



AUDITOR GENERAL
for
Western Australia



PERFORMANCE EXAMINATION

Grounds for Improvement:

Government Owned or Controlled Contaminated Sites

Report No. 6
November 2002



AUDITOR GENERAL
for
Western Australia

**THE SPEAKER
LEGISLATIVE ASSEMBLY**

**THE PRESIDENT
LEGISLATIVE COUNCIL**

PERFORMANCE EXAMINATION – Grounds for Improvement: Government Owned or Controlled Contaminated Sites

This report has been prepared consequent to an examination conducted under section 80 of the *Financial Administration and Audit Act 1985* for submission to Parliament under the provisions of section 95 of the Act.

Performance examinations are an integral part of the overall Performance Auditing program and seek to provide Parliament with assessments of the effectiveness and efficiency of public sector programs and activities thereby identifying opportunities for improved performance.

The information provided through this approach will, I am sure, assist Parliament in better evaluating agency performance and enhance Parliamentary decision-making to the benefit of all Western Australians.

A handwritten signature in black ink, appearing to read 'D D R Pearson'.

D D R PEARSON
AUDITOR GENERAL
November 13, 2002

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Auditor General's Overview

We are fortunate in Western Australia to live in an environment that is relatively pristine by world standards. There is no room, however, for complacency.

Western Australia's heavy reliance on groundwater and our predominantly sandy soils, particularly in coastal regions, make us especially vulnerable to land contamination. In severe cases, land contamination can also pose a risk to human health. The commercial property market is sensitive to the impact of land contamination, having observed the high dollar cost of site remediation. In addition to potentially high remediation costs, owners of contaminated land face further uncertain financial obligations through reduced land values and public liability exposures.

When the redevelopment of past industrial sites for residential use has commenced, without first identifying the full extent of land contamination and assessing the potential health risks, the subsequent costs of trying to put things right have been high. The community's resultant loss of confidence in government and its agencies can be a further significant, if intangible, cost.

The need for a new 'coordinated management framework with clear rules and procedures' was identified in a public Discussion Paper¹ released by the Department of Environmental Protection in 1995. Drafting of a new Contaminated Sites Bill commenced in 1997 although, at September 2002, the Bill was yet to be presented to Parliament.² The issues are complex. The legislation needs to be clear and carefully targeted, yet also equitable and workable.

Land contamination is an issue for government as both a regulator and a major landowner. Previous government discussion and position papers have focused on the public sector's role as a regulator; this examination has focused on the public sector's role as a major landowner. Government faces risk because it owns most of the land in Western Australia. Government faces further risk because land with problems, such as contaminated sites, can become government's responsibility by default over time.

The proposed Contaminated Sites Bill is an important backdrop to this examination but the financial risk to government and the need for an effective response exists regardless.

This examination was undertaken in the knowledge that insufficient information is currently available to estimate the public sector's financial liabilities resulting from land contamination. However, enough is known to indicate that dealing with the effects of land contamination is going to be a challenging, long term and costly issue for government and its agencies. Only careful planning and management is likely to succeed in delivering an effective response.

¹ 'Assessment and Management of Contaminated Land and Groundwater in Western Australia', August 1995. A follow-up public Position Paper, with the same title, was released in May 1997.

² The Governor announced on August 14, 2002 that a proposed Contaminated Sites Bill was on the Government's program for consideration in the upcoming Parliamentary session.

Executive Summary

Why We Did the Examination

The incidence of contaminated sites with large clean-up costs appears to be becoming more common. Community concern about the health and environmental impacts of land contamination³ is growing, following a number of high profile incidents within Western Australia.

Because of the limited information currently available about the extent of land contamination within Western Australia, no evaluation of the State's potential financial liability has yet been undertaken. However, recent contaminated site clean-up costs, incurred by the Western Australian Government on behalf of the community, have been as high as \$17.5 million (the former East Perth Gasworks). Even relatively simple cases of remediating⁴ contaminated sites can be costly. For example, CALM estimates that it could cost around \$500 000 to remediate the several bush sites near Dwellingup, where buried drums containing a mixture of oils and chemicals (including the now banned herbicide 2,4,5-T) were found in early 2002.

What We Did

The examination selected 10 agencies⁵ in order to:

- review how well advanced they were in identifying the contaminated sites under their ownership or management control;
- review their ability to assess the associated health, environmental and financial risks that they face; and
- identify significant or common issues faced by agencies.

What We Found

Overall Conclusion

The examination found that two agencies, Western Power and LandCorp, had management policies, practices and systems in place that were generally consistent with best practice⁶ for the identification of contaminated sites and the assessment of associated risks. The other eight agencies met best practice to varying degrees, in differing areas, and all had management systems in place that addressed land contamination.

³ The term 'land' contamination includes contamination in soil and groundwater but excludes contamination that is solely in buildings erected on the site (for example, asbestos in roofs). NB Recent draft revisions of the proposed Contaminated Sites Bill have also included surface water in the definition of land contamination.

⁴ Contaminated site 'remediation' is action taken to eliminate, limit, correct, counteract, mitigate or remove any contaminant, or the negative effects on the environment or human health of any contaminant (DEP Draft Guideline 'Site Classification Scheme', November 2001, Contaminated Sites Management Series).

⁵ The 10 agencies were selected because they had significant landholdings and because they reflected differing activities of government. They were: Agriculture; CALM; Education; DOLA; GoldCorp; LandCorp; Main Roads; WAGR; WAPC and Western Power (see 'Examination Focus and Approach' for full agency names).

⁶ Refer Appendix 1 for information regarding how the examination assessed 'best practice'.

All 10 agencies recognise that managing the impacts of land contamination is becoming an increasingly important and costly issue for them, demanding a long term management focus and approach. This is because they are already experiencing strong financial, environmental and social imperatives to better identify the extent of land contamination, and its likely impacts, within their property portfolios. Yet many agencies appear reluctant to commit the required resources to this task, as they face:

- an uncertain legislative environment – new legislation having been imminent for several years;
- possibly substantial investigation costs – with the government’s funding approach still unclear; and
- the absence of a clear whole-of-government approach to setting priorities for action – identified as a problem in 1995.

Identifying Contaminated Sites

The examination found that Western Power and LandCorp have made the most progress in identifying their contaminated sites. Only Western Power, LandCorp and GoldCorp (an agency with few sites, nearly all of which are believed to be contaminated) were able to provide a reliable estimate of the number of contaminated sites that they were likely to own or control.⁷ The other seven agencies either did not provide an estimate or provided an incomplete estimate based on the number of contaminated sites that they already knew about, rather than on a systematic portfolio assessment.

There is currently no authoritative definition of a ‘contaminated’ site within Western Australia to assist with identification. When the examination asked agencies how they defined a contaminated site, many different answers were given. Until this is clarified through legislation or a policy directive, estimates of the number of public sector ‘contaminated sites’ within Western Australia could vary greatly, depending on the context in which the question is asked and how contamination is defined.

Balancing Risks and Costs

The risk to agencies, of having unidentified contaminated sites within their property portfolios, is the hidden environmental or human health harm that these sites may be causing. Even if these unknown contaminated sites do not pose immediate threats to human health or the environment, they may still present a significant financial liability.

The agencies face a challenge in deciding how much time and money to spend in finding out about unknown land contamination problems, relative to assessing and remediating the ones that they already know about or suspect. It must also be acknowledged that contaminated site investigation costs can be high, especially across a large property portfolio. Conducting an initial

⁷ The actual number of sites that these three agencies will report as contaminated depends on the eventual legislated definition and, possibly, some further specific site investigations.

screening risk assessment can be a time consuming and labour intensive activity. After this screening assessment identifies ‘at risk’ sites, one agency has estimated that it typically costs between \$15 000 to \$100 000 to undertake a detailed assessment of each individual site, depending on site size and complexity. These investigation costs are incurred before any remediation of contaminated sites is undertaken.

Agencies have to address this problem within the practical constraints of budgetary pressures and competing government and community priorities. However, the demands for improved environmental performance from public sector agencies – whether imposed by growing financial liabilities, increasing community expectations, more prescriptive environmental legislation, stricter industry standards or other means – are likely to increase rather than decrease.

Understanding the Risks

Australian governments have endorsed taking a nationally consistent approach to major environmental issues such as contaminated sites. Under this approach, land is considered contaminated if it has a substance present at a concentration that presents, or has the potential to present, a risk of harm to human health or the environment.

The starting point for obtaining a better understanding of land contamination risks is to document historic, current and neighbouring land uses for sites within a property portfolio. Knowledge of historic land use is important because most land contamination has been created by past activities, sometimes going back a century or more.

The examination found that most of the agencies need to improve their knowledge of land uses within their property portfolios. Historical information gets harder to obtain, or lost, the longer the delay in making a start in compiling it. Without this information, government loses its ability to make the polluter pay and, over time, these sites may become orphan sites by default.⁸

Property Portfolio Size and Activity

Agencies that are responsible for large numbers of sites, and are active in property dealings, are exposed to increased land contamination risks.⁹ Eight out of the 10 agencies own or control more than 500 sites each. These eight agencies are also actively involved in property acquisition and/or disposal. DOLA, in particular, has responsibilities for significantly more sites (about 58 000 in total) than any other Western Australian public sector agency. Therefore the public sector as a whole, and some individual agencies, have a high-risk exposure to land contamination.

Six of the agencies are also active in leasing land to tenants, each of them owning more than 200 currently leased properties. Some of these properties have been leased to one or more tenants for decades. Agencies acknowledge that these older leases are often not protected with clear environmental lease clauses, nor had assessments of suspected land contamination been

⁸ Orphan contaminated sites are sites where the polluter or owner cannot be identified or found, or cannot be held responsible or cannot be made to pay. In these circumstances, the State assumes liability by default.

⁹ Clearly property portfolio size and activity are not the only risk factors. Other key risk factors include types of past land uses and site proximity to people and/or environmentally sensitive areas.

undertaken before lease commencement. This can subsequently make it difficult to hold lessees liable for land contamination that they have created and to apportion the responsibility for land contamination between the lessor and lessee(s).

Addressing the Priorities

Australian and international experience suggests that aiming to return all land to its uncontaminated state will be prohibitively expensive, and ultimately an unrealisable objective. Government funding to identify, assess and remediate contaminated sites will always need to be balanced against the many other priorities of government.

Meeting this challenge will require extensive public consultation and, in some cases, partnerships between different levels of government, local communities and business. Past experience has shown that, without community acceptance, it is difficult to achieve a satisfactory outcome to contaminated site remediation and redevelopment. Government decision-making processes will need to be transparent and sound, supported to the maximum extent feasible by objective scientific data.

Public Sector Coordination

The examination found, from a review of Department of Environmental Protection (DEP) and agency files, that agencies have worked effectively together in the recent past to address specific cases of land contamination once a problem has become apparent. However, further improved agency coordination is needed to facilitate the identification, assessment and remediation of those high priority contaminated sites that pose the greatest threats to human health and the environment. There is currently no across public sector management framework in place to achieve this.

Some specific measures to improve public sector coordination include:

- A better risk-based funding approach needs to be established. Currently contaminated site investigation and remediation costs are met from agency budgets or from specific submissions to government for supplementary funding. Government considers submissions put before it on a case-by-case basis and has limited opportunity to assess relative priorities.
- A policy for the allocation of agency responsibility for orphan contaminated sites needs to be implemented to ensure that the long term interests of the State are protected. This issue will become more pressing if greater numbers of orphan contaminated sites are identified, once contaminated sites legislation is enacted.
- The draft contaminated sites guidelines developed by DEP, while comprehensive, are technical and written primarily for professional practitioners. Agency managers require clear guidance about managing the health, environmental and commercial risks of land contamination.

Reconciling Environmental and Development Objectives

DEP case files suggest that, in common with elsewhere, urban renewal projects have driven much of the contaminated site remediation that has been undertaken in Western Australia. Perth is a growing city. Demand for inner city renewal, and attempts to mitigate the problems associated with urban sprawl, will place continuing pressure on government to rehabilitate older industrial areas for medium to high density residential use.

In the past, environmental and land development objectives have often been seen as directly conflicting. However the growing size of the financial costs and liabilities associated with land contamination are such that future land redevelopment must reconcile and accommodate these dual objectives. In particular, this means that the level of remediation undertaken ('How clean is clean?') will be guided by the contaminated site's future intended land use, taking into account the community's acceptance of the redevelopment proposal.

Recommendations

Government should:

- introduce new or amended environmental legislation into Parliament to govern the identification and management of contaminated sites;
- identify an agency, or agencies, that should have a leading role in assessing and managing land contamination across the public sector, with clear responsibilities; and
- develop an improved approach for allocating resources to the identification, assessment and remediation of contaminated sites.

The lead agency, or agencies, should, in accordance with the Government's policy direction:

- develop a coordinated inter-agency approach to identify, assess and remediate those contaminated sites that pose the greatest threats to human health and the environment;
- communicate clear guidance to assist other agencies discharge their responsibilities for managing land contamination.
- assist landholding agencies to reconcile environmental and land development objectives and to closely align contaminated site remediation with the site's intended future use; and
- advise government on the allocation of orphan sites to those agencies that are best placed to manage the risks on behalf of the State.

Landholding agencies should:

- purposefully manage all future land acquisitions, disposals and capital works projects in order to avoid unknowingly receiving contaminated land from other parties, or unknowingly transferring it to them;

EXECUTIVE SUMMARY (continued)

- ensure that responsibility for remediating land contamination on leased sites can be allocated to the party that created it by:
 - inserting clear environmental clauses into all new lease contracts;
 - undertaking, as appropriate, baseline investigations for land contamination before commencing new leases; and
 - reviewing older leases to identify and address the risk of acquiring the financial liability for land contamination that has been created by lessees.
- progressively adopt a systematic approach to:
 - identifying their sites most likely to be contaminated;
 - prioritising those that warrant further investigation and assessment; and
 - developing and documenting an open and transparent course of action for sites found to be contaminated, which communicates full information to stakeholders and actively involves them in the resolution process.

Introduction

Background

Historically, land contamination has principally resulted from poor or inadequate operational practices associated with the manufacture, use and disposal of chemicals, although it can also occur naturally.¹⁰ In the 1970s, concern with land contamination in Europe and North America led to legislative action and some large contaminated site clean-ups. The major concerns associated with land contamination in these countries, and subsequently in Australia, have been:

- groundwater contamination;¹¹
- residential redevelopment of former industrial, commercial or agricultural land; and
- abandoned industrial and waste disposal sites.

Common types of contaminants include: metals; solvents, acids, oils and tars; asbestos, pesticides, herbicides, putrescible material and hazardous wastes. Contamination can occur as a result of past or current industrial, agricultural and commercial activities including:

- waste disposal (controlled and uncontrolled);
- accidental spillage;
- leakage during plant operation;
- storage and transportation of raw materials, finished products and wastes;
- use of agricultural chemicals; and
- migration of contaminants from a neighbouring site either through soil, groundwater, surface water or the air.

Land is considered contaminated if it has a substance present at a concentration that presents, or has the potential to present, a risk of harm to human health or the environment. The following three conditions need to be present for land contamination to pose this risk:

- Contamination needs to be present at sufficiently high levels to pose a potential risk to human health and/or the environment.¹²
- If contamination in excess of threshold levels is present, there needs to be a target in proximity that could be adversely affected by the contamination. The target could be human or ecological.
- Finally there needs to be a 'pathway' by which the contaminant can reach the target. For a person the pathway could be through ingestion or through skin contact.

¹⁰ Background derived from several sources, mainly the Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites, published by the Australian and New Zealand Environment and Conservation Council (ANZECC) in January 1992 and the draft DEP Contaminated Sites Management Series of Guidelines published in 2000 and 2001.

¹¹ Western Australia is heavily reliant on groundwater for drinking and irrigation. Groundwater currently supplies about 50% of Perth's drinking water whereas other State capital cities use little groundwater for drinking.

¹² For soil contamination, investigation levels have been set for common contaminants known as ecological investigation levels (EILs) and health investigation levels (HILs). The ecology is more sensitive to most common contaminants than people and EILs are usually more stringent than HILs.

INTRODUCTION (continued)

If all three conditions are present, one or more needs to be removed to eliminate the risk of harm. For example, the pathway could be removed by constructing an effective barrier between the contamination and the target. Unless the contamination is fully remediated, and/or the risk totally eliminated, environmental regulators will usually impose conditions on the future use of the site. These conditions typically require the implementation of environmental management plans, and restrictions on future land use, to ensure that human health and the environment continue to be protected from harm.

Contaminated Sites Legislation

The issue of contaminated sites is one of national significance and is subject to Commonwealth/State government agreements. The *National Environment Protection Council (NEPC) Act of 1994*¹³ provides for NEPC to issue 'Measures' (NEPM) to ensure nationally consistent environmental approaches within Australia. A Contaminated Sites Assessment NEPM was issued in December 1999, endorsed by the Commonwealth and all State Environmental Ministers. This NEPM documents the process for site risk assessment and contains 10 detailed Guidelines on how to conduct site examination – ranging from laboratory testing to community consultation.

In 1997, the then Western Australian Minister for the Environment stated in a Contaminated Sites Position Paper¹⁴ that: “*the current system is failing because it is unable to manage critical issues which to date have not been addressed adequately*”. The Paper listed the main existing legislation applicable to contaminated sites management as:

- *The Planning Legislation Amendment Act (1996)* – which provides the framework and primary mechanisms for general land use planning and development approval in Western Australia;
- *The Health Act (1911)* – which provides, amongst other things, wide ranging powers for the administration of environmental health standards in Western Australia by State and local governments; and
- *The Environmental Protection Act (1986)* – which provides a number of powers to prevent and abate pollution and minimise the discharge of waste to the environment.¹⁵

The main legislative and systemic weaknesses identified in the Position Paper related to the inability of government to:

- progress the identification and reporting of contaminated sites;
- enforce polluters to undertake remedial action; and
- set clear rules for determining the liability for land contamination.

¹³ Corresponding Acts were passed in each State and Territory including the National Environment Protection Council (Western Australia) Act of 1996.

¹⁴ 'Assessment and management of contaminated land and groundwater in Western Australia' – May 1997.

¹⁵ Further environmental protection legislation was introduced to Parliament in 2002 and more is scheduled, including a proposed Contaminated Sites Bill, during the second session of the present Parliament.

To address these weaknesses, drafting of a Contaminated Sites Bill commenced in 1997. The stated purpose of the draft Bill is “to enable and facilitate the identification of contaminated sites so that they may be recorded on a register. This will ensure that those sites that pose a threat to human health or the environment are cleaned up and that the market is fully informed when sites with contamination change hands. It also facilitates the management and remediation of contaminated sites, and informs the land transaction process so no one should acquire a contaminated site not knowing it to be contaminated”.¹⁶

Contaminated Site Remediation Costs

Contaminated site remediation costs are generally quite large but vary according to the severity of the contamination, the nature of the site and the site’s intended future use. Some examples of recent site assessment and remediation costs that the Western Australian government has met are shown in Table 1.

Contaminated Site	Source of Contamination	Year ⁽ⁱ⁾	Estimated costs ⁽ⁱⁱ⁾
East Perth Gasworks ⁽ⁱⁱⁱ⁾	Former gasworks site remediated as part of the East Perth redevelopment.	1994	\$17.5 m
Minim Cove, Mosman Park ⁽ⁱⁱⁱ⁾	Former fertiliser manufacturing plant site redeveloped for residential use.	1997	\$16 m
Albany Gasworks	Residential redevelopment near the Albany foreshore halted when tarry wastes discovered – it was subsequently found the site had once been a gasworks.	2000	\$9 m
Waste Control Pty Ltd, Bellevue.	Site clean-up following a hazardous chemical fire at a collection/recycling facility for industrial waste.	2002	\$8 m
Omex, Bellevue	Residential blocks contaminated by waste from a past lubricating oil refiner, which had been disposed of in a disused clay pit.	1997	\$7 m
Port Catherine, Coogee ⁽ⁱⁱⁱ⁾	Proposed redevelopment of former industrial land to residential, commercial and public use, including a marina.	2002	\$6 m
Vela Luka Park, Spearwood	Tarry wastes found in gardens and open spaces following residential redevelopment of an old gasworks site.	2000	\$1 m
CALM, Dwellingup	Buried drums in State forest suspected and found to contain hazardous chemicals.	2002	\$0.5 m

Table 1: Contaminated sites assessment and remediation costs.

Contaminated sites are costly to remediate. The presence of land contamination can therefore significantly reduce affected land values.

Notes:

- i Year in which investigation or remediation commenced.*
- ii Estimated site assessment and remediation costs. Some sites may incur additional future costs.*
- iii Site remediation was planned as part of the site’s redevelopment.*

Source: Agency and DEP estimates

¹⁶ The legislation is supported by draft standards and guidelines for contaminated site reporting, assessment, disclosure, auditor certification etc, based on the 1999 NEPM and relevant Australian and international standards. The quoted purpose is sourced from explanatory notes that have accompanied several drafts of the proposed Bill.

INTRODUCTION (continued)

Contaminated site remediation costs can therefore significantly reduce affected land values. For example, the former Causeway Bus Depot adjoining the Perth central business district was revalued from \$11.6 million in the financial year 1999-2000 to \$6.5 million in 2000-01 because of the presence of land contamination. The Department for Planning and Infrastructure has recently agreed to transfer this site to the East Perth Redevelopment Authority (EPRA) for a negotiated price of \$2.8 million.¹⁷

As well as affecting land values, the cost of remediating land contamination can also affect land redevelopment options. For example, WAGR sold the Midland railway workshops site to the Midland Redevelopment Authority (MRA) in 1999 for the price of a ‘peppercorn’ (\$1), recognising that the cost of remediating land contamination likely exceeded the site’s market value. After undertaking detailed site assessment for land contamination, MRA prepared a site proposal with less opportunity for residential redevelopment but with reduced site remediation costs.¹⁸ This reflects a trade-off between:

- accepting reduced options for land uses, resulting in reduced revenue for the developer but with lower remediation costs; and
- seeking greater options for more sensitive land uses¹⁹, resulting in additional revenue for the developer but with higher (sometimes much higher) remediation costs.

Examination Focus and Approach

This examination selected 10 public sector agencies in order to:

- review how well advanced they were in identifying the contaminated sites under their ownership or management control;
- review their ability to assess the associated health, environmental and financial risks that they face; and
- identify significant or common issues faced by agencies.

The 10 agencies represent a cross-section of public sector landholding agencies, with known or suspected contaminated sites:

- Department of Agriculture (Agriculture);
- Department of Conservation and Land Management (CALM);
- Department of Land Administration (DOLA);
- Department of Education (Education);

¹⁷ This site was valued at \$7.2 million in accordance with directions prescribed in the Governor’s Order EC301, Government Gazette 21 December 1999. The transfer price was agreed at \$2.8 million in 2002 to account for the uncertain costs of land contamination remediation. EPRA plans to redevelop this site as the first phase of the Gateway Precinct, an urban renewal project to revitalise the eastern approach to the city of Perth.

¹⁸ Criteria of acceptable levels of land contamination are more stringent for residential use than for industrial use because:

- the potential exposure time to contamination is increased; and
- children’s’ developing bodies are more susceptible to contaminants than adult bodies and they are also likely to absorb higher quantities, by playing in and eating soil.

¹⁹ Different land uses pose differing levels of risk to human health. Sensitive land uses include: residential (particularly low density residential); childcare centres; pre-primary schools and primary schools. Less sensitive land uses include: public open space; commercial and industrial (State Environment Protection Policy No. S 95, 4 June 2002, Victoria).

- Gold Corporation (GoldCorp);²⁰
- Main Roads Department (Main Roads);
- Western Australian Government Railways Commission (WAGR);
- Western Australian Land Authority (LandCorp);
- Western Australian Planning Commission (WAPC); and
- Western Power Corporation (Western Power).

A consulting firm, experienced in land contamination risk assessment and management within Australia and overseas, was engaged to assist the examination, which included:²¹

- background research;
- review of agency files;
- interviews with landholding agencies and regulators; and
- the use of a detailed questionnaire and follow-up review and analysis.

The examination did not include testing of agency systems nor extend to: assessing current agency operational work practices, performance of regulatory bodies; and related environmental and health issues (such as waste disposal or the occupational health and safety of employees).

20 GoldCorp does not have 'large' landholdings but was included because it faces some significant challenges as a small agency that owns 23 sites, 21 of which are suspected of being contaminated.

21 Further information about how agency performance was assessed is given in Appendix I.

Identifying Contaminated Sites

- *Only two agencies had management policies, practices and systems in place that were generally consistent with best practice for the identification of contaminated sites and the assessment of associated risks.*
- *The other eight agencies met best practice to varying degrees, in differing areas. All agencies had management systems in place that addressed land contamination.*
- *Most of the agencies are not yet able to provide a reliable estimate of the number of contaminated sites that they own or control.*
- *There is currently no authoritative definition of a contaminated site within Western Australia to assist with identification.*

Background

To date, within the Western Australian public sector, it has been acceptable practice for an agency to manage its property portfolio by dealing with individual sites as and when the agency becomes aware that the site has a land contamination problem.

In recent years it has also become prudent, and more common, to undertake some form of site investigation for land contamination whenever certain ‘trigger’ events occur, such as any land acquisition, disposal or lease. These events are triggers because the transfer of land ownership and/or control can also bring with it the transfer of the future financial liabilities, arising from any known or unknown land contamination on the site.

A further key trigger is the planned redevelopment of a site to a more sensitive land use, such as from industrial to residential.

The advantage of managing land contamination as a problem arises, or as a trigger occurs, is that money is not wasted on looking for problems that either do not exist or are insignificant and do not require present resolution. The disadvantage of this approach is the unknown environmental or human health risk that may be resulting from unidentified contaminated sites within the agency’s property portfolio. Even if individual contaminated sites pose no immediate threat, an agency may still possess significant financial liabilities associated with contaminated site ownership.

Identifying Contaminated Sites

To address land contamination risks, large landholding organisations,²² both public and private, are starting to take a more systematic approach to identifying potentially high risk sites.²³ This approach comprises three main stages:

- A property portfolio wide screening investigation of all sites to identify those sites which warrant further assessment. This process typically involves compiling information about

²² Examples would include major land developers, major property owners, managers or investors, oil companies and utilities.

²³ Western Australian public sector agencies are required to adopt the discipline of risk management as an integral part of their day to day operations. Risk management is defined as the systematic application of management policies, procedures and practices to the tasks of identifying, analysing, assessing, treating and monitoring those risks that are inherent in the operations of an organisation. It is a process designed to protect the department or statutory authority, the whole of government and the general community from unnecessary costs and losses (Background to Treasurer’s Instruction 109, Western Australian Financial Management Bookcase).

historic, current, and neighbouring site use. It may also involve limited soil and/or groundwater testing. It can be a time consuming and labour intensive activity, depending on the size and nature of the agency property portfolio, the amount and reliability of information held on existing agency databases and the level of detail to which the screening assessment is undertaken.

- Those sites considered most at risk are then subjected to a more rigorous, and expensive, scientific assessment. This assessment should be conducted according to applicable guidelines and standards because the information gathered must be sufficient to form a reliable opinion regarding the condition of the site. It will usually be based on the results of analysing soil samples and, possibly, groundwater, surface water or air samples.
- When necessary, based on this assessment's results, the costs and benefits of alternative remediation options will be evaluated and a site specific contamination management plan developed and implemented.

The examination therefore reviewed 10 agencies to assess how well advanced they were in adopting a systematic approach to contaminated site identification and risk estimation (Table 2). The agencies were reviewed against a set of attributes that would describe a large commercial property manager, seeking to achieve international best practice (see Appendix I for further information).

Agency	Properties owned ⁽ⁱ⁾	Agency ability to identify its contaminated sites and assess the associated land contamination risks
LandCorp Western Power	1 600 3 000	The agencies have undertaken systematic portfolio reviews to identify their contaminated sites and have assessed their main risks.
Agriculture GoldCorp Main Roads WAGR ⁽ⁱⁱ⁾ WAPC	120 20 1 800 1 500 2 800	A systematic portfolio review to identify contaminated sites had been partially undertaken or was being implemented. Some of the main property portfolio land contamination risks had been assessed.
CALM DOLA Education	2 100 58 000 800	The agencies recognise the need for more comprehensive information about the existence of land contamination within their property portfolios and the associated risks that they face.

Table 2: Identifying contaminated sites and associated risks.

Western Power and LandCorp have made the most progress in identifying their contaminated sites and assessing the associated risks.

Note:

- The number of property sites owned or controlled by each agency. A 'site' can vary in area from a residential block to a pastoral lease or a nature reserve. Totals have been rounded.*
- Number of sites excludes 5 000 km of rail freight corridor on a 49 year lease to the private sector, 200 km of owned urban passenger rail corridor and associated buildings, stations, depots and car parks .*

Source: OAG analysis of agency data

IDENTIFYING CONTAMINATED SITES (continued)

Only Western Power, LandCorp and GoldCorp (an agency with few sites, nearly all of which are believed to be contaminated) were able to provide a reliable estimate of the number of contaminated sites that they were likely to own or control.²⁴ The other seven agencies either did not provide an estimate or provided an incomplete estimate based on the number of contaminated sites that they already knew about, rather than on a systematic portfolio assessment.

Some agencies, such as Western Power and WAGR, have created land contamination as an unintended consequence of their past operational activities. Other agencies, such as DOLA and GoldCorp, have predominantly acquired land contamination problems from others. However, most agencies have, to varying degrees, to deal with both land contamination that they themselves have created and with land contamination that others have created.

For example, Education is an agency that would be considered unlikely to create land contamination. However, when the former Scarborough Senior High School site was being redeveloped, unexpected land contamination was encountered that required remediation. The major source of this contamination was from past pesticide and herbicide spraying.

Defining Contaminated Sites

There is currently no authoritative definition of a 'contaminated' site within Western Australia to assist agencies with their identification of contaminated sites. When the examination asked agencies how they defined a contaminated site, most said they applied the definition contained in the draft DEP contaminated sites guidelines. Some agencies said that they applied their own definition(s), others mentioned national and international standards and others stated that they relied on professional advice.

Successive versions of the draft Contaminated Sites Bill contain clauses requiring land-owners to report 'suspected' contaminated sites to DEP, and the draft DEP contaminated site guidelines reflect this anticipated legislative requirement. However, land-owners cannot reliably identify how many suspected contaminated sites they own or control until the legislation becomes law and DEP provides further regulations or guidelines, on how this part of the Act will be practically interpreted and implemented. The following examples illustrate this difficulty:

- An extreme (but still valid) view would be to say that little land in Western Australia, which has been subject to urban or rural development, remains in an uncontaminated pristine state. Therefore most developed land is, to some extent, suspected of being contaminated. This would include many older residential areas (with the likely presence of pesticides, lead paint or asbestos in the soil around the house) and many farms (pesticides, herbicides, sheep and cattle dips, and fence treatments).
- In contrast, DEP estimated in the 1997 Position Paper that there are at least 1 500 contaminated sites on the Swan Coastal Plain alone. This figure would include many sites that have had underground petrol storage tanks, as these tanks are known to be prone to leakage. DEP advises that this estimate of 1 500 contaminated sites on the Swan coastal plain is likely to be conservative.

²⁴ The actual number of sites that these three agencies will report as contaminated depends on the eventual legislated definition and, possibly, some further specific site investigations.

The State of Victoria has a more developed legislative and regulatory framework for the identification and management of contaminated sites, than currently exists in Western Australia. Victoria has developed a priority list of about 110 contaminated sites.²⁵ Typically, these sites are considered to pose an unacceptable risk to human health or the environment and must therefore be remediated or actively managed as a high priority.

Although Western Australia is likely to have lower absolute levels of land contamination than more heavily industrialised States such as Victoria, we may not necessarily have fewer ‘priority’ sites. This is because our heavy reliance on groundwater and our predominantly sandy soils, particularly in coastal regions, make us especially vulnerable to the effects of land contamination.

Therefore the question “*How many contaminated sites does the Western Australian public sector own or control?*” cannot be reliably estimated until:

- more comprehensive agency information about property portfolio land contamination is available; and
- clearer legislated definitions of land contamination, supported by regulations and explanatory guidelines, have been put in place.²⁶

Balancing Risks and Costs

The agencies face a challenge in deciding how much time and money to spend in finding out about unknown land contamination problems, relative to assessing and remediating the ones that they already know about or suspect.

It must also be acknowledged that contaminated site investigation costs can be high, especially across a large property portfolio. Conducting an initial screening risk assessment can be a time consuming and labour intensive activity. After this screening assessment identifies ‘at risk’ sites, one agency has estimated that it typically costs between \$15 000 to \$100 000 to undertake a detailed assessment of each individual site, depending on site size and complexity. These investigation costs are incurred before any remediation of contaminated sites is undertaken.

Agencies have to address this problem within the practical constraints of budgetary pressures and competing government and community priorities. However, the demands for improved environmental performance from public sector agencies – whether imposed by growing financial liabilities, increasing community expectations, more prescriptive environmental legislation, stricter industry standards or other means – are likely to increase rather than decrease.

A further ‘driver’ to adopt a more systematic approach to property portfolio management is that government itself faces budgetary pressures that do not permit it to remediate all contaminated sites straight away. Without better information, governments cannot be assured that scarce financial resources are being directed to those public sector contaminated sites that pose the greatest threats to human health or the environment.

²⁵ The Environment Protection Authority of Victoria (EPA Victoria) advised that it had 109 sites on its Priority Sites Register at 31 July 2002. EPA Victoria’s web site contains a disclaimer that its Priority Sites Register is not a listing of all contaminated sites in Victoria, nor is it a list of all contaminated sites of which EPA Victoria has knowledge.

²⁶ While a definition for the public sector could be implemented by a policy directive, it is preferable for the public sector to work to a statewide definition specified by Parliament through legislation.

IDENTIFYING CONTAMINATED SITES (continued)

The following paragraphs briefly summarise some of the key land contamination issues facing each of the 10 agencies and what they are doing to meet them.

Agriculture conducted basic chemical storage and handling inventory audits at 39 of its 119 sites, during 1999-2000. Although the focus of these audits was primarily on employee occupational health and safety, chemical land contamination was also found. A separate property portfolio fuel storage audit was conducted during the same period. Agriculture is currently undertaking a more rigorous and comprehensive environmental testing program for 17 of its 119 sites (thought to be representative of higher risk sites) for a combined assessment of chemical storage/handling practices and land contamination. Agriculture advises that most of its land holdings are remote from human population and that the cost effectiveness of remediating any contamination found on these sites will require careful consideration.

CALM manages about nine per cent of the State's land area, comprising primarily Crown Land that forms the 'conservation estate'. CALM also controls a number of pastoral leases, former pastoral leases, miscellaneous reserves and freehold properties. CALM currently considers land contamination on a site-by-site basis as the need arises. Following the discovery of buried drums containing chemical contaminants in Dwellingup, CALM has commenced compiling information of possible chemical disposals at other sites.

DOLA administers all Crown Land within Western Australia (comprising 93 per cent of the State's land area) and, to the extent that its resources permit, is the direct land manager of all unallocated Crown Land and unmanaged reserves (36 per cent of the State's land area).²⁷ DOLA often acts on behalf of other public sector agencies that do not possess the statutory power to deal in land. DOLA advises that it is "*potentially exposed to enormous costs in identifying, assessing, securing, and managing its known or seriously suspected contaminated sites*". DOLA is currently liaising with DEP to work out how to implement a practical risk-based screening program.

Education currently considers land contamination on a site-by-site basis as the need arises. In response to recent environmental issues at schools, it has created a new position of an environmental specialist. Once established, the new position will develop further environmental strategies for issues such as land contamination. Education advises that this will most likely include a systematic risk assessment of all sites. Most of Education's sites are schools, which have high public use Monday to Friday. Parents and local communities are particularly concerned when suspicions of land contamination arise.

GoldCorp (Perth Mint) had 22 'battery'²⁸ sites vested to it in 1987. Most were no longer operating and the rest were being closed down. GoldCorp suspects 20 of these 22 sites to be contaminated. To date, GoldCorp has focused its attention on identifying and managing contamination problems associated with the Northampton lead battery site because of its close

²⁷ Therefore about 57 per cent of the State's land area is Crown Land allocated to, and directly managed by, other parties. For example, the conservation estate is allocated to and managed by CALM.

²⁸ Battery sites were set up in the late 19th and early to mid 20th centuries to assist miners extract minerals from ore using a combination of physical battering and chemical leaching. Many of the batteries took gold but some took other minerals, for example lead at Northampton. Most of these old battery sites are contaminated. Most are far away from population or areas of environmental sensitivity but others, like Northampton, are close to towns. In addition to the 22 sites vested in GoldCorp, about 50 more battery sites are known to have operated since 1899. The location of some of these sites is not precisely known (although GoldCorp knows the location of its 22 sites).

proximity to population and a watercourse. GoldCorp is presently engaging a consultant to assess a further 11 battery sites. The scope of the proposed consultancy includes the provision of advice on public liability, occupational health and heritage issues, in addition to assessing these sites for land contamination.

LandCorp was created in 1992 and is the government's primary land and property development agency. It regularly addresses land contamination issues as part of its core business of buying and selling land and has well developed policies, systems and practices. LandCorp conducts its land dealings on a commercial basis but its future role is likely to be expanded to include more frequent contaminated sites remediation, undertaken as a community service obligation at the request of government.

Main Roads manages land contamination issues as part of its operational project management processes and procedures. Environmental management is included in Branch and Corporate Business and Risk Management Plans. Main Roads is planning to implement a process to gain a broader knowledge of its property portfolio land contamination risks.

WAGR has recently undergone major organisational change with the privatisation of its rail freight business and the further disposal of surplus land under an accompanying Land Rationalisation Program. In recent years, WAGR's primary focus has been on identifying and managing the land contamination risks associated with these land disposals (both sales and long term leases), as well as the ongoing management of other known contaminated sites. WAGR has recently commenced a network-wide screening assessment to better identify those of its remaining sites most at risk of being contaminated. WAGR has a further problematic task in the identification and assessment of contamination on over 5 000 km of rail track.

WAPC is the decision-making body responsible for guiding land development within Western Australia. WAPC also has significant landholdings including reserves for parks and recreation areas, residential redevelopments and land held under the *Metropolitan Regional Town Planning Scheme Act 1959*. WAPC, as a landowner, currently considers land contamination on a site-by-site basis as the need arises. WAPC states that it will develop, in consultation with DEP, a portfolio-wide program for contaminated site identification and reporting, once the proposed legislation is enacted.

Western Power is the most able of the 10 agencies to identify its contaminated sites. It has documented site history, identified the most common contaminants likely to be present and undertaken a preliminary site risk assessment and categorisation. However further investigation and assessment of its more at-risk sites is still required. Western Power advises that it is awaiting clarification of its legal obligations under the proposed Contaminated Sites Bill before committing financial resources to this task.

Recommendations

Government should introduce new or amended environmental legislation into Parliament to govern the identification and management of contaminated sites.

Landholding agencies should progressively adopt a systematic approach to:

- identifying their sites most likely to be contaminated;
- prioritising those that warrant further investigation and assessment; and
- developing and documenting an open and transparent course of action for sites found to be contaminated, which communicates full information to stakeholders and actively involves them in the resolution process.

Understanding the Risks

- *The State has a high risk exposure to land contamination. Many agencies are major landowners and are active in land acquisition, disposal and leasing. Land contamination also poses significant risks to agencies involved in land redevelopment and major construction works projects.*
- *Most agencies need to improve their knowledge of land uses within their property portfolios. Documenting this information is the starting point for agencies seeking to gain a better understanding of their own land contamination risks.*

Knowledge of Land Use

The starting point for obtaining better understanding of land contamination risks is to identify and document the following attributes for sites within a property portfolio:

- Current site activities and their significance. This knowledge is also essential in order to stop or minimise environmental or health harm resulting from current activities.
- Activities on neighbouring properties that may impact on the site or be impacted by the site. Land contamination, especially groundwater contamination, can migrate from its initial source over time.
- The historical site activities, including consideration of neighbouring properties. In DEP site assessment guidelines, consistent with guidelines elsewhere, the documentation of historic activity is the starting point of the ‘desktop study’, which forms the basis of any systematic site investigation. This is because most land contamination has been created by past activities, often going back a century or more, when there was little regulation of industry pollution and waste disposal. Typical sources of historical information are land titles, local government records, aerial photographs, agency records and interviews with older employees, ex-employees and neighbours.

The examination therefore assessed each agency’s knowledge of current, neighbouring and historic land uses, for sites within their property portfolio (Table 3).

UNDERSTANDING THE RISKS (continued)

Agency	Properties owned ⁽ⁱ⁾	Agency knowledge of land use (3=adequate, 2=partial, 1=little)			Rating (max of 9)
		Current	Neighbouring	Historical	
LandCorp	1 600	3	3	3	9
Western Power	3 000	3	3	3	9
Agriculture	120	2	2	2	6
Education	800	3	1	2	6
GoldCorp	20	2	2	2	6
Main Roads	1 800	2	2	2	6
WAGR	1 500	2	2	2	6
WAPC	2 800	2	2	2	6
CALM	2 100	2	1	2	5
DOLA	58 000	1	1	1	3

Table 3: Agency knowledge of property portfolio land use.

Most agencies need to improve their knowledge of land uses within their property portfolios. In particular, historical information gets harder to obtain, or is lost, the longer the delay in making a start in compiling it. Without this information, government loses its ability to make the polluter pay and, over time, these sites may become orphan sites by default.

Note:

i The number of property sites owned or controlled by each agency. A 'site' can vary in area from a residential block to a pastoral lease or a nature reserve. Totals have been rounded.

Source: OAG analysis of agency data

Some agencies own vast tracks of land, much of it in remote areas, and it is neither practical, nor financially feasible, to compile detailed knowledge of land uses for all these sites. For these agencies, a practical starting point could be to screen-out their many low risk sites that do not presently warrant further investigation. By progressively compiling and documenting²⁹ existing site knowledge, agencies should be better able to identify critical knowledge gaps and prioritise sites for further investigation. Agencies with a greater number of sites, especially DOLA, will generally incur higher costs in compiling this information than agencies with fewer sites.

Case Study – Burswood Railway Asbestos Contamination

The following case study highlights:

- that land contamination may pose significant financial, environmental and social risks to all parties involved in land redevelopment and major construction works projects;
- the difficulties that can be encountered in determining the full extent of land contamination even when detailed site assessments are undertaken by qualified professionals in accordance with technical standards,³⁰ and
- the need to take prompt, open and transparent action when a land contamination problem is identified, communicating full information to stakeholders and involving them in the resolution process.

²⁹ DEP Draft Guidelines for 'Reporting of Known or Suspected Contaminated sites' (April 2001) contains a useful pro-forma for documenting site knowledge to assist with portfolio risk assessment.

³⁰ Asbestos can be particularly difficult to detect if it is buried in only a few small discrete spots within a much larger surface area.

The Graham Farmer Freeway (the Freeway) is a 6.5 kilometre freeway incorporating a bridge across the Swan River at Burswood and a 1.6 kilometre tunnel under Northbridge to link Great Eastern Highway and Orrong Road in the east to Mitchell Freeway and Loftus Street in the west. The objective of the Freeway is to take traffic out of the central business district.

The Freeway was built in two design and construct contracts under Main Roads project management. The contract for Stage 1, involving construction of the tunnel, was awarded in 1996. The contract for Stage 2, for the section from East Parade to Great Eastern Highway, was awarded to Transfield Thiess Joint Venture (TTJV) in March 1997, with on-site construction work commencing in December 1997. Stage 2 included the realignment of about 1.7 kilometres of railway on the Burswood peninsula.

In 1994, at the commencement of the Freeway project, Main Roads undertook a desktop study to assess the significance of land contamination likely to be encountered during construction. This study concluded that there was a high risk of encountering land contamination, with a wide range of potential contaminants, because of past industrial, commercial and waste disposal³¹ activities carried out over an extended time period.

Both Main Roads and TTJV undertook further assessments for land contamination, using qualified environmental consultants, before commencing construction of Stage 2. As part of this process, one of the Main Roads commissioned assessments, dated August 1995, tested for asbestos contamination along the proposed road and rail alignment near the former James Hardie Asbestos Cement and Swan Portland Cement factories (the 'Swan Portland site'). Some low levels of chrysotile asbestos contamination³² were identified from laboratory testing and by direct visual observation, although this report concluded that the project area adjacent to the Swan Portland site was generally free from asbestos contaminated soils.

In September 1997, a TTJV commissioned environmental assessment investigated 10 potentially contaminated sites along the road reserve. Some contaminated material, including lead, zinc and benzene products, were found and subsequently disposed of off-site by TTJV. This assessment also identified an apparent redundant and unlisted landfill site (rubbish tip) at the rear of some business properties resumed to make way for the Freeway. Building rubble, glass, wood and household waste were found in this redundant landfill site although the presence of asbestos was not identified. However the report stated that the depth and extent of the landfill material had not been defined although past site employees had suggested it could be up to six metres in depth (soil samples had been collected to a maximum depth of three metres from the 10 sites). The report added that defining the depth using environmental drill rigs was most likely not possible 'due to the high potential for drill rig refusal on landfill material.'

During April to June 1998, TTJV excavated fill material for the realigned railway embankment from an area that included the redundant landfill site

31 Historically, areas within the Burswood peninsular have been used as both regulated and unregulated rubbish tips.

32 People are primarily exposed to asbestos related diseases by breathing in asbestos fibres suspended in air. Chrysotile (white) asbestos is the most common type of asbestos. Other types include crocidolite (blue) and amosite (brown) asbestos. Blue and brown asbestos are considered extremely hazardous because, once inhaled as dust, the fibres can remain indefinitely in lung tissue. Chrysotile is considered less hazardous because its fibres, if inhaled, are less likely to remain in the lungs and may be eliminated by the body fairly quickly. Chrysotile asbestos remains, however, a known human carcinogen.

UNDERSTANDING THE RISKS (continued)

but did not include the area surrounding the Swan Portland site. TTJV used a sifting process to screen-out oversized (greater than 7.5 centimeters) rubble and metallic fragments that were unsuited for use as fill. This sifting process used about 31 000 cubic meters of excavated material to generate nearly 17 000 cubic meters of fill. Asbestos contamination in other nearby areas, initially identified as suitable for fill by TTJV, was detected and managed in accordance with DEP requirements.

In October 2000, six months after the opening of the Freeway, TTJV discovered fragments of asbestos and fibre cement sheets along the surface of the railway embankment during a routine inspection. TTJV engaged a consultant to establish the extent and nature of this contamination. On receipt of the consultant's report, Main Roads wrote to WAGR in May 2001 to advise WAGR of the problem and provide a copy of the report. This report stated that, on the basis of limited soil testing, the realigned railway embankment was contaminated throughout with low levels of asbestos cement fragments and possibly asbestos fibres. The report concluded that the associated environmental and health risks were low as a result of the low levels of contamination, limited access to the railway reserve and nature of the adjoining land uses. Subsequent studies have confirmed the low risk posed by this contamination.

However, having dealt with employee asbestos-related diseases for many years, WAGR was concerned about its broader 'duty of care' responsibilities, notwithstanding that the health risk had been assessed as low. WAGR therefore immediately engaged a consultant to undertake a more comprehensive site assessment. This latter report, dated August 2001, identified surface and subsoil asbestos cement sheet contamination³³ over the realigned railway reserve from the Swan River to Goodwood Parade and in the existing rail reserve between Goodwood Parade and Great Eastern Highway.

This August 2001 report identified three likely sources of asbestos cement contamination in the rail reserve: the fill relocated from the landfill site within the road reserve by TTJV; the Swan Portland site; and past WAGR operations (trackside construction and the possible stripping of locomotives) in an area known as Hamburger Hill. (The latter two areas being outside of, and unrelated to, the TTJV works.) A subsequent occupational health-specific site assessment, commissioned by WAGR in October 2001, reported that the more dangerous asbestos fibres were only likely to be present in a small part of the rail reserve adjacent to the Swan Portland site. This area has since been remediated to the satisfaction of the regulatory authorities.

WAGR responded promptly and effectively on being informed by Main Roads of the asbestos contamination. In addition to assisting WAGR in its environmental risk management of the rail reserve, Main Roads also undertook concurrently a more extensive examination of the road reserve.³⁴

Commencing June 2001, WAGR commenced an environmental risk management process, based on triple bottom line concepts, to inform

33 The presence of chrysotile (white), crocidolite (blue) and amosite (brown) asbestos was confirmed (in the form of asbestos cement sheeting) with chrysotile being the most common.

34 This 'audit' examination focused on the asbestos contamination of the rail reserve. It did not include a review of issues associated with the asbestos contamination of the road reserve and did not examine contractual arrangements between Main Roads and TTJV.

stakeholders of the issues and determine appropriate remediation strategies. A risk management model was developed that included a series of risk management workshops, involving key parties (including Main Roads, TTJV, WAGR employees, their union, neighbours and regulators) to develop a program of assessment, communication and remediation. Results of site investigations, occupational health risk assessments and air monitoring data were distributed to stakeholders to ensure transparency of information. The risk management and communication process led to the conclusion that, given the nature and extent of the asbestos contamination in the rail and road reserves, differing remediation strategies will likely be used for different areas according to the assessed health risk – ground cover for low risk areas, worst spots entombed or removed.

As landowner of the rail reserve, WAGR has a potential ongoing financial liability and other obligations. These include: duty of care responsibilities to its customers, employees and neighbours; probable future listing of the site by DEP on a contaminated sites register, which may limit future uses of the rail corridor (for example, providing access routes for services such as electricity, water, gas and communications); and reduced land values if sold or leased. Both Main Roads and WAGR agree that the extent of asbestos cement contamination in the newly constructed rail embankment can be determined. When remediation costs are reliably known, WAGR and Main Roads will need to agree on cost-sharing arrangements.

Property Portfolio Size and Activity

Being responsible for large numbers of sites and being active in property acquisition, disposal or leasing exposes agencies to increased land contamination risks as follows:

- Being responsible for large numbers of sites – the more sites an agency owns, the greater the likelihood that some of them are contaminated.
- Being active in property acquisition – the greater the number of acquisitions the greater the risk of acquiring sites without understanding and managing the contamination risks related to the site.
- Being active in property disposal – the greater the number of disposals, the greater the risk that contaminated sites are sold without informing the purchaser. This exposes an agency to the risk of litigation. Furthermore, the community is unlikely to consider it acceptable for government agencies to rely unduly on the principle of ‘buyer beware’ when selling land.
- Being active in property leasing where there can be both:
 - a risk to the lessor if the lessee carries out activities that could contaminate or pollute the property; and
 - a risk to the lessee if not informed of issues by the lessor.

The examination therefore reviewed the number of properties owned by each agency, their combined dollar value and recent land acquisition, disposal and leasing activity (Table 4).

UNDERSTANDING THE RISKS (continued)

Agency	Total sites ⁽¹⁾	Total site value (\$m) ⁽ⁱ⁾	No. of sites acquired ⁽ⁱⁱ⁾	No. of sites disposed ⁽ⁱⁱ⁾	No. of sites leased ⁽ⁱⁱⁱ⁾
DOLA	58 000	\$2 350	unknown ^(iv)	unknown ^(iv)	2150
LandCorp	1 600	\$550	190	750	250
WAPC	2 800	\$350	290	170	520
Main Roads	1,800	\$250	340	110	370
WAGR	1 500 ^(v)	\$100	nil	70	900
CALM	2 100	\$1 900	30	20	460
Western Power	3 000	\$300	20	50	20
Education	800	\$850	30	20	40
Agriculture	120	\$40	5	3	nil
GoldCorp	20	unknown	nil	nil	7

Table 4: Agency land ownership and amount of land dealings.

Eight out of the 10 agencies own or control more than 500 sites. These agencies are also actively engaged in property acquisition, disposal and leasing. DOLA has responsibility for significantly more sites than any other agency in the sample (and within the Western Australian public sector).

Notes

- i The number and value of property sites owned or controlled by each agency. A 'site' can vary in area from a residential block to a pastoral lease or a nature reserve. Totals have been rounded.*
- ii Figures reflect the total number of sites divested and acquired in the past two financial years from July 2000 to June 2002. This level of activity may not be a typical pattern for each agency.*
- iii Rounded number of sites leased out by agencies in mid 2002. This figure does not include sites that agencies may lease from other parties.*
- iv DOLA did not have this information readily available because of the size and complexity of its land administration function. The number of acquisitions and disposals would likely be large.*
- v Number and value of sites excludes 5 000 km of rail freight corridor on a 49 year lease to the private sector, 200 km of owned urban passenger rail corridor and associated buildings, stations, depots and car parks .*

Source: Agency records

Although many of the 10 agencies would not consider land management to be their core business, most of them are both major and active landowners. As such, land contamination represents a significant risk exposure for the State overall and for many agencies individually.

It may be that some agencies, CALM and DOLA for example, are less likely to possess a significant number of sites that are contaminated, because of the nature of their landholdings. However, these agencies do not have systems in place to confirm this.

Property Leasing Risks

Six of the agencies are active in leasing properties to tenants, each of them owning more than 200 currently leased properties. It is now prudent commercial practice when leasing land, especially land that may already be contaminated or that is being leased for a use that could create contamination³⁵, to:

- include strong clauses in the lease contract to ensure that the lessee is liable to remediate any land contamination that they create; and
- conduct a baseline assessment of land contamination, before commencing a lease, if the site could potentially be contaminated or the existence of land contamination is suspected.

Many of the agencies own or control land that has been leased to one or more lessees for decades. This includes, for example, land acquired and reserved for some future purpose, which has been leased until it is needed. Agencies acknowledged that strong environmental lease clauses had only been introduced in recent years and would not apply to these older leases. Also baseline assessments had not been undertaken, which could make it difficult to apportion responsibility for any future discovered land contamination.

The examination found two cases where an agency had leased out Crown Land for use as service stations. In both cases the agency had experienced prolonged negotiations with the lessee(s) regarding: the extent of on-site and off-site land contamination resulting from service station operations; responsibility for remediation costs; and the allocation of the risk of public liability (for example, possible future events such as neighbours lodging a compensation claim against the agency for loss of income or amenity). Agency files indicated that the issues were relatively complex, requiring expert knowledge and ongoing management attention. Other agencies may face similar leasing risks.

Although GoldCorp leases out fewer properties than any of other nine agencies, except Agriculture, the following case study shows that even agencies with relatively small property portfolios may still face land contamination risks.



³⁵ Lists of industries and the types of land contamination that they can cause are available from DEP guidelines and elsewhere.

Recommendations

Landholding agencies should:

- purposefully manage all future land acquisitions, disposals and major works projects in order to avoid unknowingly receiving land contamination from other parties, or unknowingly transferring it to them; and
- ensure that responsibility for remediating land contamination on leased sites can be allocated to the party that created it by:
 - inserting clear environmental clauses into all new lease contracts;
 - undertaking, as appropriate, baseline investigations for land contamination before commencing new leases; and
 - reviewing older leases to identify and address the risk of acquiring the financial liability for land contamination that has been created by lessees.

Addressing the Priorities

- *There is currently no across public sector management framework in place that facilitates the identification, assessment and remediation of high priority contaminated sites that pose the greatest threats to human health and the environment.*
- *Agency responsibility for orphan contaminated sites needs to be allocated so that the risks to the State are effectively managed.*
- *Agency managers require clear non-technical written guidance about how to identify, assess and manage land contamination risks.*

State Financial Liabilities

The State of Western Australia, as a major landowner, faces significant financial risks because of land contamination. The State is further exposed to financial risk through having to assume future responsibility for a presently unknown number of orphan contaminated sites – sites where the polluter or owner cannot be identified or found, or cannot be held responsible or cannot be made to pay.

No evaluation of the State's potential financial liability has yet been undertaken, because of the limited information currently available about the extent of land contamination within the public sector. A key objective of strengthening the existing environmental legislation is to facilitate the implementation of a better system to identify and assess contaminated sites. A better understanding of the State's potential financial liabilities should follow from this.

The examination has concluded that some of the main financial risks facing the State are (not necessarily in order of significance):

- the cost of identifying, assessing and remediating land contamination its own agencies have created;
- the cost of assessing and remediating land contamination other parties have created (and cannot be held or made accountable for);
- unknowingly taking over, or passing on, land contamination from or to others through land acquisition, disposal and leasing transactions;
- possible litigation if contaminated sites that pose a threat to human health or the environment are undetected, or detected but not purposefully managed;
- reduced real property values as a result of land contamination; and
- diversion of scarce resources from other health and environmental priorities to the expensive remediation of low risk contaminated sites.

ADDRESSING THE PRIORITIES (continued)

Currently contaminated site investigation and remediation costs are met from agency budgets or from specific submissions to government for supplementary funding. Government considers submissions put before it on a case-by-case basis and has limited opportunity to assess relative priorities. A better risk-based funding approach therefore needs to be established. It is recognised that unplanned emergencies will inevitably arise but these should be the exception rather than the rule.

Agency Responsibility for Orphan Sites

In the past DEP has managed the remediation of some orphan sites. It is now recognised as no longer appropriate that the regulating agency, which signs-off on contaminated site remediation, should also be the agency undertaking that remediation. DEP therefore released a Discussion Paper in August 2001³⁶ that outlined existing and proposed agency roles for the management of orphan contaminated sites.

Although various regulatory agencies have important roles to play, the main management responsibilities for orphan sites rest with the proponent agency. For existing orphan sites, the proponent agency is usually the agency that owns or controls the site.

It can be expected that most agencies will not be keen to become the proponent agency for future declared orphan contaminated sites. The responsibilities can be onerous and long term and, in most cases, the problems are not of the agency's own making. GoldCorp, with ongoing responsibility for its 22 battery sites, is such an example.

The examination found that GoldCorp has adopted a diligent approach to managing the land contamination problems it had been handed. However, GoldCorp is a small agency without a specialist property management function and associated policies, practices and systems. It does not therefore appear to be well-placed to effectively manage the long term risks associated with these contaminated battery sites on behalf of the State.

Whatever decision is made regarding GoldCorp, a broader policy question facing the Government is how to best allocate future agency proponent responsibility for orphan contaminated sites so that the risks to the State are effectively managed. This issue will become more pressing if greater numbers of orphan contaminated sites are identified, once contaminated sites legislation is enacted.

³⁶ Titled 'Government agency roles in the management of contaminated sites – a proposal'.

Public Sector Coordination

Australian and international experience suggests that aiming to return all land to its uncontaminated state will be prohibitively expensive, and an ultimately unrealisable objective. Government funding to identify, assess and remediate contaminated sites will always need to be balanced against the many other priorities of government.

Meeting this challenge will require extensive public consultation and, in some cases, partnerships between different levels of government, local communities and business. The examination noted, from a review of DEP case files, that without community acceptance it is difficult to achieve a satisfactory outcome to contaminated site remediation and redevelopment.³⁷ Government decision-making processes will also need to be transparent and sound, supported to the maximum extent feasible by objective scientific data.

The examination found, from a review of DEP and agency case files, that agencies have worked effectively together in the recent past to address specific cases of land contamination once a problem has become apparent. However, further improved agency coordination is needed to facilitate the identification, assessment and remediation of high priority contaminated sites that pose the greatest threats to human health and the environment. There is currently no across public sector management framework in place to achieve this.

Reconciling Environmental and Development Objectives

DEP case files suggest that, in common with elsewhere, urban renewal projects have driven much of the contaminated site remediation that has been undertaken in Western Australia. Perth is a growing city. Demand for inner city renewal, and attempts to mitigate the problems associated with urban sprawl, will place continuing pressure on government to rehabilitate older industrial areas for medium to high density residential use.

In the past, environmental and land development objectives have often been seen as directly conflicting. However the growing size of the financial liabilities associated with land contamination, already apparent in the commercial property market, are such that future land redevelopment must reconcile and accommodate these dual objectives. In particular, this means that the level of remediation undertaken ('How clean is clean?') will be guided by the sensitivity of the contaminated site's intended future land use, taking into account the community's acceptance of the redevelopment proposal.

³⁷ The importance of early, frequent and genuine community consultation is emphasised in DEP and NEPM technical guidelines for contaminated site assessment and management.

Contaminated Site Guidelines

The draft contaminated sites guidelines developed by DEP, while comprehensive, are technical and written primarily for professional practitioners. While many aspects of managing land contamination require specialised knowledge, most agencies will be addressing land contamination issues as part of their strategic property management function. Many of these agency property managers are not technical specialists in the professional disciplines associated with land contamination. These managers will need clear non-technical written guidance about how they should discharge their legal obligations, how they should manage land contamination risks (health, environmental and financial/commercial) and how they should utilise professional practitioners to assist them.

Recommendations

Government should:

- identify an agency, or agencies, that should have a leading role in assessing and managing land contamination across the public sector, with clear responsibilities; and
- develop an improved approach for allocating resources to the identification, assessment and remediation of contaminated sites.

The lead agency, or agencies, should, in accordance with the Government's policy direction:

- develop a coordinated inter-agency approach to identify, assess and remediate those contaminated sites that pose the greatest threats to human health and the environment;
- communicate clear guidance to assist other agencies discharge their responsibilities for managing land contamination.
- assist landowning agencies to reconcile environmental and land development objectives and to closely align contaminated site remediation with the site's intended future use; and
- advise government on the allocation of orphan sites to those agencies that are best placed to manage the risks on behalf of the State.

Appendix I – Examination Criteria

A consulting firm, experienced in land contamination management within Australia and overseas, was engaged to assist the examination. The consultant identified the following attributes that would describe a large commercial property management company, seeking to achieve performance comparable to international best practice for managing land contamination. Such a company typically would:

- Have a centralised corporate area staffed with specialist expertise in environmental assessment and management.
- Have defined an organisational ‘risk profile’ for properties that includes specific triggers for conducting environmental assessments and/or remediation.
- Ensure that all environmental matters are vetted by the environmental specialist.
- Evaluate total environmental liabilities before every acquisition, lease or any control of property occurs.
- Uses ‘in-house’ multidisciplinary teams to evaluate the significance of environmental issues, supported by external professionals as required.
- Works from the principle that the costs associated with the assessment and management of environmental liabilities must be commercially viable on a site-by-site basis.

Working from this base, a set of 11 main examination criteria were developed to assess the level of progress the agencies had made in dealing with land contamination on a property portfolio-wide basis. These 11 main criteria, together with some key sub-criteria, are listed below.³⁸

Agency Management Framework

- Involvement of top level management.
- Inclusion in agency corporate business plans and risk management plan.
- Development of corporate policies to manage land contamination risks.
- Having a specialist environmental management function.
- Having a specialist property management function.

Approach to Portfolio Property Management

- Attributes of property asset registers.
- Delegation of property management responsibilities.

³⁸ The examination did not include testing to determine how well agency systems, policies and controls were operating in practice.

APPENDIX 1 – EXAMINATION CRITERIA (continued)

Approach to the Identification of Contaminated Sites

- Definition applied.
- Method of identifying and documenting high risk sites.
- Method of determining financial liability.
- Process to ensure consistency in decision-making.

Processes to Manage Land Acquisition, Disposal and Leasing

- Possession of a high level property strategy.
- Controls over property disposals.
- Controls over property acquisitions.
- Controls over property leased to tenants.

Awareness of Existing and Proposed Environmental Legislation

- How current compliance is monitored.
- Consideration of implications of proposed Contaminated Sites Bill.
- Ability to categorise and report contaminated sites.
- Likelihood of assuming responsibility for orphan sites.

Processes Applied to Evaluating the Significance of Land Contamination

- Use of criteria to determine when different levels of land contamination assessments are required.
- Use of guidelines and protocols to evaluate environmental condition.
- Use of specialist staff to assist in evaluation.

Knowledge of Current Site Uses

- Documentation of current site activities and their environmental significance for sites in the property portfolio.
- Use of criteria to determine whether current site uses will impact on site contamination status.

Knowledge of Neighbouring Site Uses

- Identification of sensitive land uses on neighbouring sites.
- Use of criteria to determine whether neighbouring site uses will impact on, or be impacted by, the site.

Knowledge of Historic Site Uses

- Documentation of historic site uses.
- Inclusion of neighbouring site uses in the historical review.
- Use of criteria to determine whether historic site uses have impacted on site contamination status.

Contaminated Site Management

- Identification of the primary contaminants of concern.
- Implementation of management conditions to protect/improve site contamination condition.
- Monitoring and review of site environmental management.
- Control over future site development.

Contaminated Site Risk Estimation

- Processes used to identify, mitigate and cost land contamination risks.
- Process used to prioritise contaminated sites within the property portfolio.

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