (NSW), the general test for application of the Act to contaminated sites is whether the EPA considers that contamination is significant enough to warrant regulation.⁴³ Where the EPA makes this determination, it may then declare a site to be 'significantly contaminated land' and issue management orders in relation to the land that may require investigation and/or remediation.⁴⁴

The **process** for determining the appropriate remediation option stems from the original decision by the EPA that contamination at a particular site is significant enough to warrant regulation. Where the EPA subsequently issues a management order requiring remediation of a contaminated site under section 14 of the Act, there may be requirement for the person to whom the order is issued to take certain specific actions to remediate the land and/or submit a plan of management for approval by the EPA.

As part of the process of preparing a plan of management, it appears that a remediation action plan will be required that, among other things, sets goals to ensure that the remediated site will be suitable for the proposed use and will pose no unacceptable risk to human health or the environment.⁴⁵ It is at this stage that a site auditor will become involved in the process by reviewing the work of the consultants, including proposed remediation methods. Statutory site audits must be undertaken, and site audit reports and statements prepared and provided, in accordance with guidelines adopted under the Act and with regard to provisions of any environmental planning instruments applying to the site.⁴⁶

The Act requires that the EPA review any plan of management submitted to it.⁴⁷ However, it is apparent that, in practice, it assumes an oversight role, relying heavily on the information provided in site audit reports and statements.⁴⁸

The **criteria** for selection of the appropriate remediation option are provided only in the broadest terms by the Act, which specifies in section 16 that a management order may require action including 'treating, *storing or containing on land*, or removing from the land and treating or disposing of any soil, sand, rock, water or other solid or liquid material of whatever kind' (emphasis added).

⁴³ *Contaminated Land Management Act 1997*, s. 11.

⁴⁴ *ibid.*, s. 14.

⁴⁵ New South Wales Environment Protection Authority 2000. *Guidelines for Consultants Reporting on Contaminated Sites*, at p. 3.

⁴⁶ *Contaminated Land Management Act 1997*, s. 53B (6)).

⁴⁷ *ibid.*, s. 14(1).

⁴⁸ Voluntary management proposals approved by the EPA under section 17 would presumably contain a provision that a site audit must be undertaken to secure compliance with the conditions of the proposal. In these circumstances the EPA would rely principally on the findings of the site auditor.

Clearly, in-situ retention of contaminants is envisaged by this section, however there is no indication as to the basis on which a choice is to be made between the various remediation actions identified in the section. However, the Site Auditor Guidelines in New South Wales indicate that soil remediation and management is to be undertaken in accordance with the 1992 ANZECC/NHMRC Guidelines.⁴⁹ The preferred order of preference for remediation strategies in NSW places 'consolidation and isolation of soil on site by containment within a properly designed barrier' as the fourth and last preference.⁵⁰

Further guidance concerning remediation options is provided in Part 4.3 of the Site Auditor Guidelines, which explicitly adopt the 1992 ANZECC/NHMRC Guidelines, including the 'remediation hierarchy'. As a result, in-situ retention is accorded a low priority as a remediation option, as confirmed by the following statement in the guideline:

'Site auditors must, where relevant, demonstrate in their site audit reports that they have considered the technical issues associated with on-site capping or the use of other physical barriers to contain contamination. Such options should be considered only where other preferred approaches from the ANZECC and NHMRC remediation hierarchy, outlined in Section 4.3.2 and followed in NSW, are not applicable.'⁵¹

Thus, auditors and the EPA alike, when evaluating plans of remediation, have to rely almost entirely on the general guidance provided by the 1992 ANZECC/NHMRC Guidelines. As has been noted already, the EPA relies heavily on the judgment of site auditors in exercising its formal power to approve such plans.

(ii) Queensland

Application of the contaminated sites provisions of the *Environmental Protection Act 1994* is triggered by a decision by the administering authority (the Queensland Environmental Protection Agency (EPA)) to place land that has been, or is being, used for a notifiable activity, or is contaminated land, on the environmental management register (EMR).⁵² Schedule 2 of the Act provides a list of some 38 'notifiable activities'. 'Contaminated land' means 'land contaminated by a hazardous contaminant', which in turn is defined to mean a contaminant '...that, if improperly treated, stored, disposed of or otherwise managed, is likely to cause serious or material environmental harm...' (Schedule 3).

Where a site has been listed on the EMR, the EPA may, depending on specific circumstances, require a site investigation to be carried out by the person who caused the contamination, the relevant local government or the owner of the land if it is satisfied that the hazardous contaminant is in a concentration that has the potential to cause serious or material environmental harm and that a person, animal or other part of the environment may be exposed to the contaminant.⁵³ A person may also

⁴⁹ New South Wales Department of Environment and Conservation 2006, *Guidelines for the NSW Site Auditor Scheme* (2nd edition).

⁵⁰ *id.*, at p. 38.

⁵¹ *id.*, at p. 39.

⁵² *Environment Protection Act 1994* (Qld.), s. 374.

⁵³ A requirement to consider or commission a site investigation must be in the form of a written notice (see s. 376).

voluntarily submit a site investigation report to the EPA with respect to land on the EMR.⁵⁴

Although not explicit under the Act or the Draft Guidelines, it appears that, in the case of a Stage 3 investigation (health use environmental assessment), a remediation plan will be developed. The Act does not provide specifically for the preparation of remediation plans; however, the Draft Guidelines⁵⁵ require that, where a site investigation report indicates that 'some remediation is required before the site would be suitable for the current or proposed use', a remediation plan must be prepared and submitted to the EPA. This plan will be relied upon by the EPA to determine the appropriate remediation strategy.

The **process** following receipt of a site investigation report and accompanying remediation plan requires the EPA to decide whether to:

- remove the land from the EMR (where satisfied it is not contaminated)
- leave it on this register (if satisfied that the land can be used for stated uses with further management), or
- place the site on the contaminated land register (CLR) where it considers remediation action is required.⁵⁶

Under section 391 of the Act, a remediation order may be issued by the EPA in relation to land placed on the contaminated sites register. Alternatively, a person may elect to proceed voluntarily to undertake a remediation of the site.⁵⁷

The process for determining the appropriate remediation strategy does not appear, from either the Act or the Draft Guidelines, to allow for the involvement of environmental auditors, as in other states such as New South Wales and Victoria. It would appear that the decision to allow in-situ retention is dependent entirely on the decision by the EPA under the Act whether to approve a site management plan. However, in practice, although the site auditor system has not been adopted in Queensland, a similar third party reviewer (TPR) process operates according to an Operational Policy.⁵⁸

The EPA maintains a list of persons it has accepted as TPRs and the Operational Policy provides that:

'Unless otherwise approved by the EPA, the TPR is to be engaged by the site owner/developer and accepted by the EPA prior to the development of a final remediation plan'.⁵⁹

It is understood that in practice, a TPR is engaged at the investigation stage because the site owner or developer is aware that the use of a TPR will be mandatory at the remediation stage.⁶⁰

⁵⁴ S. 375.

⁵⁵ *op. cit.*, fn. 36, at Appendix 7, cl. 7.7.

⁵⁶ Ss. 384(2).

⁵⁷ S. 390.

⁵⁸ Queensland Government, Environmental Protection Agency 2008, *Operational policy: third party reviewer terms of reference*.

⁵⁹ *id.*, at p.2.

⁶⁰ Pers. comm., Greg O'Brien, Queensland Environmental Protection Agency, October 2007.

Upon completion of a remediation, the TPR must execute a statutory declaration that certifies, among other things, that:

‘...the site has been assessed and remediated to a standard such that the contamination may be safely managed under the conditions of an attached draft SMP (site management plan) and listed on the EMR (environmental management register) as a managed site’.⁶¹

Thus, it appears that in practice, the EPA will rely upon a certification by statutory declaration that, where in-situ retention has been adopted as a remediation strategy, it will result in the safe management of the site. While the Operational Policy provides for consultation between TPRs and the EPA concerning the content and adequacy of both remediation plans and site management plans, it is clear that the TPRs bear a considerable responsibility for determining the acceptability of the selected remediation option, as do environmental auditors in other jurisdictions. It is interesting to note that this ‘transfer’ of responsibility from the EPA to TPRs is not provided for in the Queensland Act or even in the Draft Guidelines.

The Act provides no **criteria** with respect to the selection of remediation strategies by the EPA or TPRs, but the Draft Guidelines offer some assistance in Appendix 7. This Appendix endorses the clean-up hierarchy adopted by the ANZECC/NHMRC 1992 Guidelines, but then proceeds to list under the heading ‘Remediation Options’ the following forms of in-situ retention:

- ‘incorporating contaminated soil into the redevelopment design by placing it under buildings or paved areas etc. (this reduces exposure through the surface and reduces leaching from rain infiltration);
- leaving contaminated soil on site and building or capping over it;
- excavating contaminated soil and burying it at one location on site (this reduces the area which contains contaminated soil.);
- installing horizontal, vertical or reactive barriers;
- constructing an engineered landfill cell on site (for situations with shallow groundwater, permeable soils, leachable contaminants or very high results);
- changing proposed land-use to a less sensitive use (to accommodate on-site containment of contaminated soil);
- solidifying (locking con taminants in solidified matrix) or stabilising (converting contaminants to a less mobile and/or less toxic form , typically by chemical reaction) when contaminants are highly leachable, then incorporating with one of the above options’.⁶²

This recognition of various forms of in-situ retention, despite its low ranking under the 1992 Guidelines, is reinforced by extensive provisions in the Act that allow for the preparation of site management plans where a ‘partial’ remediation is decided upon as the appropriate strategy. A site remediation order may include a request to submit for approval a site management plan.⁶³ Similarly, if a person proposes to undertake

⁶¹ id., at p.4.

⁶² Cl. 7.7.2, Appendix 7.

⁶³ Ss. 391(6).

remediation voluntarily, they may choose to submit a site management plan.⁶⁴ Where a plan is approved by the EPA, the land subject to the plan will remain on the EMR.

These provisions clearly envisage that in-situ retention of contaminants will be acceptable provided the remediation plan and accompanying site management plan present an adequate justification. This is reinforced by the following statement in the Draft Guidelines:

'Where a site is contaminated and the costs associated with full clean-up are greater than the land value, then it may be more economical for the site to be partially remediated to allow for commercial or industrial use rather than completely remediated for residential use'.⁶⁵

Thus, it would appear that in Queensland the option of in-situ retention has a significantly greater policy recognition than in other states, despite the endorsement of the hierarchy of clean-up options adopted in the 1992 ANZECC/NHMRC Guidelines.

(iii) Victoria

The *Environment Protection Act 1970* (Vic.) includes provisions that empower the Victorian Environment Protection Authority (EPA) to require various parties to investigate and clean up any contamination on those sites. The principal mechanisms that may be employed by the EPA for these purposes are works approvals⁶⁶, licences⁶⁷ and notices, each of which has a broader purpose and is not directed specifically to the subject of site contamination.⁶⁸ Two types of notices may be used by the EPA to direct clean-up—a pollution abatement notice⁶⁹ or a clean-up notice (CN).⁷⁰

Detailed supporting measures are provided through the *State Environment Protection Policy (Prevention and Management of Contaminated Land)*.⁷¹ This instrument sets out investigation procedures and specifies required clean-up levels for contaminated sites. It specifically acknowledges that the EPA may use a works approval, licence or notice to require the preparation of, first, a site contamination assessment by an occupier of premises⁷² and, second, a statutory environmental audit by an occupier or owner of premises.⁷³

The **process** for determining the appropriate remediation strategy for a contaminated site may include direct involvement on the part of the Victorian EPA, depending upon whether the remediation is being conducted under the relevant land-use planning regime or through a notice issued under the *Environment Protection Act*. Environmental auditors who are appointed by the EPA under Part IXD of the Act perform a guidance and oversight role directed principally to determining whether the proposed remediation strategy is compatible with the envisaged use of the site.

⁶⁴ S. 403.

⁶⁵ Cl. 7.7.2, Appendix 7.

⁶⁶ *Environment Protection Act 1970* (Vic.), s. 19B.

⁶⁷ S. 20.

⁶⁸ It should be noted that only a relatively small proportion of clean-ups are required through these mechanisms; it is estimated that approximately 80% of clean-up and management in Victoria is driven by local government, planning authorities exercising their powers under the state's planning system (pers. comm., Chris McAuley, Victorian EPA, April 2007); see Section 2.3.2 for a brief summary of these arrangements.

⁶⁹ S. 31A.

⁷⁰ S. 62A.

⁷¹ No. S.95, *Gazette*, 4/6/2002 (referred to herein as the 'SEPP').

⁷² *id.*, cl. 19 (in practice, this provision is rarely used, the preference being to use statutory environmental audits under s. 53V).

⁷³ Cl. 26; see also s. 53V of the Act.

Where an assessment indicates that a site is contaminated⁷⁴, a clean-up program will be designed and implemented by the site assessor (who is usually a consultant employed by the occupier or owner for this purpose, but may also be an environmental auditor⁷⁵). At this point the auditor prepares an environmental audit report that includes an evaluation of the quality of the assessment and the need for further clean-up. The party conducting the clean-up is expected to liaise thereafter with the auditor to ensure that an 'acceptable standard' is achieved by the clean-up, but the auditor must not be directly involved in the detailed design or implementation of the clean-up.⁷⁶ Instead, at the conclusion of the clean-up, the auditor will determine whether to issue either a certificate or a statement of environmental audit.

A certificate of environmental audit may be issued by an environmental auditor only if the condition of a segment of the environment is not detrimental to any 'beneficial use' of that segment.⁷⁷ Otherwise, the auditor must issue a statement of environmental audit that identifies the beneficial uses of the segment that are protected and the terms and conditions that need to be complied with before a certificate of environmental audit may be issued.⁷⁸ These instruments are intended to guide the permissible future uses of a contaminated site, in particular where a change of use is contemplated.

The EPA may intervene and direct a clean-up under clause 26(4) of the SEPP, which provides that, if a statement of environmental audit indicates that a site is not suitable for any use in its current condition, the EPA may require clean-up or management to protect human health and the environment. This presumably will be done through the issue of a CN.

The **criteria** for selection of an appropriate remediation option are prescribed by the SEPP. The principal objective is to protect the 'beneficial uses' of a site, as defined in Table 1 of the SEPP. Under clause 22, site management strategies must 'where practicable maximize all potential uses of a site', and the preferred management strategy should be determined with reference to, among other things, the principles of the waste hierarchy, achieving the best practicable environmental outcome and the protection of beneficial uses. Clause 23 of the SEPP adds to these broad criteria by requiring clean-ups to meet the relevant objectives in Table 2 (which generally refer to the investigation levels established by the NEPM (Site Assessment)); or to be determined through a site-specific risk assessment in accordance with the methodology set out in the NEPM or by a method that has been approved by the EPA. In the latter case it is assumed that the broad criteria outlined in clause 22 would provide the principal guidance to assessors and environmental auditors.

There is no specific reference in the SEPP to the 1992 ANZECC/NHMRC Guidelines or to the specific option of in-situ retention. However, a Regulation under the *Environment Protection Act* adopted in July 2007 introduces two new categories of 'scheduled premises':

⁷⁴ Cl. 21 provides that: 'Where contamination at a site is of a level which precludes a protected beneficial use of the relevant land use, a state of pollution exists and the land must be cleaned up or managed...' (see further below regarding the concept of 'protected beneficial use').

⁷⁵ If an auditor conducts the assessment and discovers serious contamination, they must withdraw and allow any clean-up work to be undertaken by others before completing their audit: see Victorian Environment Protection Authority 2007, *Environmental auditing of contaminated land*, Publication 860.1, at p. 4.

⁷⁶ *id.*, at 3.

⁷⁷ S. 53Y.

⁷⁸ S. 53W.

- Category L02 (contaminated sites – on-site soil containment): sites where on-site containment (for example, a cell) is used—for which a works approval and in all likelihood a financial assurance will be required, and
- Category L04 (contaminated sites – long-term management): sites where long-term management may be required, particularly in relation to groundwater contamination—which are exempt from the requirement for a works approval or licence, but will require a financial assurance.⁷⁹

This Regulation provides a clear indication that in-situ retention is an acceptable remediation option in Victoria, but the current legislation and SEPP provide little explicit guidance as to the circumstances in which this option is acceptable or its level of priority. In this respect the Victorian system is distinctively ‘open-ended’ and leaves both the party conducting the clean-up and the environmental auditors considerable discretion with respect to the choice of remediation option. As discussed elsewhere in this report, variable site conditions require a degree of flexibility. However, in the public interest there are cogent arguments for having a regulatory regime that articulates the criteria that are to be used in selecting particular remediation options.

(iv) Western Australia

The *Contaminated Sites Act 2003* (WA) commenced operation on 1 December 2006 and is administered by the Department of Environment and Conservation (DEC). It provides a regulatory framework for the identification, recording, classification, management and remediation of contaminated sites in Western Australia. The Act provides for the issue of an investigation notice to require the recipient to investigate the nature and extent of suspected contamination and prepare a remediation plan⁸⁰; for the issue of a clean up notice that may specify action to be taken or require the recipient to implement an approved clean-up plan⁸¹; and for the issue of a hazard abatement notice where there is an immediate and serious risk of harm.⁸²

The **process** for determining the appropriate remediation strategy involves the development and approval of a site management plan. This plan will normally include the outcomes of the investigation process and the proposed remediation and ongoing management strategies where applicable. It must be submitted to the chief executive officer (CEO) of DEC for approval.

Where an investigation, clean-up or hazard abatement notice has been issued under the Act, an auditor’s report is mandatory.⁸³ Consequently, the preparation of a site management plan pursuant to such notices will require the review of an auditor. Similarly, if a Certificate of Contamination Audit is requested,⁸⁴ the request must also be accompanied by an auditor’s report. Whenever a report is provided to the CEO of DEC containing information regarding the assessment, monitoring or remediation of a source site, it must be accompanied by a mandatory auditor’s report.⁸⁵

⁷⁹ Environment Protection (Scheduled Premises and Exemptions) Regulation 2007.

⁸⁰ S. 49.

⁸¹ S. 50.

⁸² S. 51.

⁸³ See ss. 62(3)(e) and r. 29(2)(d).

⁸⁴ S. 62.

⁸⁵ R. 31(1).

The classification of known or suspected contaminated sites in Western Australia is critical to their ongoing assessment, remediation and management. In the case of sites where in-situ retention is regarded as the favoured option by a developer, the auditor's report will be considered by the CEO along with relevant guidelines. If accepted, it will in all likelihood be classified 'Contaminated—Restricted Use', which will be reflected in any certificate of contamination audit issued by the CEO.

As in other jurisdictions, the final classification of the land and any restrictions on its use will be determined principally on the basis of the auditor's findings. However, the role of the CEO in issuing certificates of contamination audit suggests that the DEC assumes an 'approval' role in relation to the remediation of contaminated sites not usually assumed in most other Australian jurisdictions. Despite this, the role of the auditor is pivotal to the outcomes.

In relation to the relevant **criteria** for determining remediation options, the CEO of DEC must take into account any relevant guidelines, industrial standards and any other information considered relevant when classifying a site.⁸⁶ The option of in-situ retention does not appear to be specifically addressed in any of the guidelines issued by the DEC. However, the hierarchy of remedial approaches recommended in 2000 by the Western Australian Environment Protection Authority⁸⁷ provides some specific guidance in the form of the following principles:

'Principle 1: Contaminated material shall preferably be either treated on-site and the contaminants reduced to acceptable levels, or be treated off-site and returned for reuse after the contaminants have been reduced to acceptable levels.

Principle 2: Disposal of contaminated material to an approved waste disposal facility or landfill or 'cap and contain' management options will only be considered if:

- treatment of the contaminated material is shown or demonstrated not to be practicable;
- the options to dispose to landfill or 'cap and contain' are undertaken in an environmentally acceptable manner; and
- the risk of disturbance of the contaminant exceeds the risk of leaving it undisturbed and contained on site'.

These principles constitute a reworking of the 1992 ANZECC/NHMRC Guidelines, which is also endorsed by the guidance statement. The option of in-situ retention is given a qualified endorsement, on the basis of some prior treatment of contaminants either on or off site, but the 'cap and contain' approach is rated as a low priority.

2.2.3 Conclusions regarding regulatory process and criteria

This detailed survey of the legislation, guidelines and policies in four jurisdictions has indicated clearly that there is little specific guidance to assist either the relevant government agency or the site auditor in identifying an acceptable remediation option,

⁸⁶ Ss. 13(4).

⁸⁷ WA Environment Protection Authority. *Guidance for the assessment of environmental factors: guidance statement for remediation hierarchy for contaminated land No. 17* (2000), p. 3.

and—more specifically in the context of this report—whether in-situ retention is acceptable in any particular case.

In practice the responsibility for making this determination appears to usually reside with contaminated sites auditors or other equivalents through formal review processes. In New South Wales and Queensland responsibility is formally vested in the relevant EPA but, in practice, each EPA relies substantially on reports or declarations provided to them by auditors. In Victoria auditors perform the principal oversight role in relation to clean-ups through the issue of environmental audit reports and certificates or statements of environmental audit. It is only in Western Australia that the relevant agency maintains formal responsibility although, again, considerable reliance is placed on auditors' reports, which must be provided to the agency. This transfer of responsibility to auditors represents a rather unique and distinctive 'privatisation' of a significant environmental regulatory function.

Auditors must, of course, comply with the legislative requirements and any guidelines issued by the relevant environmental agency. However, as has been indicated by this survey, the criteria specified in each jurisdiction for determining appropriate remediation options in any particular situation are of a broad and 'open-ended' character. Some jurisdictions (in particular, New South Wales, Queensland and Western Australia) continue to invoke the 1992 ANZECC/NHMRC Guidelines as their principle guidance, thus relegating in-situ retention to a low priority. However, and perhaps somewhat contradictorily, the Queensland measures make extensive provision for 'partial' remediation and the use of site management plans, thereby appearing to afford in-situ retention a higher priority. Victoria and Western Australia attach less significance to the ANZECC/NHMRC Guidelines and have adopted general principles that do not afford prominence to in-situ retention as a remediation option.

Overall, there is a lack of consistent approach across the jurisdictions surveyed. Given the rather dated nature of the ANZECC/NHMRC Guidelines, this situation is entirely understandable. In the absence of clear criteria for choosing a remediation option, a range of economic, social and developmental factors may determine whether in-situ retention is acceptable in any particular case.

2.3 The role of land-use planning systems in relation to site clean-up

It is clear that by far the majority of contaminated site investigations and remediation occurs through the land-use planning system in Australian jurisdictions. Although no centralised, accessible statistics are available, estimates suggest that, depending on the jurisdiction, up to 80% of contaminated sites are addressed through the applicable system.⁸⁸

Decisions regarding the acceptability of remediation and management methods, including in-situ retention of contaminants, made through the land-use planning systems of Australian jurisdictions vary substantially, and raise significant issues about process, accountability and the consistency and acceptability of outcomes. For example, the New South Wales and Victorian EPAs take a largely hands-off approach

⁸⁸ This estimate is based on information gained from discussions by the authors with regulators in Queensland, New South Wales, Victoria and Western Australia in the course of preparing surveys of state site contamination legislation.

to local planning processes concerning proposed future uses of known or potentially contaminated land, whether by way of rezoning proposals or development applications. On the other hand, the Queensland EPA is a concurrence authority for development applications involving contaminated sites, and the Western Australian DEC is a final approval authority through its register classification process and its capacity to issue certificates of contamination audit under the *Contaminated Sites Act 2003*.

Across Australia, therefore, the outcomes of development approval processes involving contaminated sites, including whether in-situ retention is an acceptable option, have the potential to differ considerably.

2.3.1 New South Wales

There are no formal statutory links in New South Wales between decision-making under the *Contaminated Land Management Act 1997* and land-use planning processes under the *Environmental Planning and Assessment Act 1979*. Standards and criteria tend to be imposed on planning authorities by SEPP 55⁸⁹ and the Planning Guidelines⁹⁰, requiring referral to the EPA of any sites considered to pose a significant risk to health or the environment. This referral requirement is based on the reporting provisions of the *Contaminated Land Management Act*.⁹¹ The Planning Guidelines require the land owner to inform the EPA of such sites, although the planning authority may also do so where it becomes aware of such risk.⁹²

Broadly speaking, development applications that involve sites that present a significant risk of harm are handled by the EPA, and those that do not by local planning authorities. However, this is not a mandatory provision of the Act. It would appear possible, therefore, for sites that present a significant risk to fall to the relevant planning authority in the event that the EPA does not assume regulatory responsibility for the site.

Where a planning authority is faced with a development application involving potentially or actually contaminated land, it is obliged to follow the requirements of the abovementioned SEPP and Planning Guidelines. The SEPP requires that all 'remediation work' be carried out in conformity with guidelines in force under the *Contaminated Land Management Act*.⁹³

In relation to assessment (investigation) criteria and methods and remediation options, relevant planning authorities in New South Wales are provided with specific guidance in the documentation referred to above. In particular, the Planning Guidelines refer to the EPA Guidelines and present a four-stage site process that includes: preliminary investigation, detailed investigation, a remedial action plan, and validation and monitoring.⁹⁴

The outcomes of this process will be submitted to the relevant planning authority with the development application for the particular site. Specific remediation strategies can be approved by councils as conditions of development approvals.

While SEPP 55 imposes a series of procedural obligations on developers wishing to redevelop contaminated land, it also relies heavily on various guidelines, particularly

⁸⁹ *State Environmental Planning Policy No. 55 – Remediation of Land (1998)*.

⁹⁰ *Managing Land Contamination, Planning Guidelines – SEPP 55 – Remediation of Land (1998)*.

⁹¹ S. 60.

⁹² op. cit., fn. 90, at 15.

⁹³ op. cit., fn. 89, at cl. 17.

⁹⁴ op. cit., fn. 90, at 14.

those issued under the *Contaminated Land Management Act*. In the case of development applications under the *Environmental Planning and Assessment Act*, there is no requirement under the SEPP for the use of an accredited auditor at any stage of the investigation or remediation process. This is principally at the discretion of the relevant planning authority.⁹⁵

It appears that, under the development approval process in New South Wales, the capacity of the relevant authority to assess or independently review a development application involving known or suspected contaminated land depends on the technical resources of the relevant planning officers and the local authority's engineers. Other than in the case of sites posing significant risk of harm, there is no formal advisory role for the EPA.

Furthermore, it does not necessarily follow that an accredited auditor will be used in the investigation and remediation processes—it will depend on whether the planning authority requires this of the developer. It is assumed that, where in-situ retention of contaminants significantly above investigation levels is being considered as the principal remediation option, either the EPA and/or an accredited site auditor will have become formally involved.

2.3.2 Victoria

As indicated above, the Victorian EPA, like the New South Wales EPA, does not involve itself directly in the planning and development control processes applicable to contaminated sites in that state. Those processes depend upon Ministerial Direction No. 1 and the General Practice Note (Contaminated Land)⁹⁶ under the *Planning and Environment Act 1987*, together with the SEPP (Prevention and Management of Contaminated Land), which in turn adopts the investigation and risk assessment processes addressed in the NEPM (Site Assessment). Any remediation outcome, including in-situ retention, will depend upon the procedures and criteria specified through these instruments.

The SEPP requires the issue by an accredited environmental auditor of a certificate or statement of environmental audit in relation to potentially contaminated land that is being considered for a sensitive use.⁹⁷ This will be used to assist determination of the planning application and the imposition of conditions (e.g. that a statement of environmental audit must be complied with before work commences).

The option of in-situ retention of contaminants will depend on any site risk assessment review by the environmental auditor and on recommendations regarding clean-up and management strategies contained in the audit statement or report.

2.3.3 Western Australia

The Western Australian DEC has provided no planning directive requiring planning authorities to adopt particular approaches in identifying, assessing or managing known or suspected contaminated sites. It relies instead on:

- its capacity to intervene via reporting requirements regarding contaminated sites

⁹⁵ See *Managing Land Contamination Guidelines*, cl. 3.6.1.

⁹⁶ Department of Sustainability and Environment 2005, *Potentially contaminated land – General Practice Note*.

⁹⁷ *op. cit.*, fn. 40., cl. 14.

- assessment and classification of known or suspected contaminated sites reported to the department
- the assignment of a memorial to the relevant certificate of title indicating the classification, and
- the power to issue Certificates of Contamination Audit.

The last three actions require the involvement of an auditor. Ultimately, the DEC has the power to issue various notices requiring investigation and/or clean-up.

In Western Australia therefore, the investigation and remediation of known or potentially contaminated land through the land-use planning process is not reliant on any direct intervention of the DEC. Instead, the 'drivers' for planning authorities to require effective investigation and appropriate remediation of contaminated sites are the prospect of poor planning outcomes, potential liability and the capacity of the DEC to intervene under the *Contaminated Sites Act 2003* through the classification/memorial process and the issuing of investigation, clean-up or hazard abatement notices.

2.3.4 Queensland

Like Western Australia with its site classification system, the existence of the Environmental Management Register and the Contaminated Sites Register under the Queensland *Environmental Protection Act 1994* provides the basis for significant involvement of the EPA with the development control process regarding contaminated sites.

Under the *Integrated Planning Act 1997*, assessment managers dealing with contaminated sites development applications must refer the application to the EPA. In turn, the EPA has the power to either remove the site from the relevant register or deem it suitable for particular purposes only when it is satisfied with the investigation and assessment process. In this sense the Queensland EPA is unique in Australia in that it is a statutory referral agency in the case of development applications involving contaminated sites.

2.3.5 Conclusions regarding the role of land-use planning systems

By various mechanisms, land-use planning systems throughout Australia endeavour to ensure that the generally accepted national criteria for investigation and remediation of contaminated sites are applied in the development application and approval process where development for 'sensitive uses' is involved. However, in the absence of any detailed national policy guidance in relation to the remediation of contaminated sites, that outcome, including in-situ remediation, will depend largely on the conclusions and recommendations of environmental auditors or, perhaps in the case of New South Wales, consultants.

Where a relevant planning authority is faced with an application that involves management of contamination by in-situ retention, it may, in the case of Queensland and Western Australia, be assisted by the fact that the matter will have a significant involvement (and essentially an approval role) from the respective state environment agency.

In the case of New South Wales and Victoria, this form of involvement in the planning process does not occur. However, the respective EPAs may assume responsibility for sites being considered in the land-use planning process through statutory reporting

processes. This can result in a decision by the EPA to issue an investigation order or notice. In New South Wales statutory reporting obligations imposed on owners of land presenting a significant risk of harm, or the guidelines encouraging planning authorities to report such sites, can facilitate this involvement if deemed necessary by the EPA. In Victoria statutory reporting requirements applying to auditors undertaking work under land-use planning processes can put the EPA on notice where an imminent environmental hazard has occurred.⁹⁸ Auditors engaged to issue a certificate of environmental audit are also required to supply certain information to the EPA.⁹⁹

However, no matter which administrative structure and process is adopted, the outcome will be directed substantially—if not predominantly—by the relevant site contamination auditor, particularly in relation to the nature of the risk assessment implemented and the proposed remediation strategy. The ability of relevant planning authorities to effectively scrutinise the recommendations of site auditors will be determined by a range of factors, including the technical capacity of planning officers and local government engineers to assess the adequacy and appropriateness of the risk assessment method, its conclusions and the recommended remediation or management techniques.

As indicated above, the lack of statutory or policy criteria with respect to risk assessment and the determination of appropriate remediation options, including when it is acceptable to retain contaminants on site, provides a wide discretion to auditors, local planning authorities and state regulators in determining the ultimate fate of such sites.

2.4 Approaches to in-situ retention in other countries

The principal objective of this report is to describe how site contamination law and policy currently addresses the option of in-situ retention of contaminants in both Australia and a number of jurisdictions overseas. In the overseas context advantage has been taken of the opportunity to explore these issues during the conduct of a wider survey for CRC CARE of site contamination law and policy in a number of jurisdictions within the United States, Canada and Europe. This research has included the conduct of face-to-face interviews with site contamination authorities in the various jurisdictions surveyed.

In the course of conducting these interviews, it became evident that the practice of in-situ retention was widely—but not universally or unqualifiedly—accepted. The decision whether to do so in any particular instance is invariably made following a Phase 2 site assessment and is based upon a range of criteria and the particular circumstances of each contaminated site. As a result of the presentation of the preliminary findings of this research to a Stakeholder Reference Group for this project in Melbourne in November 2007, further enquiries have been pursued by email with selected jurisdictions in relation to the specific practice of excavating contaminated soils and locating them in an engineered storage facility on site.

The objective in undertaking these enquiries is to ascertain the extent to which the option of in-situ retention has been used in each overseas jurisdiction, rather than to

⁹⁸ Ss. 53ZB(3).

⁹⁹ Ss. 53ZB(1).

identify the detailed legislative or policy guidelines that influence the selection, or rejection, of the option on a case-by-case basis. That is a much more detailed analytical task that is being pursued separately through the larger CRC CARE project to describe site contamination law and policy in jurisdictions outside Australia. What follows in this section is a summary of the responses received from enquiries made to regulators in overseas jurisdictions concerning the acceptability of in-situ retention as a remediation strategy.¹⁰⁰

2.4.1 United Kingdom

While Part IIA of the United Kingdom's Environmental Protection Act 1990 (inserted in 1995) sets out the formal regulatory process for dealing with contaminated sites in the UK, in practice it is rarely used; instead, clean-up is administered primarily through the land-use planning system.¹⁰¹ A site-based risk assessment approach is commonly employed and remediation options are determined by reference to cost-effectiveness and suitability for use. The Environment Agency has published 'model procedures for the management of contaminated land' that are intended to apply to clean-ups under both Part IIA and the planning system, but they do not offer specific guidance with respect to the acceptability or otherwise of in-situ retention.¹⁰² It is significant that these procedures devote attention to 'long-term monitoring and maintenance' procedures, which suggests that the retention of contaminants in situ may be a common occurrence. This was confirmed in interviews with several parties in the United Kingdom. One official indicated that the whole aim of remediation is to achieve safe retention in situ as it has become too expensive to remove contaminants from sites.¹⁰³ However, there is also a suggestion that inadequate arrangements for the retention of information concerning contaminants retained in situ could lead to serious consequences in the future:

'Local authorities may only retain information on sites where there is a conflict with their current uses and disregard information that may prove important if the sites change function. Thus, the 'suitable-for-use' approach could, in effect, leave a toxic debt for future generations to address.'¹⁰⁴

This criticism relates to the issue of institutional controls, which is addressed further below.

2.4.2 Germany

The federal constitutional system within Germany means that the responsibility for regulating site contamination has been divided between the Federal Government and the state governments (Laender). In 1999 the Federal Government established a national regulatory framework through the Federal Soil Protection Act and the Federal

¹⁰⁰ In March 2007 one of the co-authors (Fowler) interviewed site contamination officials in the United Kingdom; Germany (Federal Government and two states—North Rhine Westphalia and Baden Wurttemberg); the European Union (Brussels); Belgium (Flanders region); the Netherlands; and Switzerland. He subsequently visited Canada and the United States in mid 2007 to conduct follow-up interviews with officials in the Canadian Federal government (Ottawa); Ontario; British Columbia; Massachusetts; and New Jersey. The results of these inquiries are presented in this section of the report.

¹⁰¹ Catney, P, Henneberry, J, Meadowcroft, J and Eiser, JR 2006, 'Dealing with contaminated land in the UK through 'development managerialism'', *Journal of Environmental Law & Planning* 8, 331, at 336: 'Regulation is to be achieved generally through the planning system as part of its role in the regulation of development undertaken predominantly by the private sector.'

¹⁰² United Kingdom Environment Agency 2004, *Model procedures for the management of land contamination*, Contaminated Land Report No. 114.

¹⁰³ Pers. comm., Stephen Griffiths, Head, Contaminated Sites Branch, Department for Environment, Food and Rural Affairs (DEFRA) (UK), 26 February 2007.

¹⁰⁴ Catney et. al., op. cit., 348.

Soil Protection and Contaminated Sites Ordinance, but implementation of this system is the responsibility of environmental agencies and local governments within the Laender. The Federal Environment Agency recognises ‘securing/containment measures’ as one of three major options for the elimination or reduction of site contamination hazards¹⁰⁵, and describes the following techniques for in-situ retention:

‘In-situ securing measures comprise, for example, encapsulation, surface sealing or vertical sealing by cut-off trenches, slurry walls or bore prick walls. Further measures include drainage installation at the bottom of the contamination source, the drainage of surface water and leachate, collecting ground gas and drawdown of the groundwater table.

Remediation measures are usually accompanied and subsequently followed by monitoring programmes, ensuring the success and sustainability of the cleanup.’¹⁰⁶

Officials interviewed within both the federal and two state agencies confirmed that in-situ retention, even at high levels, is considered an acceptable practice and is widely used in Germany.¹⁰⁷

2.4.3 Belgium (Flanders region)

The Flanders and Walloon regions of Belgium have separate measures concerning site contamination. It was only possible to investigate the Flanders system, which incorporates a number of innovative features (e.g. provision for the transfer of liability by contract) under the Soil Remediation Decree 1995. The Flemish system has incorporated German investigation levels and allows for retention in situ above these threshold values where a site-based risk assessment process has been undertaken.¹⁰⁸

2.4.4 The Netherlands

The Netherlands was one of the first countries in Europe to adopt specific legislation with regard to site contamination—the Soil Interim Act 1981. A subsequent Act (the Soil Protection Act 1987) was eventually merged with the original legislation in 1994 and is complemented by a range of Decrees, Regulations and Circulars. For many years a goal of ‘multifunctional use’ was pursued, leading to substantial backlogs in site remediation activity. In 1999–2000 this approach was abandoned in favour of a ‘clean-up for described uses’ approach that was eventually reflected in changes to the Soil Protection Act in 2006 (similar to the approach accepted in the United Kingdom for many years). During 2006–07, Circulars have been issued relating to the risk-based approach and target values for intervention.

According to the officials interviewed, in-situ retention is not supported in the Netherlands as a remediation strategy unless there has been some prior, active remediation.¹⁰⁹ Nevertheless, some retention of contaminants has been very common,

¹⁰⁵ International Centre for Soil and Contaminated Sites 2004, *Management and remediation of contaminated sites: 30 years of German experience*, German Federal Environmental Agency, Berlin, at 7.

¹⁰⁶ *id.*, at 8.

¹⁰⁷ Interviews with Andreas Bieber, Head of Division, Soil Conservation and Contaminated Sites, German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, 6 March 2007; Prof. Dr Wilhelm König, Head, Soil Protection Unit, Ministry for Environment and Conservation, Agriculture and Consumer Protection, State of North Rhine Westfalia, 7 March 2007; and Alfons Eggerman, Manager, Contaminated Sites Unit, Ministry of Environment, State of Baden-Württemberg, 19 March 2007.

¹⁰⁸ Pers. comm., Victor Dries, Head of Policy Support Department, Public Waste Agency of Flemish Region (OVAM), 8 March 2007.

¹⁰⁹ Interview with Ruud Cino, Head of Department of Soil Remediation and Aneka Havinga-Smilde, Coordinator, Legal Section, Dutch Ministry of Environment (VROM), 13 March 2007.

even under the previous multifunctional use approach, so that most remediated sites have required long-term management and after-care. Amendments to the Soil Protection Act in 2006 have provided for the preparation of post-remediation plans for this purpose.

2.4.5 Switzerland

Like Germany, Switzerland has a federal system in which a ‘framework’ law—the Contaminated Sites Ordinance 1998 (SR.814.680)—is largely administered at the state (canton) level. This Ordinance was made according to the 1983 Federal Law relating to the Protection of the Environment (SR.814.01). A guideline document issued by the Federal Government reflects a policy of allowing in-situ retention only where further treatment will not be required beyond one to two generations:

‘Securing measures are primarily appropriate where the site can be left to its own devices based on the present facts about the pollutants and due to the considerable degradation of the pollutants over the course of no more than one to two generations without any further treatment measures needed...’¹¹⁰

In practice, in-situ retention is allowed after the removal of ‘hot spots’ and where it is possible to safeguard against further threats by regular monitoring.¹¹¹

2.4.6 The United States

The development of the Superfund legislation (the Comprehensive Environmental Response, Compensation and Liability Act, referred to as CERCLA) in 1980 in the United States heralded a new wave of specific site contamination laws in many countries thereafter. This legislation applies primarily to sites that have been abandoned or where the responsible parties are unable to bear the full cost of remediation, while contaminated sites that are continuing to be used for industrial or other purposes are regulated under the Resources Conservation and Recovery Act (RCRA). It was not possible to interview federal EPA officials specifically in relation to the acceptability of in-situ retention for this project, but it is clear that this strategy has the support of the agency. In a recent publication the EPA states:

‘At a large number of Superfund sites, especially landfills, wastes are left buried on site with protective covers of soil and other materials, often many feet deep, to keep people from coming into contact with the wastes.’¹¹²

More detailed enquiries were able to be made in two states—Massachusetts and New Jersey. In Massachusetts it was advised that in-situ retention has been practised since 1993, when a system of privatised supervision of clean-ups was introduced. All sites where contaminants have been retained are audited regularly, providing some reassurance to communities who are generally wary of the privatised system and have particular concerns in relation to in-situ retention.¹¹³

New Jersey is a state where a long history of intensive industrial activity has left many thousands of contaminated sites to be cleaned up under the supervision of the New Jersey Department of Environmental Protection (DEP). The relevant legislation (the

¹¹⁰ Swiss Agency for the Environment 2001, *Contaminated sites: register, evaluate, remediate*, at 28.

¹¹¹ Pers. comm., Bernhard Hammer, Swiss Agency for the Environment, Forests and Landscape, 15 March 2007.

¹¹² United States Environmental Protection Agency 2006, *Reusing Superfund sites*, at 7.

¹¹³ Pers. comm., Catherine Finneran, Brownfields Coordinator, Massachusetts Department of Environmental Protection, 23 July 2007.

Industrial Site Recovery Act¹¹⁴) is designed to trade off some risk in relation to remediated sites for economic growth associated with putting land back into productive use, and therefore facilitates strategies involving in-situ retention.¹¹⁵ However, the DEP is considering the issue of what levels of contaminants it is safe to leave behind, especially in terms of the consequences of the failure of a protective cap. Currently, significant levels of contaminants are able to be left behind at a site where a failure of the cap would not lead to serious or significant damage, but this approach is under review.¹¹⁶

2.4.7 Canada

Canada also has a federal constitutional system but, unlike Germany and Switzerland, its federal government has not adopted a framework law on site contamination. Instead, there is a set of broad principles that have been agreed upon by the Environment Ministers from the federal and provincial governments¹¹⁷; and a separate guideline for federal agencies to follow when undertaking clean-ups on locations under their jurisdiction according to the Federal Contaminated Sites Action Plan.¹¹⁸ All other clean-up activity in Canada is governed by the legislation adopted in each province. In this respect the Canadian regulatory system is quite similar to the approach that has been pursued in Australia.

The Federal Government's guidelines are widely used by federal agencies undertaking clean-up activities, but do not specifically address the in-situ retention option. They state that:

'The remediation objectives for a site need to be established in conjunction with the RM [risk management] objectives in order to meet site management goals for the current or intended beneficial land use of the site. It may be that at some point there will be no requirement to remediate a site, but simply to monitor it, as part of the RM Strategy. In a property transfer scenario, remediation to intended land use requirements is usually negotiated with the new land purchaser'.¹¹⁹

It was indicated in interviews with officials from Environment Canada that it is commonplace for remediation of federal sites to involve some in-situ retention, and to therefore require ongoing monitoring and maintenance.¹²⁰

At the provincial level, enquiries were made with officials in Ontario and British Columbia. In Ontario the system for achieving site clean-up has evolved from a regulatory process to one that depends primarily on voluntary initiatives that are supervised by qualified professionals who must file a record of site contamination with the Ontario Ministry of Environment.¹²¹ While a 'dig and dump' approach is adopted in most cases, it is possible for in-situ retention above prescribed generic standards to be

¹¹⁴ NJSA 13: 1K-6

¹¹⁵ Pers. comm., Ken Kloo, Administrator, Office of Brownfield Reuse, New Jersey Department of Environmental Protection, 24 July 2007.

¹¹⁶ *ibid.*

¹¹⁷ Canadian Council of Ministers of the Environment 2006, *Recommended principles on contaminated sites liability*.

¹¹⁸ Government of Canada, Contaminated Sites Management Working Group 1999, *A federal approach to contaminated sites*, at 29. Under the Federal Action Plan established in 2002, approximately \$3.5 billion has been allocated by the federal government over 10 years (from 2004) to the clean-up of all contaminated sites under federal jurisdiction.

¹¹⁹ *id.*, at 29.

¹²⁰ Pers. comm., Lisa Keller, Head, Federal Sites, Contaminated Sites Division, Environment Canada, 24 October 2006.

¹²¹ The principal Act is the Environmental Protection Act, R.S.O. 1990, cl. E.19, as amended by the Brownfields Statute Law Amendment Act 2001, R.S.O. 2001, cl. 17.

allowed by qualified professionals where a Phase 2 site-based risk assessment has been undertaken.¹²²

Similarly, British Columbia has developed since 2003 a system in which over half of all site clean-ups are undertaken voluntarily and privately under the supervision of 'rostered professionals'.¹²³ Another 25% are undertaken via a system of certificates of compliance issued by the Ministry of Environment on the basis of remediation plans submitted by rostered professionals on behalf of the responsible parties.¹²⁴ It was indicated in interviews that only 10–20% of clean-ups in British Columbia currently involve in-situ retention, but that this figure is expected to rise sharply when a new protocol is developed to allow a screening-level risk assessment process to be undertaken in place of a full Phase 2 quantitative risk assessment.¹²⁵

Finally, while the CRC surveys did not extend to Quebec, it appears that in-situ retention has been accepted in this jurisdiction also as a remediation option in recent years.¹²⁶ Amendments to the Quebec Environmental Quality Law in 2003 provided for site-specific risk assessment, except in relation to petroleum hydrocarbons and private residential development. Where risk assessment has been used, it has invariably resulted in the retention of contaminants in situ, although it is usually by the simple method of adding up to a metre of topsoil over the contaminated soil.¹²⁷ This has caused questioning of the need for sophisticated risk assessment if this is the usual result, and also of the overall strategy of in-situ retention:

'Are we simply returning back to the situation we faced in the past, where contamination was simply left in place and passed over to the next generation?'¹²⁸

2.4.8 Summary

There is a very widespread acceptance in the overseas jurisdictions surveyed that in-situ retention is an acceptable remediation strategy, invariably where a site-specific, quantitative risk assessment has been undertaken beforehand that indicates that retention of contaminants above investigation or screening levels poses no significant long-term risk to health or the environment. However, the proportion of clean-ups in which this strategy is adopted varies widely across different jurisdictions, depending on factors such as:

- the continued acceptability and economic advantages of the alternative 'dig and dump' strategy
- the insistence in some jurisdictions that there must be some treatment of contaminants prior to containment, or a likelihood that the retained contamination will not survive indefinitely in situ.

¹²² Pers. comm., Terri Bullman, Manager, Water Standards Section, Ontario Ministry of the Environment, 24 April 2007 (also confirming that 90% of all clean-ups in Ontario are undertaken outside the formal, regulatory process).

¹²³ Pers. comm., Mike McFarlane, Land Remediation Section, Environmental Management Branch, British Columbia Ministry of Environment, 10 July 2007.

¹²⁴ Environmental Management Act, S.B.C. 2003, cl. 53, Part 4 and Contaminated Sites Regulation, B.C. Regulation 375/96.

¹²⁵ Pers. comm., Mike McFarlane, op. cit.

¹²⁶ Beaulieu, M 2005, 'The use of site specific assessment and the in-situ management of contaminated soil in the redevelopment of contaminated sites', presentation to the 6th meeting of the International Committee on Contaminated Land (ICCL), Paris (available at: www.iccl.org).

¹²⁷ *ibid.*

¹²⁸ *ibid.*

There also appears to be considerable variation in the specific technical methods of retention in situ that are practised in different jurisdictions—from a simple soil capping approach to substantially engineered arrangements on site.

It has proved difficult in the course of this research to identify clear or specific guidelines in most jurisdictions concerning when, and in what manner, in-situ remediation will be allowed. Rather, the very widespread acceptance of site-specific risk assessment procedures has meant that decisions concerning in situ retention are tending to be made on a case-by-case basis, either by regulators or, in an increasing number of jurisdictions, by accredited qualified professionals (similar to environmental auditors in Australia). As the practice of in-situ retention becomes more common, there may well be a need for greater attention to the development of more detailed guidelines or criteria to govern the circumstances and particular methods involved.

However, there was not a strong recognition of this need in most of the jurisdictions surveyed. Rather, regulators appeared to be reconciled to the practical reality that in-situ retention is a necessary concomitant of achieving the redevelopment of contaminated sites for economic and urban planning purposes, and that community scepticism in relation to this practice needs to be managed through better risk communication strategies rather than by challenging the practice per se. As will be seen below, there is also a growing focus on the use of 'institutional controls' to provide for the long-term management, or 'stewardship', of sites where remediation has involved in-situ retention of some contaminants. This reflects an increasing level of adoption of this approach to remediation in many jurisdictions.

2.5 Conclusions concerning the current regulatory process and criteria

Variations between individual contaminated sites demand flexibility in determining the appropriate remediation option in each case. However, there are factors other than simply the appropriateness of technical choice that should be applied in the process of determining the choice of remediation option in the public interest. Contaminated sites can present a range of environmental and health risks, and the future use of land may have real or perceived implications for local communities and the public at large. The retention of contamination on site may create significant reservations on the part of potentially affected local residents and urban populations generally.

Consistency of decision-making both between and within jurisdictions is the essence of the National Environment Protection Council (NEPC) legislation that is the basis of the contaminated sites NEPM, limited though it is to site assessment. There appears to be no reasonable argument that the selection of site remediation options should not be subject to processes that introduce equitability and accountability into determination of the final outcome.

There are also commercial and economic arguments for national consistency. The NEPC was introduced in the 1990s as an outcome of the Intergovernmental Agreement on the Environment. It recognised, among other matters, the need for national consistency in environmental regulation to avoid the then looming issue of 'forum shopping' by industry and developers—that is, to introduce a more level playing field.

The acceptability within Australian jurisdictions of in-situ retention as a remediation strategy is uncertain presently due to a lack of clear, contemporary guidance on remediation. At the national level the existing 1992 ANZECC/NHMRC Guidelines pre-date the emergence of site-based risk assessment and provide only a very general level of guidance on the choice of remediation options. The 1999 ANZECC Guidelines, while addressing on-site containment specifically, suggest a preference for ‘the best use of available waste treatment and disposal facilities’, and fail to provide detailed guidance. The inability of the NEPM mechanism to cover remediation as well as the assessment aspect of site contamination (due to the terms of the enabling legislation) has exacerbated the problem.

Similarly, there is little specific guidance within most state/territory contaminated sites legislation (or guidelines and policies made thereunder) to assist either the relevant government agency or a site auditor to determine whether in-situ retention is acceptable in any particular case. Consistent with the 1992 ANZECC/NHMRC Guidelines, the general policy at the state level appears to be to afford a low priority to in-situ retention as a remediation option. In the large number of situations in which remediation is being undertaken in the course of the redevelopment of land, rather than according to the direct operation of site contamination legislation, planning authorities within each state appear to rely heavily on the advice and recommendations of site auditors or environmental consultants in determining the appropriate level and form of site remediation. The absence of detailed guidance at either the national or state level means that decisions by the relevant parties are the subject of wide discretion, usually linked to a site-based risk assessment.

In the overseas jurisdictions surveyed for this report, it was found that there is a relatively widespread acceptance of in-situ retention as a remediation strategy; however, take-up of this option varied considerably, depending on the availability and cost of disposal to landfill as an alternative, and also the level of priority afforded (particularly in Europe) to the active treatment of contaminants—either generally or prior to containment. The most extensive use of in-situ retention occurred in the United Kingdom and the United States, in both instances as part of a brownfields movement that has evolved since the mid 1990s to encourage the voluntary clean-up of contaminated sites. However, community mistrust of this solution is a constant factor that has needed to be addressed, primarily by way of expanded risk communication processes.

Conclusion 1: *The authors concur with the recommendation by the Review of the Assessment of Site Contamination NEPM (National Environment Protection Council, September 2006) that the EPHC should initiate an update of the 1992 ANZECC/NHMRC Guidelines; the authors also consider that it would be beneficial if any such review paid particular attention to the subject of in-situ retention of contaminants as a remediation strategy.*

3. Institutional controls—long-term management of contaminated sites

3.1 Introduction—the need for specific institutional controls

Generally speaking, the complexities and uncertainties involved in ensuring effective longer term management of contaminated sites where the approved strategy has been to retain contaminants on site have not been adequately addressed by most Australian jurisdictions. Decisions by environmental agencies to permit management strategies that involve the in-situ retention of contaminants at levels greater than specified investigation standards would appear to be based on the assumption that the engineered solution will reduce the risk of adverse effect on health or the environment to an acceptable level. For this assumption to be valid, there is a need in most circumstances to both manage and maintain the engineered facility and to monitor the condition of the land. Specifically, arguments for this are as follows:

- The risk assessment may subsequently prove to be inadequate or in error.
- Future scientific research may prove the assumptions about the toxicity and potential impacts of the particular contaminant(s) to be erroneous.
- The engineering works may deteriorate or fail.
- The condition of the site may alter due to environmental or other factors.

It follows that there is a need for legal machinery that will:

- impose effective legal obligations on responsible parties to manage and maintain the site over time
- permit effective enforcement of that machinery
- ensure that dealings with the site (sale, leasing, subdivision and development) will not disperse or obscure responsibility for management and monitoring of its condition over time.

The issue for Australian jurisdictions at present is whether the statutory machinery currently available under contaminated sites, planning and real property legislation can adequately achieve these objectives. The general approach, as will be seen from the survey below, is to place considerable reliance on clean-up orders or even remediation plans for this purpose. There are several arguments for the adoption of statutory machinery in addition to clean-up orders that can be used to impose longer term management requirements for contaminated sites:

- If a management/monitoring obligation has been imposed using a remediation order/notice, the revocation of that order following clean-up may cast doubt on the continuation of the obligation.
- Remediation orders apply to the person on whom a responsibility lies for the clean-up; should the property be onsold, it does not necessarily follow that a clean-up order will run with the land.

- This problem is exacerbated in the case of subdivision of land, where several new titles will normally be issued. Even if the clean-up order runs with the land, enforcing it against a range of landowners, some of whom may have different degrees and perhaps different types of pollution on their allotment (unevenly spread across the original contaminated site), is likely to pose difficulties.
- Remediation plans (often attached to a clean-up order/notice) focus on the immediate task of remediation based on previous investigations and risk assessment, and are not necessarily directed to longer term management of the land.

Before examining in more detail the current mechanisms in selected Australian jurisdictions for ensuring effective, long-term management of contaminated sites, it is proposed to survey some recent overseas developments in this context. This will serve to put into perspective the nature of the mechanisms currently available in Australia and, particularly, to highlight the need for a more focused approach to this matter.

3.2 Recognition of the need for institutional controls in overseas jurisdictions

Wherever in-situ retention of contaminants is involved, it is likely that there may be restrictions on the way in which the relevant property can be used in the future, and that ongoing management of the site in the form of monitoring, testing and reporting will be required. The long-term effectiveness of in-situ retention as a remediation strategy is dependent upon such arrangements. This is what has come to be referred to in the United States as the 'long-term stewardship' issue.¹²⁹ In the course of interviews with federal government officials, it was suggested to one of the authors that this is the 'hottest issue' in relation to site contamination law and policy in that country.

The principal challenge with long-term stewardship is to ensure that the relevant obligations with respect to future management of remediated sites are incorporated within an enforceable legal instrument (usually referred to in the United States as an 'institutional control'). One commentator has described the subject of institutional controls as a 'sleeping giant' in relation to brownfields projects in the United States:

'The issue of institutional controls is much like the sleeping giant in the fairy tales you heard as a child. After sleeping peacefully for many years, this issue, like the sleeping giant, has taken central stage in the brownfields movement and on several other fronts. Are institutional controls being implemented as planned? Who has the authority to enforce these controls? Do the public and local regulators have notice about the existence of these controls? Who is responsible for monitoring and enforcing these controls over the long term? Many are now demanding answers to these questions.'¹³⁰

¹²⁹ United States Environment Protection Agency, Long-Term Stewardship Task Force 2005, *Long-term stewardship: ensuring environmental site cleanups remain protective over time: challenges and opportunities facing EPA's cleanup programs*, EPA 500-R-05-001; see also Anon. 2000, *Long-term enforcement and stewardship of institutional controls*, Environmental Due Diligence Guide (BNA) No. 95, at 231.1071.

¹³⁰ Edwards, AL, 'The sleeping giant awakes: the growing public debate about institutional controls', paper presented to Brownfields Conference, 13–15 November 2006, Boston, USA (on file with authors).

There has been recognition in the United States that traditional legal mechanisms under private property law (such as easements, restrictive covenants and statutory liens) are affected by numerous technical requirements that significantly limit their capacity to provide the necessary legal framework.¹³¹ A recent survey in 41 US states revealed a wide range of legal mechanisms that are being employed to impose institutional controls on partially remediated sites. These include deed restrictions, environmental covenants, orders or consent decrees, planning permits, property easements and zoning restrictions.¹³² The survey report identified several critical issues relating to the effectiveness of institutional controls, including:

- the allocation of responsibility for their implementation
- the development of information systems to keep track of them and make them available to the public
- the development of systems to ensure compliance with and enforcement of them.¹³³

The survey also reported that numerous states had indicated an 'inability to adequately monitor and inspect institutional controls to ensure compliance with any activity and use limitations on the [relevant] property', and also had experienced difficulties with respect to the enforceability of institutional controls.¹³⁴

One response to the above issues has been the development in 2003 by the National Conference of Commissioners on Uniform State Laws of a new model state law known as the Uniform Environmental Covenants Act (UECA).¹³⁵ The UECA provides a specific form of legal instrument (the 'environmental covenant') that can be used to detail the necessary institutional controls over remediated sites and can be recorded on the relevant land title. The aim is to ensure long-term enforceability of these covenants. By 2009, 21 states had enacted the UECA and another 18 had either introduced or were planning to introduce UECA legislation.¹³⁶

The subject of institutional controls and long-term stewardship does not appear, from our research, to have been addressed in any detail outside the United States. However, as in-situ retention becomes a more widespread remediation strategy, long-term stewardship is likely to emerge in many jurisdictions, including within Australia, as a key indicator of the effectiveness of site contamination law and policy. It is particularly relevant to an assessment of whether currently emerging approaches are consistent with the concept of environmental sustainability. If institutional controls are not able to be effectively monitored and enforced, it could be argued that the approach involving in-situ retention of contaminants is simply transferring both the impacts and the cost of site contamination to future generations. It is critical, therefore, in ensuring both regulator and community acceptance of in-situ retention as a remediation strategy, that an effective legal mechanism for the imposition of institutional controls is available to regulators. In this regard the United States UECA provides an interesting precedent.

¹³¹ United States Environmental Protection Agency, op. cit., fn. 23, at 24: 'Archaic common law doctrine and other State property laws...often work against long-term institutional controls, undermining their effectiveness and compromising the ability of government agencies to maintain and enforce them.'

¹³² Association of State and Territorial Solid Waste Management Officials, State Superfund Focus Group 2007, *State status in the implementation of institutional controls: summary of inventory findings*, (on file with authors).

¹³³ id., at 8–9.

¹³⁴ id., at 10.

¹³⁵ Available at: www.environmentalcovenants.org. See further, Strasser, K 2007, 'The Uniform Environmental Covenants Act: why, how and whether', *Boston College Environmental Affairs Law Review* 533.

¹³⁶ Uniform Environmental Covenants Act legislative update, available at: www.environmentalcovenants.org.

3.3 Institutional controls in Australia

3.3.1 Overview of current mechanisms

There is considerable variation among Australian jurisdictions in the statutory machinery available to ensure reliable longer term management of contaminated sites.

Under the New South Wales *Contaminated Land Management Act 1997*, the EPA may issue a management order that will be able to operate until such time as a site ceases to be significantly contaminated.¹³⁷ Where a management order has been issued under the Act, the EPA may also issue an ongoing maintenance order to facilitate future management and monitoring of a site¹³⁸, or may impose restrictions or public positive covenants requiring ongoing management of the land.¹³⁹ There is no contaminated sites register on which orders or other types of restrictions can be recorded.

In Western Australia clean-up or remediation orders currently constitute the sole legal basis for imposing and maintaining any longer term management and monitoring conditions required by the relevant state environment agency. However, the state's contaminated sites classification system (register) may provide a basis for the application of ongoing monitoring and management conditions. Land may be classified as 'contaminated—restricted use' or 'remediated for restricted use', and restrictions may be placed on the use of the site.¹⁴⁰ Depending on the scope of the term 'restriction', this may include long-term management and monitoring.

In Victoria a clean-up notice (CN) may impose ongoing management and monitoring conditions on an occupier of land.¹⁴¹ It would appear that this responsibility can be transferred by the EPA to any occupier as the property changes hands. Additionally, as noted earlier, the government has recently introduced Regulations through the *Environment Protection Act 1970* to impose a requirement for a works approval (and associated bond) in cases where contaminants are to be retained on site as an approved remediation strategy. As a works approval can contain such conditions as the EPA considers appropriate, it would appear valid to include a requirement for monitoring and management.¹⁴² On completion of the works to which an approval applies, application must be made for a licence under the Act to maintain those works on site—in this case, the engineered repository for the contaminants. Similar to the New South Wales situation, there is no contaminated sites register maintained by the Victorian EPA under the contaminated sites provisions of its Act. However, there is a Priority Sites Register on which CNs and pollution abatement notices (PANs) are recorded.

The Queensland EPA uses a different mechanism for the imposition of monitoring and management of contaminated sites in the form of a site management plan (SMP), and also maintains registers of contaminated sites. In circumstances where remediation has occurred but the site remains contaminated and should be subject to restricted

¹³⁷ S. 14.

¹³⁸ S. 28

¹³⁹ S. 29(2)(a). These restrictions or covenants are recorded on the register maintained under the *Real Property Act 1900* (NSW), according to s. 88E of the *Conveyancing Act 1919* (NSW).

¹⁴⁰ *Contaminated Sites Act 2003* (WA), ss. 15(4).

¹⁴¹ *Environment Protection Act 1970*, s. 62A.

¹⁴² *ibid.*, ss. 19B(7).

uses, the EPA may leave the particulars of the land on the Environmental Management Register subject to the preparation of an SMP.¹⁴³

3.3.2 The use of remediation and site management plans

In all the above jurisdictions the details of the required ongoing monitoring and management of the site are likely to be contained in a remediation plan or SMP. The New South Wales EPA may issue a management order requiring the person to whom it is issued to submit for approval a plan of management that would presumably include a remediation action plan if appropriate.¹⁴⁴ This involves a statutory site audit that must be prepared and submitted by an accredited site auditor.¹⁴⁵ Although not clear, it would appear that long-term monitoring and management strategies would be included in this plan. It is assumed that, if the EPA were to issue an ongoing maintenance order, it would include in the order, directly or by reference, a management plan (or its essential elements).

In Western Australia the *Contaminated Sites Act 2003* would appear to allow CNs to contain monitoring and management conditions either as stand-alone provisions or as part of a required management plan.¹⁴⁶

In Victoria the requirement for the preparation of a remediation plan can be specified in a PAN or CN, following an assessment indicating that the site is contaminated. It is not clear from the Victorian EPA Guidelines that the auditor responsible for reviewing the acceptability of the remediation plan is also required to consider longer term monitoring and management if there is any potential risk associated with the proposed clean-up strategy, including the retention of contaminants on site. If a clean-up strategy involves on-site retention, it appears likely that the site will be regarded as scheduled premises and require a works approval under the *Environment Protection Act 1970*. It would appear that the monitoring and management requirements of any required remediation plan would be included as conditions of the relevant works approval and ensuing licence.

For the purposes of future management of contaminated sites, the Queensland EPA may require the preparation of an SMP that must include, among other matters, 'details of the measures proposed to be taken to manage the risk of serious environmental harm...by the hazardous contaminant'.¹⁴⁷

3.3.3 The relationship between orders/notices and the maintenance of long-term management and monitoring

The significance of formal notices for the remediation of contaminated sites where in-situ retention has been approved, and that may require ongoing management and monitoring, may depend on whether or not a particular jurisdiction relies i) on a form of register as a management tool (as well as the issue of orders or notices) or ii) exclusively on orders and notices as the essential management tool.

For example, in Western Australia, besides the issuing of CNs that may include a requirement to prepare a management plan (which, in turn, may include longer term monitoring and management requirements), the DEC may classify a site as

¹⁴³ *Environmental Protection Act 1994*, ss. 384(2).

¹⁴⁴ *Contaminated Land Management Act 1997*, ss. 14(1).

¹⁴⁵ *ibid.*, s. 47.

¹⁴⁶ *Contaminated Sites Act 2003*, ss. 50(4).

¹⁴⁷ *Environmental Protection Act 1997*, ss. 404(b)(i).

‘contaminated—restricted use’ or ‘remediated for restricted use’, and must specify restrictions on the use of the site in either case. Depending on the interpretation of the term ‘restriction’, the classification can require longer term management and monitoring of the site and may require adherence to the terms of any management plan required as a condition of a CN. On withdrawal of a CN in relation to such sites, the register will provide the basis for imposing ongoing obligations on the landowner.

Queensland also maintains registers of contaminated sites. Where particulars of land are recorded on the state’s environmental management register (EMR), an SMP may be prepared¹⁴⁸ that includes both remediation strategies and any post-remediation management requirements. Where the SMP approves an SMP, it must record the details of the plan on the EMR and provide to the person submitting the plan written notice of the approval and a suitability statement for the land.¹⁴⁹ It is an offence under the *Environmental Protection Act 1994* to willfully contravene an SMP, attracting a maximum penalty of \$166,500 or two years imprisonment in the case of an individual and \$832,500 for a corporation. The equivalent strict liability offence attracts a maximum penalty of \$83,500 for an individual and \$417,000 for a corporation. Also, an owner proposing to dispose of land recorded on the EMR must give written notice to the prospective purchaser of the details on the register and, if the land is subject to an SMP, the details of that plan.¹⁵⁰

In New South Wales, once land ceases to be significantly contaminated for the purposes of the *Contaminated Land Management Act 1997*, all management orders in relation to the land cease to have effect.¹⁵¹ On that basis any monitoring or site management requirements in the order would cease to apply. If the EPA perceives that, in the case of in-situ retention, continuing management and monitoring should be an enforceable, legal requirement, it would presumably issue an ongoing maintenance order (see above).

In Victoria the EPA can issue CNs containing ongoing management and monitoring conditions. It would appear, however, that those conditions will apply only as long as the notice remains in effect. Otherwise, the Victorian EPA would have recourse to the requirement for a works approval and licence for the on-site containment of contaminants in order to impose appropriate management and monitoring conditions.

3.3.4 Commercial implications of institutional controls

The above indicates the range of statutory machinery available in the various Australian jurisdictions to ensure effective long-term management of sites where contaminants have been retained in situ. Depending on the jurisdiction, this may include an ongoing maintenance of remediation order, an ongoing CN, works approval or licensing (with conditions), a notice to prepare an SMP or a conditional inclusion on a register (with or without an SMP).

In the absence of any specific statutory mechanism dedicated to the longer term management of such sites, these processes will determine the manner in, and extent to, which obligations to manage a remediated site can be imposed and enforced. For example, if the only mechanism available for imposing management obligations is a

¹⁴⁸ *Environmental Protection Act*, s. 401.

¹⁴⁹ *ibid*, s. 413(2).

¹⁵⁰ *ibid*, s. 421(2)(a).

¹⁵¹ *Contaminated Land Management Act 1997*, s. 14(8).

CN, it follows that the notice must remain in force to continue those obligations and be transferrable to subsequent occupiers.

There is an argument from developers of contaminated land that, in situations where a relevant authority has approved a remediation process that involves in-situ retention of contaminants, the extent to which the land remains subject to, for example, a remediation notice or is allocated to a particular category on a register might unreasonably impinge on the commercial value of the land. It is argued that this is unreasonable where a required risk assessment has demonstrated that the level of risk associated with the containment method adopted is sufficiently low as to render acceptable the retention of the contaminants on site.

The counter-argument is that the site remains contaminated and that, as a matter of public interest, its character in this respect should be validly recorded in an order, notice or classification that reflects the condition of the land.

3.4 Conclusions regarding institutional controls

The need for legal measures that impose restrictions concerning future use and obligations with respect to ongoing management of sites where contaminants have been retained in situ is now well recognised in the United States. Special legislation to allow for the registration of environmental covenants on land titles for these purposes has been adopted in almost half of the states in that country. By contrast, in Australia, there is presently only a low level of recognition of the need for institutional controls, as distinct from engineering measures, for sites where containment has been adopted as a remediation strategy. A variety of mechanisms may be employed for this purpose in Australian jurisdictions, including orders under site contamination legislation, remediation plans or SMPs, and conditions attached to a planning approval. However, there is no consistent approach to this matter across jurisdictions, and there may be serious questions concerning the legal efficacy of some of the mechanisms currently being used—in terms of their enforceability and capacity to bind subsequent owners of the relevant sites.

Conclusion 2: *The authors believe that, as part of the proposed EPHC update of the ‘management components’ of the 1992 ANZECC/NHMRC Guidelines, there is considerable merit in considering the most appropriate form of legal instrument through which to impose long-term institutional controls to ensure effective long-term stewardship of sites where contaminants have been retained in situ.*

4. Residual liability

4.1 The Australian position

Owners and occupiers of land that has been remediated to the satisfaction of the relevant regulatory authority and/or environmental auditor commonly seek a process whereby the site can be ‘signed off’ or assigned to a new category on any register that may exist in the relevant jurisdiction. Their expectation is that there should be a degree of finality about the outcomes. In particular, developers who are proposing to invest in new development on remediated land may seek some form of assurance for the purposes of commercial security that further clean-up orders will not be issued in the future. Purchasers of remediated property also may seek this form of certainty.

In circumstances where the investigation and remediation has occurred through the land-use planning system and development approval has been granted, this certainty will exist—inasmuch as the planning approval cannot be revised or rescinded other than through a planning appeal or other legal remedy where the courts have the power to review the merits of the original decision.¹⁵² However, despite new development on a site having been approved under the applicable land-use planning system, there is generally no constraint on a regulatory agency issuing an additional investigation or remediation order when a site otherwise presumed to have been effectively remediated exhibits further signs of contamination.

For example, the wording of the South Australian *Environment Protection Act 1993*¹⁵³ is as follows:

- ‘If -
- (a) the Authority is satisfied that site contamination exists at a site;
 - or
 - (b) the Authority suspects that site contamination exists at a site because a potentially contaminating activity of a kind prescribed by regulation has taken place there,
- the Authority may issue a site contamination assessment order in respect of the site to an appropriate person.’

There appears to be nothing in this respect to suggest that the South Australian EPA may not issue a site contamination assessment order even though the site has been assessed and/or ostensibly remediated on a previous occasion. It should be noted, however, that this recent legislation incorporates two measures in relation to future liability that are unique within Australian jurisdictions: first, it is possible for future liability to be transferred to a third party by an ‘arms length’ agreement¹⁵⁴; and, second, a person redeveloping land for a changed use must assume responsibility to the exclusion of all other parties previously responsible.¹⁵⁵

¹⁵² For a discussion of what the New South Wales Planning and Environment Court requires by way of finality in a planning condition, see *Walker v. Minister for Planning and Others* [2007] 157 LGERA 124.

¹⁵³ S. 103H.

¹⁵⁴ S. 103E

¹⁵⁵ S. 103D(2)

While these measures do not afford absolute finality in relation to site clean-up, they do allow for a legally sanctioned transfer of the residual liability that may exist following a clean-up. It will be seen below that similar measures have been introduced in some overseas jurisdictions, in particular in Canada.

In other jurisdictions in Australia the general position seems to be that there is little finality attached to the approved completion of a remediation. For example, in Victoria there appears to be nothing to prevent the Victorian EPA from issuing a new pollution abatement notice under section 62 of the *Environment Protection Act 1970* if it considers that circumstances have changed so as to warrant the issuing of such a notice in relation to any particular site. Similarly, there appears to be no limitation on the Queensland EPA issuing an investigation or remediation notice on a site that has already been subject to investigation and clean-up, provided the conditions prescribed by sections 376 or 391 of the *Environment Protection Act 1970* have been met. Likewise, the New South Wales EPA may declare land to be an investigation area and issue an investigation order whenever it considers that contamination poses a significant risk of harm.

The situation in Western Australia under the *Contaminated Sites Act 2003* differs from those referred to above. The DEC is not prohibited from issuing an investigation notice or CN in relation to a site previously subject to assessment and remediation under the Act if circumstances have changed. However, if the new requirement for investigation and possible remediation occurs due to an error by the DEC in issuing a certificate of contamination audit, the state will bear responsibility for the subsequent remediation and, presumably, any associated investigation.¹⁵⁶

However, this responsibility would not be assumed where no such error has occurred. It follows that, where the issue of risk associated with a remediated site recurs due to new knowledge of a particular contamination, or an engineering failure in the case of management of contaminants in situ, the state would not bear the cost of the remedial action required.

4.2 Approaches to residual liability overseas

The question of residual liability following the completion of a clean-up has emerged as a major issue in many jurisdictions overseas, particularly for parties involved in voluntary clean-ups as part of a brownfield redevelopment. Such liability may arise where there has been retention of contaminants on site and unforeseen consequences are experienced some years afterwards that pose a new, significant threat to public health or an ecosystem. It may also arise where institutional controls imposed on a site have not been implemented and the parties responsible for doing so have ceased to operate (the so-called 'orphan site' scenario). There may also be a possibility of residual liability being imposed on responsible parties where new technologies emerge in the future that could address remnant contamination. Whether, in any of these circumstances, liability should be imposed afresh on the original polluter, or the brownfield developer, or any other parties who may have been involved with the redevelopment of the site (e.g. financiers) is a vexed question.

¹⁵⁶ op. cit., fn. 145, ss. 29(1)(b).

There may be an argument for asking governments to pick up the responsibility for additional remediation in such instances, on the basis that they have signed off on the original clean-up. However, most governments are unwilling to provide an unqualified sign-off and are unlikely to agree to accept responsibility in such circumstances, especially where other parties have sought to make a commercial profit from the redevelopment of the affected land. The question of who should be liable in such circumstances is therefore left to be dealt with under the relevant liability provisions in site contamination legislation, although these provisions were probably not written with this particular scenario in mind. While no clear approach to this issue has been identified yet, some interesting developments are occurring in various jurisdictions overseas.

Some jurisdictions, particularly in North America, have provided a level of relief from future liability for clean-up to those undertaking brownfield redevelopments voluntarily. In the United States the Superfund legislation was amended in 2002 to provide such liability relief, and many states have enacted similar measures.¹⁵⁷ The difficulty with this immunity is that it is usually qualified, such that it does not provide protection against an unanticipated event or situation. Often, such parties will therefore also seek the protection of special insurance against future liability (which is now widely available in North America and usually provides cover for a period of up to ten years). In Australia, as noted in Section 4.1 above, it appears that such immunity measures are generally lacking in state/territory site contamination legislation, and it would therefore seem desirable for some attention to be directed to this option by policy-makers. It is also only recently that similar insurance options have begun to be made available in this country.¹⁵⁸

While the provision of a qualified immunity for voluntary brownfields developers appears to have encouraged voluntary clean-up action in North America, additional approaches to the subject of residual liability have also been contemplated. In Canada, national guidelines on liability for site contamination adopted some years ago by the Canadian Council of Ministers for the Environment were amended in 2006 to allow for the transfer of residual liability between parties, provided that an adequate form of financial assurance is put in place.¹⁵⁹ It is for each province to determine how to implement this guideline through its own site contamination legislation.

Another approach to the issue of residual liability is to provide for the transfer of liability upon a change of use of a contaminated site. In the Canadian province of Alberta the

¹⁵⁷ See the *Small Business Liability Relief and Brownfields Revitalization Act 2001* (Public Law 107-118 (HR2869)), which commenced operation on 11 January 2002. At the state level many laws equivalent to Superfund have also provided for liability relief: see Alberini, A et. al. 2005, 'The role of liability, regulation and economic incentives in brownfields remediation and redevelopment', *Regional Science and Urban Economics* 35, 327, at 329: 'In the US, where federal legislation addressing contaminated sites was passed over 20 years ago..., state programs were recently established to encourage cleanup and redevelopment of potentially contaminated sites by offering (a) reductions in regulatory burdens, (b) relief from liability for future cleanups and environmental damage once certain mitigation standards are met and/or (c) financial support for regeneration of brownfields.... Liability relief usually comes in the form of letters of no further action, certificates of cleanup completion or covenants not to sue.' See also, Environmental Law Institute 2002, *An analysis of state Superfund programs: 50 state study, 2001 update*, ELI, Washington DC, at 39-40. For a review of relevant provisions in Canadian provincial legislation, see Albert a Environmental Law Centre 2004, *A review of regulatory approaches to contaminated site management* (on file with authors).

¹⁵⁸ Halfacre, J and Rollason, S 2007, 'The role of environmental insurance when dealing with contaminated land', presentation to Strategic Risk Rationalisation Conference, Melbourne, 18 October 2007 (on file with author).

¹⁵⁹ Canadian Council of Ministers of the Environment, *Recommended principles on contaminated sites liability*, 2006. See, similarly, recent South Australian legislation: *Environment Protection (Site Contamination) Amendment Act 2007*, inserting s. 103E in the principal Act.

relevant site contamination legislation provides that a person who proposes a change of use of land is responsible for its remediation, to the exclusion of all other parties.¹⁶⁰

It seems clear that issues related to future liability for partially remediated sites will require close attention in many jurisdictions. The provision of qualified immunities for voluntary clean-ups, a process for transfer of residual liability by agreement and the possible linkage of future liability to a change of use of contaminated land are all options worthy of consideration. Whether governments should also provide special funds (in the manner of the United States Superfund) to cover such situations is a policy issue on which opinions are likely to differ considerably.

It is also important to note in this context the emergence in the United States in recent years of organisations that are willing to engage in commercial transactions under which they agree to take over the residual risk of liability for a remediated site.¹⁶¹ These environmental liability transfer (ELT) transactions usually involve the sale of a contaminated site to an 'ELT company'. They are invariably backed up by specialised insurance cover against exposure to any unanticipated additional costs in relation to clean-up beyond the amount estimated at the time of the transfer. Cost estimates are based on extensive prior assessment of the site, and these transactions are usually entered into in full consultation with the relevant environmental authority.

While it is not possible to formally transfer residual liability under United States site contamination laws, ELT transactions usually provide to the responsible party or parties a high level of 'insulation' from future liability. It appears that these types of transactions are particularly attractive to corporations that wish to clear off contingent liabilities from their books for the purposes of both corporate reporting requirements and the promotion of a 'green' image. Many of these are Fortune 500 companies that are ineligible to obtain the usual brownfield incentives such as financial assistance or relief from future liability for voluntarily cleaning up their properties (because they are the original polluters). In effect, the marketplace in the United States is generating a new breed of investor in site clean-ups—in the form of companies that develop a 'portfolio' of contaminated sites for which they have agreed to assume responsibility and presumably believe they can make a profit from after having overseen clean-up operations. This approach has not yet presented itself in Australia to any obvious degree, although it may be that American ELT companies may be willing to extend their activities here in the near future.

Finally, there has also been a distinct trend, particularly in Canada, of providing new types of exemptions from liability for certain parties. Exemptions have been provided in recent years by amendments to the original legislation in Canadian provinces for local government authorities when acquiring properties for non-payment of rates and taxes; for lenders who foreclose on a property; and for down-gradient property owners affected by the migration of contaminated groundwater.¹⁶² It is also common for most legislation to provide an exemption for 'innocent purchasers'. In the United States a new rule was adopted in 2006 under the Superfund legislation with respect to the due diligence standard that has to be met by parties seeking to qualify for this exemption as an 'innocent landowner, contiguous property owner or bona fide prospective

¹⁶⁰ Alberta *Environmental Protection and Enhancement Act*, R.S.A. 2000, c. E-12; see, similarly, in South Australia, *Environment Protection (Site Contamination) Amendment Act 2007*, inserting s. 103D(2) in the principal Act.

¹⁶¹ Scott, G, 'Environmental liability transfer: the offshore experience. Case studies, indemnity processes – transfer of risk', presentation to Strategic Risk Rationalisation Conference, Melbourne, 18 October 2007.

¹⁶² For a survey of Canadian provisions, see Abdel-Aziz, A and Chalifour, N 2007, *The Canadian brownfields manual*, Lexis Nexis Canada Inc., Markham, Ontario.

purchaser'.¹⁶³ The site contamination legislation in most states/territories in Australia does not address the subject of exemptions to the same extent as has been done in equivalent legislation in Canada and the United States and may therefore warrant review from this perspective.

4.3 Conclusions regarding residual liability

There is currently no clear or explicit protection under state site contamination laws (with the exception of the recent South Australian legislation) against the imposition of a fresh responsibility to undertake further clean-up work some time after a remediation has been completed, should a fresh threat to human health or the environment present itself. This position contrasts with the situation that has evolved in North America, in particular, whereby this form of 'residual liability' may be avoided in several ways under the relevant legislation, including:

- the provision of qualified relief from liability for those undertaking a voluntary, brownfield clean-up
- measures that allow the transfer of residual liability by agreement, or upon a change in use of the relevant land.

It was also noted that a number of exemptions from liability have been provided for in overseas legislation, for example to protect bona fide purchasers who have exercised due diligence in relation to their purchase of contaminated land.

Conclusion 3: *The authors see merit in the proposed update of the 1992 ANZECC/NHMRC Guidelines being extended to include the ANZECC Position Paper on Financial Liability for Contaminated Sites Remediation (1994), with particular attention to be directed to the issue of residual liability.*

¹⁶³ United States Environmental Protection Agency, All Appropriate Inquiry Rule (40 CFR, Part 312).

5. Interaction with waste management laws

5.1 Emergence of this issue in Europe

The possibility that in-situ retention of contaminants might attract the operation of waste management laws became a reality in the European Union (EU) as a result of the decision of the European Court of Justice (The Court) in September 2004 in the *Van de Walle* case.¹⁶⁴ The case arose from a criminal prosecution under Belgian law of several parties for the offence of ‘abandoning waste’ by having allowed the accidental leak of hydrocarbons from a service station. The case was referred to the Court for a preliminary ruling concerning the interpretation of the term ‘waste’ in the EU Waste Management Directive 2006/12/EC (repealing and replacing Directive 75/442/EEC). Under Article 1 of this Directive, waste was defined to mean ‘any substance or object in the categories set out in Annex 1 which the holder discards or intends or is required to discard’.

The Court concluded that this definition covered both hydrocarbons that are unintentionally spilled and cause soil and groundwater contamination and also the soil itself that had been contaminated by hydrocarbons, even if it had not been excavated. The decision to extend the definition of ‘waste’ to include soils that have been the subject of contamination caused far-reaching debate and uncertainty within EU countries. In his analysis of the decision, McIntyre noted that:

‘The position taken by the Court may serve to render many national regimes on contaminated land redundant as the treatment of contaminated soil would now be required under and would need to be conducted in accordance with the relevant waste management legislation’.¹⁶⁵

The implications of the *Van De Walle* decision were therefore far reaching. Depending on the wording of national waste management laws, parties could be made criminally liable for storing or keeping waste without a licence simply by being in possession of a contaminated site.¹⁶⁶ Also, the disposal of contaminated soil to a landfill under the regular ‘dig and dump’ method could constitute an unlawful disposal of waste if not licensed. Furthermore, if the disposal of contaminated soil to landfill was processed under waste management laws, it could result in the classification of the soil as ‘hazardous’ waste, thereby attracting substantially higher fees or even being prohibited—depending on the relevant definition of the term ‘hazardous’. In the United Kingdom it was reported that a consultant has been made the subject of a civil action for damages by a client because the consultant failed to advise that the cost of disposal

¹⁶⁴ *Van de Walle and Others*, Case C-1/03, decided 7 September 2004 (full text of decision available in *Journal of Environmental Law* (2005) 17(1), 109–117; see also accompanying analysis by McIntyre, O at 117–127. For a survey of this issue across a number of EU jurisdictions, see English Partnerships, Brownfield Research Summary 2006, *One permit or two? Waste management and the development process*. For an Australian discussion of this issue, see Preston, BJ 2008, ‘Ecologically sustainable development in the context of contaminated land’, *Environmental and Planning Law Journal* 25, 164.

¹⁶⁵ *ibid.*, at 120.

¹⁶⁶ Harrison, A, ‘A change in climate for the definition of ‘waste?’’, in Environmental Industries Commission–Business Services Ltd, *The land remediation yearbook 2007*, 81. See also deFraeye, J and Visser, E 2005, *The interaction between soil and waste legislation in ten European Union countries*, NICOLE (Network for Industrially Contaminated Land in Europe), at 6: ‘NICOLE believes that the legal vacuum that exists in many countries with regard to potential reuse of contaminated soil is to be clarified. In light of the recent ECJ ruling, the definition of ‘waste’ should be amended to make an exception for treatable and reusable contaminated soil’.

of contaminated soil to a landfill would be increased due to a hazardous waste classification.¹⁶⁷

The EU has attempted to address the various issues arising from the *Van De Walle* decision through its new Waste Directive (2008/98/EC), which was adopted on 19 November 2008.¹⁶⁸ Under Article 2.1(b) ‘unexcavated contaminated soil’ is excluded from the scope of the Directive. The organisation Network for Industrially Contaminated Land in Europe (NICOLE) has prepared a draft Position Paper on the Revised Waste Framework Directive (which has not yet been formally adopted) that offers the following observations on the effect of the new Directive:

- ‘where contaminated soil has been excavated for reuse, it may still be excluded from the scope of the Directive as a “by-product” of waste pending treatment on or off site (see Article 5) and as meeting “end of waste” criteria (see Article 6) if applied to the proposed use either in a treated or untreated form (where risk assessment has indicated that the soils are suitable for use such that there is no overall adverse environmental or human health impact);
- if there is no real alternative to disposal of contaminated soil to landfill, it will be waste at the point of excavation and will continue to be so at the point of disposal, and would only cease to be waste if the relevant waste permit held by the landfill is surrendered at some point.’¹⁶⁹

It remains to be seen whether these speculative interpretations of the new Waste Directive will find widespread acceptance; if they do, the various issues identified above would appear to have been addressed. In particular, where soils are excavated and then redeposited on site, they may no longer have to be regarded as waste during the time that they are being treated either on or off site, during transport or in relation to their return to the soil on site.

The same problems do not appear to have arisen in either Canada or the United States. To a large extent, the issue is one of statutory definition, and it would appear that it has been possible in both these countries to achieve a satisfactory delineation between the scope of site contamination and waste management laws in these jurisdictions. Of course, it may also be the case that the matter has simply not yet been tested in the courts in the way that has occurred in the EU.

5.2 The Australian position

There is clearly a potential for the same issues to arise in Australia, where waste management laws have been developed for some years in all jurisdictions. The study of national contaminated sites law and policy undertaken for CRC CARE, which has substantially contributed to this study on in-situ retention, was not required to address the relationship between the contaminated sites regulatory regimes governing the in-

¹⁶⁷ Arch, C, ‘Waste not want not: ongoing changes in brownfield remediation?’, in Environmental Industries Commission–Business Services Ltd, *The land remediation yearbook 2007*, 85, at 86.

¹⁶⁸ *EUR-Lex* (Official Journal of the European Union), 22.11.2008, at L 312/3: available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:312:0003:0003:EN:PDF>

¹⁶⁹ NICOLE, *Second position on waste* (June 2009), published as an Annex to the Common Forum Helsinki 2009 Meeting Report, available at: http://www.commonforum.eu/Documents/Meetings/2009/Helsinki/Common_Forum_Meeting_Helsinki09_report.pdf

situ retention of contaminants and the potential for conventional waste management regimes to apply to that remediation option.

However, some additional research on this matter has been undertaken for this report. Generally speaking, this indicates that there would appear to be little or no statutory constraint on the waste management laws of each of the four jurisdictions considered in this study being applied to the in-situ retention of contaminants. The stored contamination would appear to fit the definition of waste in all cases and there would appear to be ample flexibility in the definitions of 'waste facility' to include instances where contaminants have been retained on site.¹⁷⁰

There is the potential, therefore, to have the same legal issues raised in relation to the application of waste management laws to site remediation in Australia as have arisen in Europe, particularly in the absence of any specific provisions to address this matter. Whether any particular state jurisdiction wishes to exclude in-situ retention of contaminants from its conventional waste management regime is a matter of policy that could attract some public debate.

5.3 Conclusions regarding interaction with waste management laws

In Europe an issue has arisen with respect to the potential application of waste management laws to contaminated sites, in particular where contaminants are retained in situ. It is possible, given the broad definition of the term 'waste' in state/territory waste management laws, that the same issue could arise in Australia, but it has not been addressed specifically as yet.

Conclusion 4: *The authors see considerable merit in consideration being given by state/territory authorities to the inclusion of provisions in their waste management and/or site contamination legislation to clarify the applicability of waste management laws to site remediation actions, in particular where in-situ retention of contaminants is proposed.*

¹⁷⁰ For example, the New South Wales *Protection of the Environment Operations Act 1997*, Schedule 5, defines 'waste' as 'any substance (whether solid, liquid or gaseous) that is discharged, emitted or deposited in the environment in such volume, constituency or manner as to cause an alteration in the environment', thus appearing to include most forms of site contamination. Furthermore, treated contaminants may also be covered by the further provision in Schedule 5 that: 'A substance is not precluded from being waste for the purposes of this Act merely because it is or may be processed, recycled, re-used or recovered'. Finally, a remediated site at which contaminants are to be stored in situ would appear to fit within the definition of a 'waste facility' in Schedule 5, as follows: '...any premises used for the storage, treatment, processing, sorting or disposal of waste (except as provided by regulations)' (emphasis added).

6. In-situ retention of contaminants and the principles of ecologically sustainable development

6.1 The Australian position

Of the four Australian jurisdictions considered in this study, three¹⁷¹ specifically adopt the principles of ecologically sustainable development (ESD) in legislation governing identification, investigation and remediation of contaminated sites. The newly introduced contaminated sites amendments to the South Australian *Environment Protection Act 1993* are also subject to the principles of ESD stipulated in that Act.

In circumstances where contaminated sites legislation adopts the principles of ESD, in particular where there is a statutory obligation imposed on the relevant authority to take the principles into account in their decision-making, there arises the issue of the extent to which the validity of any decision made in relation to the investigation and remediation of contaminated sites is affected by the principles. Perhaps the two most significant elements of the concept of ESD are the precautionary principle¹⁷² and the notion of 'intergenerational equity'.

Indeed, given the open-textured nature of decision-making under most Australian contaminated sites legislation and the concept of 'delegated' authority to contaminated sites auditors, it is arguable that the principles of ESD are the only statutory criteria that might provide a degree of consistency and accountability in the contaminated sites regulatory regime. Nevertheless, it is clear that, in the case of the majority of state contaminated sites agencies, the delegation of authority to auditors in relation to such matters as risk assessment methodology, remediation action plans, site management plans and ongoing monitoring of contaminated sites means that there could be relatively few administrative decisions made that might attract the operation of the ESD principles. However, such principles may also be relevant to decisions made by land-use planning authorities, where planning legislation or relevant planning policy instruments invoke the principles of ESD. This is dependent on the terms of the particular planning legislation and policy instruments, but there is a general trend towards incorporating the concept of ESD in such measures.

There have now been numerous instances of Australian courts applying the precautionary principle, including one notable case in New South Wales dealing with a contaminated site.¹⁷³ In that case the Land and Environment Court, when faced with two conflicting assessment reports about the appropriate level of asbestos contamination for a site, erred on the side of caution and determined that, given the technical uncertainty, the precautionary principle should be applied and the soil should be asbestos free.

Other situations of uncertainty in relation to the assessment and remediation of contaminated sites can be envisaged. For example, a risk assessment may be required of a contaminant for which there is very little toxicological data or where it is difficult to model or quantify other variables. Similarly, and flowing from uncertain risk assessment

¹⁷¹ Queensland, New South Wales and Victoria.

¹⁷² 'If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to protect environment degradation': see, for example *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth), s. 3A.

¹⁷³ *Commonwealth of Australia v Randwick City Council* [2001] NSWLFC 79.

outcomes, a proposed remediation plan may be perceived as not adequately dealing with risk. In these circumstances it is quite possible that a court might fall back on the precautionary principle in reaching its decision.

Application of the principle of intergenerational equity is less common in the Australian courts, probably because it is more abstruse than the precautionary principle and does not readily lend itself to routine use. In relation to any proposal to retain contaminants in situ, the argument would presumably be that contamination problems should not be addressed by simply sealing contaminants within a site in the expectation that future generations will not have to deal with them. That argument would presumably be countered by the proposition that an appropriate risk assessment based on proposed management strategies should result in the contamination being retained on site only if the assessed risk is deemed acceptable.

Perhaps the appropriate application of the principle of intergenerational equity is as support to the precautionary principle—that is, if there is serious scientific doubt regarding future impacts, the wellbeing of future generations must also be a determining factor in rejecting the proposal.

6.2 Overseas approaches to the sustainability issue

While there has been a global embrace of the concept of sustainable development over the past 20 years, most overseas jurisdictions have not explicitly sought to incorporate this concept as a statutory objective in their environmental and natural resources legislation to the very considerable extent that this has occurred in Australia.¹⁷⁴ As a result, there is little discussion in other countries of site contamination issues generally, and in-situ retention specifically, in the context of sustainability or sustainable development. However, it can be argued that the extensive consideration of ‘long-term stewardship’ issues recently in the United States is, in essence, the same debate under a different heading.

What is ultimately at stake in these debates is the acceptability of economically advantageous methods of site remediation that encourage voluntary (brownfields) projects but leave substantial quantities of contaminants in situ. Is this consistent with the precautionary approach that underpins the sustainability concept, or with the principle of intergenerational equity that is also an essential foundation of the concept?¹⁷⁵ The response in the United States has been to focus on the adequacy of the engineering and institutional controls that are intended to ensure the long-term safety and stewardship that is required and expected by communities. However, there has been no clear consensus reached yet on this issue, either overseas or in Australia.

6.3 Conclusions regarding in-situ retention and sustainability

The principles of ESD are prescribed as objects in most state site contamination legislation, thereby calling for the consideration of the precautionary principle and the principle of intergenerational equity when decisions are made under such legislation.

¹⁷⁴ See Fisher, DE 2003, *Australian environmental law*, Lawbook Co., Sydney, ch. 10, for a survey of the Australian experience with legislation to implement the concept of sustainable development.

¹⁷⁵ Preston, op. cit., 168–176.

Where in-situ retention of contaminants is proposed, there is a particular challenge involved in applying these principles appropriately.

While in-situ retention is being increasingly employed as a cost-effective means of remediating and redeveloping urban land in many countries, whether the benefits of this approach in terms of restoring degraded urban areas to a better use will be greater than any associated long-term costs clearly depends on the absence of further health and environmental impacts at such sites in the future. Unless more is done to ensure the effectiveness of the engineering and institutional controls that accompany in-situ retention, the jury of community opinion may well return a negative verdict in the future in terms of the compatibility of this option with either the goal of environmental sustainability or ESD.

There is presently a perceived resistance within affected communities to the strategy of in-situ retention and a growing recognition within the site remediation industry that more effective risk communication methods are required to ensure widespread public consultation on this option. The current lack of clear guidance from regulators in Australia as to the circumstances in which in-situ retention is acceptable, and the deficiencies in the legal adequacy of institutional controls, are likely to exacerbate these community concerns. The compatibility of in-situ retention with the goal of sustainability therefore remains a significant policy—and potentially legal—issue.

No specific conclusions or proposals are offered with respect to this issue—on the basis that action to address the other issues identified in this report will more than likely serve to also address this matter.

7. Conclusions

7.1 *The regulatory framework*

As in most other countries faced with the need to address the challenge of managing contaminated sites, whether or not a site will be remediated will be substantially determined by the market place. However, the nature of the proposed remediation strategy and its acceptability in the public interest will be determined principally by the relevant regulatory regimes, whether they be specific contaminated sites legislation, land-use planning systems or a combination of both.

This is not to suggest that particular remediation options for different sites (or even classes of sites) should be prescribed. Rather, the law can and should provide a clear framework and specific criteria by which those charged with determining what remediation options are applicable can be guided in the public interest, not simply the interests of particular governments and/or developers. Essentially, this becomes an issue of accountability of decision-makers in the context of a myriad of factors that contribute to producing a sound social, commercial and environmental outcome in relation to a contaminated site.

In Australia there have been notable instances of the application of in-situ retention as a remediation management strategy. Homebush Bay (the 2000 Olympics site in Sydney) and the Docklands redevelopment in Melbourne are two such examples. However, although in-situ retention has been employed as a remediation strategy from time to time in Australia, its acceptability within Australian jurisdictions remains uncertain due to a lack of clear, contemporary guidance on remediation options generally.

At the national level the existing guidelines produced by ANZECC/NHMRC in 1992 pre-date the emergence of site-based risk assessment and provide only a very general level of guidance with respect to the choice of remediation options. The 1999 ANZECC Guidelines, while addressing on-site containment specifically, suggest a preference for 'the best use of available waste treatment and disposal facilities', and fail to provide detailed guidance. The inability of the NEPM mechanism to cover remediation as well as the assessment aspect of site contamination (due to the terms of the enabling legislation) has exacerbated the problem with respect to the lack of contemporary, detailed national guidance concerning remediation strategies in Australia.

Similarly, there is little specific guidance within most state/territory contaminated sites legislation (or guidelines and policies made thereunder) to assist either the relevant government agency or a site auditor to determine whether in-situ retention is acceptable in any particular case. Consistent with the 1992 ANZECC/NHMRC Guidelines, the general policy at the state/territory level appears to be to afford a low priority to in-situ retention as a remediation option. In the large number of situations in which remediation is being undertaken in the course of the redevelopment of land, rather than pursuant to the direct operation of the legislation, planning authorities within each state/territory appear to rely heavily on the advice and recommendations of site auditors or environmental consultants in determining the appropriate level and form of remediation. The absence of detailed guidance at either the national or state/territory level means that decisions by the relevant parties are the subject of wide discretion, usually linked to a site-based risk assessment. While a degree of flexibility is necessary

to reflect the wide variation in the condition of contaminated sites, the public interest would argue for a regulatory regime that is consistent and equitable, and provides the necessary degree of accountability for decision-making.

Furthermore, it is possible that the lack of clarity and consistency of approach across jurisdictions with respect to the selection of remediation options generally, and the adoption of in-situ retention specifically, may be discouraging remediation activity in the market-place, where regulators and/or environmental auditors continue to opt for clean-up to background values (usually via the 'dig and dump' method) in preference to the more economically attractive option of in-situ retention. Without clearer and stronger legal and policy guidance on the circumstances in which the option of in-situ retention is acceptable, such caution is likely to continue.

In the overseas jurisdictions surveyed for this report it was found that there is a relatively widespread acceptance of in-situ retention as a remediation strategy, but that take-up of this option varies considerably, depending on the availability and cost of disposal to landfill as an alternative, and also the level of priority afforded (particularly in Europe) to the active treatment of contaminants – either generally or prior to containment. The most extensive use of in situ retention was found to have occurred in the United Kingdom and the United States, in both instances as part of a 'brownfields' movement that has evolved since the mid 1990s to encourage the voluntary clean-up of contaminated sites. However, community mistrust of this solution is also a constant factor that has needed to be addressed, primarily by way of expanded risk communication processes.

Conclusion 1: *The authors concur with the recommendation by the Review of the Assessment of Site Contamination NEPM (National Environment Protection Council, September 2006) that the EPHC should initiate an update of the 1992 ANZECC/NHMRC Guidelines; the authors also consider that it would be beneficial if any such review paid particular attention to the subject of in-situ retention of contaminants as a remediation strategy.*

7.2 Institutional controls

The need for legal measures that impose restrictions on future use and obligations with respect to ongoing management of sites where contaminants have been retained in situ is now well recognised in the United States. Special legislation to allow for the registration of environmental covenants on land titles for these purposes has been adopted in almost half of the states in the United States. By contrast, in Australia, there is presently only a low level of recognition of the need for legal/institutional controls, as distinct from engineering measures, for sites where containment has been adopted as a remediation strategy. A variety of mechanisms may be able to be employed for this purpose in Australian jurisdictions, including orders under site contamination legislation, remediation or site management plans, and conditions attached to a planning approval. However, there is no consistent approach to this matter across jurisdictions, and there may be serious questions concerning the legal efficacy of some of the mechanisms currently being used, in terms of their enforceability and capacity to bind subsequent owners of the relevant sites.

Conclusion 2: *The authors believe that, as part of the proposed EPHC update of the ‘management components’ of the 1992 ANZECC/NHMRC Guidelines, there is considerable merit in considering the most appropriate form of legal instrument through which to impose long-term institutional controls to ensure effective long-term stewardship of sites where contaminants have been retained in situ.*

7.3 Residual liability

There is currently no clear or explicit protection under state/territory site contamination laws (with the exception of the recent South Australian legislation) against the imposition of a fresh responsibility to undertake further clean-up work some time after a remediation has been completed, should a fresh threat to human health or the environment present itself. This position contrasts with the situation that has evolved in North America, in particular, whereby this form of ‘residual liability’ may be avoided in several ways under the relevant legislation, including:

- the provision of qualified relief from liability for those undertaking a voluntary ‘brownfield’ clean-up
- measures that allow the transfer of residual liability by agreement or upon a change in use of the relevant land.

It was also noted that a number of exemptions from liability have been provided for in overseas legislation—for example, to protect bona fide purchasers who have exercised ‘due diligence’ in relation to their purchase of contaminated land.

Conclusion 3: *The authors see merit in the proposed update of the 1992 ANZECC/NHMRC Guidelines being extended to include the ANZECC Position Paper on Financial Liability for Contaminated Sites Remediation (1994), with particular attention to be directed to the issue of residual liability.*

7.4 Application of waste management laws to contaminated sites

In Europe an issue has arisen with respect to the potential application of waste management laws to contaminated sites, in particular where contaminants are retained in situ. It is possible, given the broad definition of the term ‘waste’ in state/territory waste management laws, that the same issue could arise in Australia, but it has not been addressed specifically as yet.

Conclusion 4: *The authors see considerable merit in consideration being given by state/territory authorities to the inclusion of provisions in their waste management and/or site contamination legislation to clarify the applicability of waste management laws to site remediation actions, in particular where in-situ retention of contaminants is proposed.*

7.5 Sustainability

The principles of ecologically sustainable development (ESD) are prescribed as objects in most state/territory site contamination legislation, thereby calling for the consideration of the precautionary principle and the principle of intergenerational equity when decisions are made under such legislation. Where in-situ retention of contaminants is proposed, there is a particular challenge involved in applying these principles appropriately.

While in-situ retention is being increasingly employed as a cost-effective means of remediating and redeveloping urban land in many countries, whether the benefits of this approach in terms of restoring degraded urban areas to a better use will be greater than any associated long-term costs clearly depends on the absence of further health and environmental impacts at such sites in the future. Unless more is done to ensure the effectiveness of the engineering and institutional controls that accompany in-situ retention, the jury of community opinion may well return a negative verdict in the future in terms of the compatibility of this option with the goal of environmental sustainability or ESD.

There is presently a perceived resistance within affected communities to the strategy of in-situ retention and a growing recognition within the site remediation industry that more-effective risk communication methods are required to ensure effective public consultation on this option. It is recognised also that a rational weighing up of the relative environmental factors associated with different options is necessary.

The current lack of clear guidance from regulators in Australia as to the circumstances in which in-situ retention is acceptable, and the deficiencies with respect to the legal adequacy of institutional controls, are likely to exacerbate these community concerns. The compatibility of in-situ retention with the goal of sustainability therefore remains a significant policy—and potentially legal—issue.

