

Chapter 1

An Overview of Contaminated Land Issues¹

1.1 Introduction

Environmental problems have a long history. While they had caused some concern among the people, they did not catch widespread attention of the majority of the people until the 1960s. Before this period, smoke, fumes, noise, heat and other discharges from factories were generally seen as a symbol of progress. At that time all nations were concentrated on economic growth and improvement of living standards. The pollution problems eventually appeared on the agenda of the government of developed countries in the 1960s when pollution began to threaten human health and life on a large scale. Since then environmental problems become a major concern of the people and environmental news begins to occupy the front page of newspapers.

The close relationship between man and land has drawn people's attention to pollution of land or land contamination. Contaminated land has caused major concern; critics even view the problems as a toxic time bomb in land (Pearce 1992b). Land contamination varies in degree of seriousness. The financial losses and health problems that it brings about can be very serious. For instance, in 1978, "residents of a housing estate in Love Canal, near Niagara Falls in the US, suffered a sudden increase in cancer, birth defects and miscarriages. The estate was built on top of a dump used for chemical wastes in the 1940s and 1950s. Homes were evacuated and the estate fenced off and declared a disaster area." (Pearce 1992a). A plan of the Love Canal Estate is shown on Figure 1 –1 on the next page. The consequence of this incident led President Carter to create a 'Superfund' program to help remediate contaminated sites. The fund is "financed from various taxes and court awards from the parties found responsible for hazardous substances releases" (USEPA 2000). The fund had an initial amount of US\$1.6 billion in 1980. The amount was subsequently increased to \$8.5 billion in 1986 (USEPA 2000).

In general, countries that suffered most from land contamination are industrialised countries like the USA, Germany, and Britain, etc. Australia has never been a major industrial nation, however, the impact of land contamination cannot be ignored. In the late 1980s, residents of Kingston, a Brisbane suburb, had to abandon their homes after black sludge began oozing into their back yard. Investigation revealed that the suburb was built on a hazardous waste dump used by an old gold mine (Egerton 1990). In Sydney, the Castlereagh landfill has attracted numerous complaints from residents nearby since its opening in 1974. It is alleged that the hazardous waste landfill has caused a lot of health problems to the neighbouring residents. The mounting complaints and criticisms have forced the state government to announce in December 1995 a proposed closure of the notorious landfill by the end of 1997 (Penrith City Council 1998).

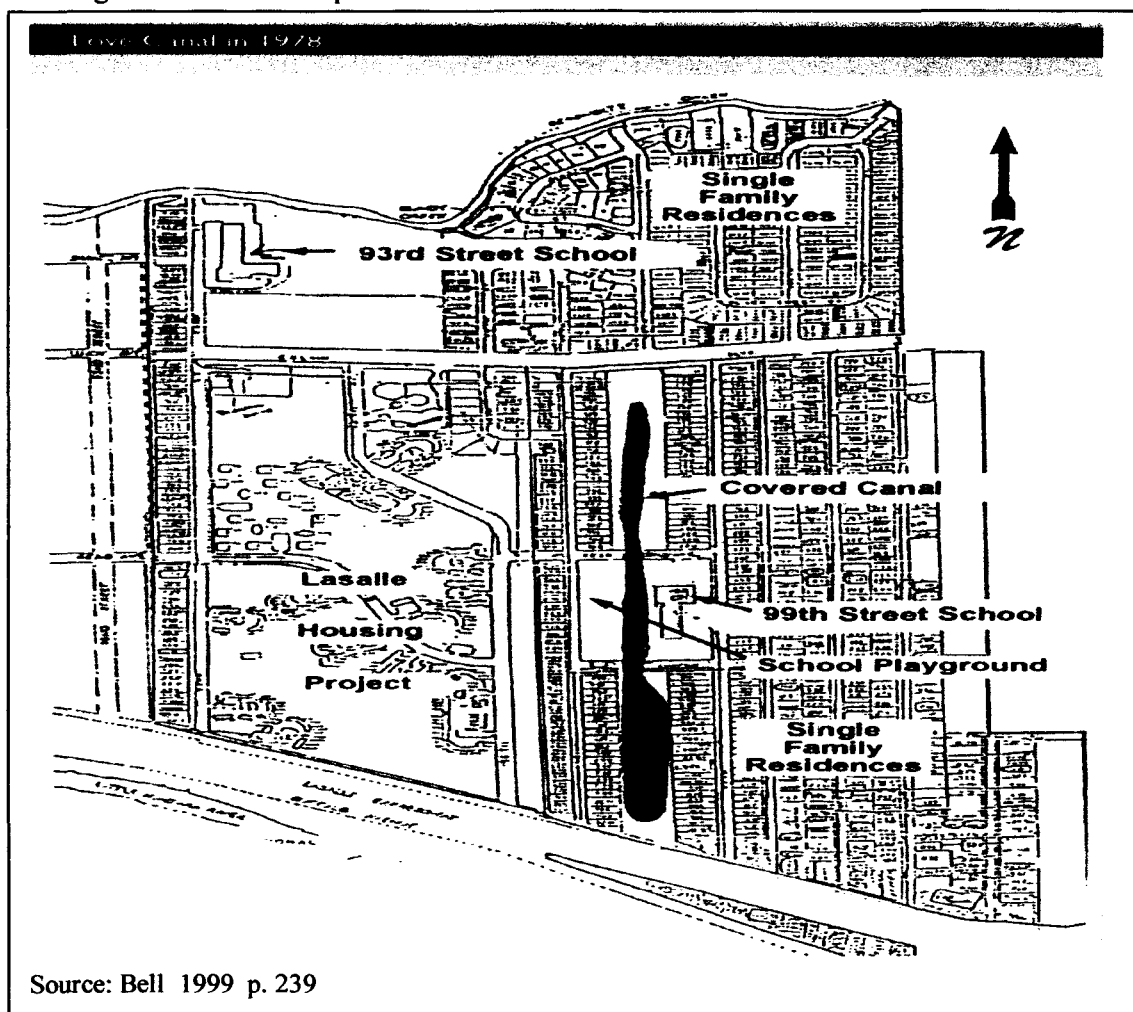
Land contamination causes health risks, financial problems and legal liabilities. Besides, it also affects the natural beauty of the environment and the existence of flora and fauna. Hence it is necessary for those people dealing with land to be aware of the seriousness of the problems. This chapter gives an overview of the issues of land contamination. It provides background knowledge

¹ This chapter is based on my publications as follows:

- Chan N. 1996, *Land Contamination And Land Value*, paper presented at the 2nd Pacific Rim Real Estate Society Conference at Sanctuary Cove, Gold Coast, Queensland, 21 – 24 January.
- Chan N. 1997, Land Contamination Law – An Overseas Experience, *The Valuer & Land Economist*, 34 (7), pp 644 – 648.
- Chan N. 2000, Turning Contaminated Land into A Valuable Asset, *Australian Property Journal*, 36(4), pp. 301 – 307.

of the causes of land contamination and how land value is affected by land contamination from a socio-economic perspective. The impact of stigma is also discussed.

Figure 1 – 1 Location plan of Love Canal



1.2 What is contaminated land?

In layman's term contaminated land refers to land that has been polluted. Nevertheless, while the ordinary people understand this meaning, it does not tell the level of hazards that people may face. To give people more information, there should be a clear definition of contaminated land.

Unfortunately, a universal definition of the term does not exist. The term is dealt with differently in different countries. In some countries, for example, in Canada (Dober 1996) and the USA (Matern 1996), there is no legal definition, whereas in other countries the term is well defined. For example, in England, contaminated land is defined under s. 78A(2) of the Environmental Protection Act 1990 as "any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that – (a) significant harm is being caused or there is a significant possibility of such harm being caused, or (b) pollution of controlled waters is being, or is likely to be caused".²

² Information from Syms's feedback in January 2001 reveals that this definition refers to the most seriously contaminated land, probably no more than 10% of all contaminated land in England.

Where legal definitions exist, the definitions of contamination may not be the same even within the same country. For instance, in Australia, Schedule 4 of the Environmental Protection Act 1994 (Qld) defines contaminated land as “land contaminated by a hazardous contaminant”. A contaminant, under s. 11 of the Act, can be:

- (a) a gas, liquid or solid; or
- (b) an odour; or
- (c) an organism (whether alive or dead), including a virus; or
- (d) energy, including noise, heat, radioactivity and electromagnetic radiation; or
- (e) a combination of contaminants.

In New South Wales, under s. 5 (2) the Contaminated Land Management Act 1997, contaminated land means “the presence in, on or under the land of a substance at a concentration above the concentration at which the substance is normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment”.

At a national level, the Australia and New Zealand Environment and Conservation Council and The National Health and Medical Research Centre (ANZECC & NHMRC 1992 p.2) define a contaminated site as “a site at which hazardous substances occur at concentrations above background levels and where assessment indicates it poses, or is likely to pose[,] an immediate or long term hazard to human health or the environment.” Given the diverse nature of definitions, persons dealing with contaminated land matters need to refer to the appropriate definition when handling land contamination problems.

It should be noted that a contaminated site is also referred to as ‘brownfield’. Simons (1998 p. ix) defines ‘brownfield’ as “A formerly industrial or commercial site that is prevented from attaining its highest and best use as a result of perceived or actual contamination.”³ It excludes rural and agricultural sites.

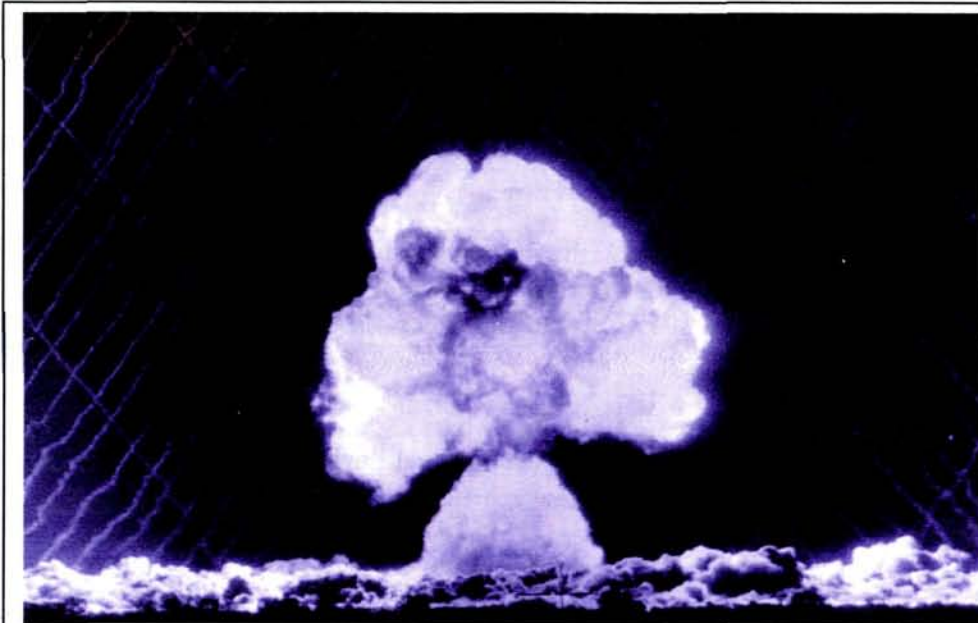
1.3 Causes of land contamination

There are many causes of land contamination. Basically land may become contaminated due to the presence of natural or artificial contaminants. Natural minerals like asbestos, uranium, radon gas releasing mineral, etc. may contaminate land if they are disturbed or exposed. Land contamination due to undisturbed natural minerals is rare. More often than not, land contamination is due to human activities such as industrial productions, farming, illegal waste disposal and accidents, etc.

While the activities of producers and consumers are to be blamed for causing land contamination, the government also bears some responsibility. To cope with development of the community, the government has to build roads and highways to facilitate transport and communication. The provision of infrastructures has a side effect that it also allows firms and people to reach and pollute areas which were not accessible before. Environmental zoning is also a two-bladed sword. On the one hand it is aimed at rationalising land uses. On the other hand, it allows industrial developments, operations and other economic activities to be conducted in designated areas and consequently brings pollution there. Furthermore land may also be contaminated in military actions and activities. For example, in the Gulf War in 1991, an extensive area of land in Kuwait and Iraq was turned into battlefields. Apart from the loss of human lives, properties and infrastructures, a number of oil facilities were destroyed causing extensive contamination to the nearby land. Likewise routine military training and testing of military equipment and warfare also

³ Information from Syms’s feedback in January 2001 reveals that this definition was based on T. Field’s work.

cause a lot of land contamination problems. For example, Britain actively used Australian soil in the 1950s and 1960s to test its nuclear weapon. The Maralinga nuclear testing ground in South Australia is still contaminated today (DPIE 1998).



Nuclear test at Maralinga, South Australia

Source: DPIE, 1998

Very often economic pressure has forced governments, especially those in developing countries, to approve or turn a blind eye on industries which are unfriendly to the environment. Some governments even see the invitation of hazardous industries to set up production plants in their country as a way to help solve economic problems. For instance, the Indian government allowed the multi-national chemical manufacturer Union Carbide to set up a plant at Bhopal. In December 1984 a large quantity of toxic chemical gas was accidentally released from the plant causing many deaths and injury to thousands of people (Infoplease 1999). Even in developed countries, the mounting economic pressure often forces the government to approve environmental unfriendly industrial activities such as mining and wood chipping.

Land contaminants are generally in the form of products, by-products and wastes. A list of common toxic contaminants is reproduced Table 1-1 on Page 1-5. A detailed one can be found in Appendix 4 of the “Environmental Guidelines: Assessment, Classification and Management of Non-Liquid Wastes” (NSW EPA 1997). The Australian And New Zealand Guidelines For The Assessment And Management Of Contaminated Sites (commonly known as the ANZECC Guidelines) lists 30 industries and land uses that are known to have been associated with land contamination (ANZECC & NHMRC 1992). A similar list is also included in the Australian Property Institute’s (API) Professional Practice 2000 Guidance Notes 15. It contains 67 items and incorporates most of the ANZECC Guidelines items (API 1999). The list is reproduced in Table 1-2 on Page 1-6 for easy reference. It should be noted that contaminants are not stationary. Hazardous substances may be carried away by ground water and surface water to pollute other land, and hence extend the boundaries of affected environment. The scope of contamination may be beyond one’s imagination.

Table 1 - 1 Common Toxic Contaminants

Organic Chemical	Inorganic Chemical
Benzene	Arsenic
Benzo(a)pyrene	Beryllium
Carbon tetrachloride	Cadmium
Chlorobenzene	Chromium (total)
Chloroform	Cyanide (amenable)
o-Cresol	Cyanide (total)
m-Cresol	Fluoride
p-Cresol	Lead
Cresol (total)	Mercury
2,4-D	Molybdenum
1,4-Dichlorobenzene	Nickel
1,2-Dichlorobenzene	Selenium
1,2-Dichloroethane	Silver
1,1-Dichloroethylene	
1,1-Dichloromethane	
2,4-Dinitrotoluene	
Ethylbenzene	
Methyl ethyl ketone	
Nitrobenzene	
Polycyclic aromatic hydrocarbons (total)	
Phenol (non-halogenated)	
Styrene (vinyl benzene)	
1,1,1,2- Tetrachloroethane	
1,1,2,2-Tetrachloroethane	
Tetrachloroethylene	
1,1,1-Trichloroethane	
1,1,2-Trichloroethane	
Trichloroethylene	
2,4,6-Trichlorophenol	
2,4,5-Trichlorophenol	
Toluene	
C6 – C9 petroleum hydrocarbons	
C10 – C36 petroleum hydrocarbons	
Vinyl chloride	
Xylenes (total)	

Source: NSW EPA 1997 Technical Appendix 2

Table 1 – 2 Specific industries and land uses associated with site contamination

1. Abattoirs and Animal Processing Works
2. Acid/alkali plant and formulation
3. Agricultural Activities (Vineyards, Tobacco, Sheep Dips, Market Gardens)
4. Airports
5. Alumina Refinery Residue Disposal Areas
6. Asbestos production, and disposal
7. By-Product Animal Rendering
8. Bottling Works
9. Breweries
10. Brickworks
11. Car Wreckers
12. Cement Works
13. Cemeteries
14. Ceramic Works
15. Chemicals manufacture and formulation
16. Coal Mines and Preparation Plants
17. Defence Works
18. Docks
19. Drum Reconditioning Works
20. Dry Cleaning Establishments
21. Electricity Distribution
22. Electroplating and Heat Treatment Premises
23. Ethanol Production Plants
24. Engine works
25. Explosives industries
26. Fertiliser Manufacturing Plants
27. Gas works
28. Glass Manufacturing Works
29. Horticulture/Orchards
30. Industrial Tailings Ponds
31. Iron and Steel Works
32. Landfill Sites
33. Lime Works
34. Marinas and Associated Boat Yards
35. Metal treatment
36. Mineral Sand Dumps
37. Mining and Extractive Industries
38. Munitions Testing and Production Sites
39. Oil Production, Treatment and Storage
40. Paint Formulation and Manufacture
41. Pesticide Manufacture and Formulation
42. Pharmaceutical Manufacture and Formulation
43. Photographic Developers
44. Piggeries
45. Plant Nurseries
46. Plastic or Fibreglass
47. Power Stations
48. Prescribed Waste Treatment and Storage Facilities
49. Printed Circuit Board Manufacturers

50. Properties Containing Underground Storage Tanks
51. Radioactive Materials, Use or Disposal
52. Railway Yards
53. Research Laboratories
54. Sawmills and Joinery Works
55. Scrap Yards
56. Service Stations
57. Sewerage Works
58. Smelting and Refining
59. Sugarmill or Refinery
60. Tanning and Associated Trades (eg Fellmongery)
61. Timber Treatment Works
62. Transport/Storage Depots
63. Tyre Manufacturing and Retreading Works
64. Waste Treatment Plants in which Solid, Liquid Chemical, Oil, Petroleum or Hospital Wastes are Incinerated, Crushed, Stored, Processed, Recovered or Disposed of.
65. Wood Storage Treatment
66. Wood Treatment Facility
67. Wood Preservation

Source: API 1999 Appendix II

1.4 Danger of land contamination

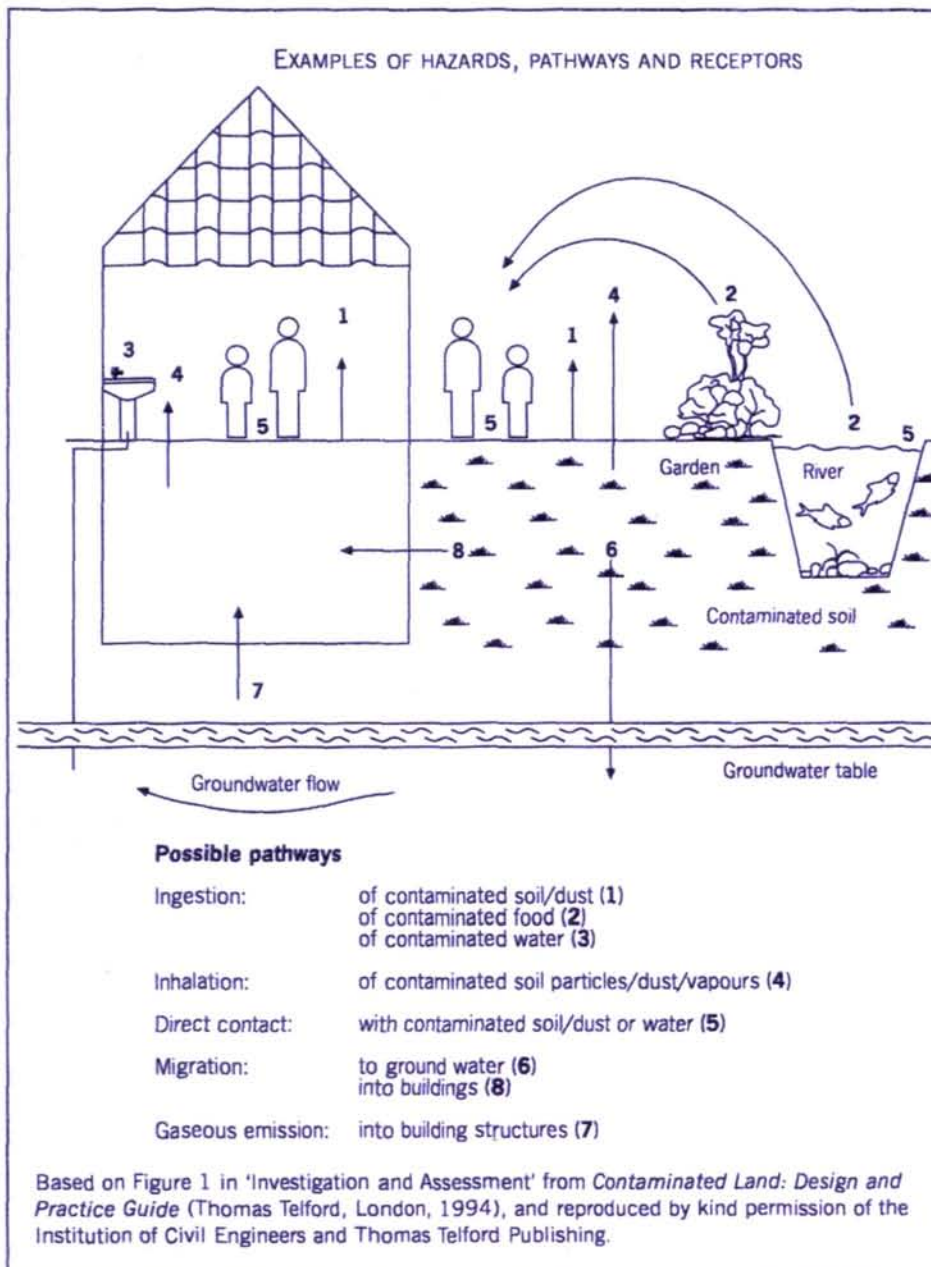
Contaminants are dangerous because they can be ignitable, corrosive, reactive, and/or toxic. Depending on the nature of the contaminants, the affected land may become a hazardous habitat for human beings and other creatures. Humans, animals and plants that are vulnerable to contamination are known as receptors or targets (RICS 1997). Contaminants in the soil may affect human and the environment in a number of ways. Figure 1 – 2 on the following page shows graphically the relationship between hazards, pathways and receptors. The pathways of contaminated land's impact on human and the environment can also be found in other references. One good reference is the ANZECC & NHMRC Guidelines (1992).

Human health and life are affected directly or indirectly through contact with or being close to the contaminants. The contaminants may enter the food chain and eventually consumed by human beings. Apart from causing human health risks, they may also infect animals and plants with diseases, upset the ecosystem, and affect materials and structure used on land.

Most contaminants are either organic or inorganic chemicals. Some are synthetic compounds that are resistant to biodegradation and chemical degradation; they are soluble in fats and can be accumulated in animal body. E.g. PCBs (polychlorinated biphenyls) are carcinogenic (causing cancer) and teratogenic (affecting unborn babies); TCDD (tetrachloro-dibenzo-para-dioxin), commonly known as “dioxin”, is highly toxic and is both carcinogenic and teratogenic.

Information about the toxicity of individual chemicals and compounds may be obtained from reference books like Klaassen (1995) and Rodricks (1992), medical practitioners, the respective Environment Protection Authorities (EPA) or health authorities. Information can also be obtained from Internet sites such as Chemicals in the Environment: OPPT Chemical Fact Sheets (www.epa.gov/docs/chemfact/) and Environmental Toxicology Concepts and Information About Specific Chemicals (www.iet.msu.edu/toxdocs.htm), etc. Information about site investigation and risk assessment are discussed in section 4.3.4 of Chapter 4.

Figure 1-2 Relationship between hazards, pathways and receptors



Source: RICS 1997 p. 4

1.5 How big is the problem?

There are many contaminated sites in developed countries, especially the highly industrialised ones. In 1989, the Office of Technology Assessment estimated that there were 40,000 contaminated sites in the USA and could cost \$US500 billion for the remediation (The Economist 1991). Since then the figure has been revised to \$US700 billion, approximately 10% of the annual GNP (Tromans & Turrall-Clarke 1994). On the other hand, the National Priority Lists compiled by the US EPA shows that there are 40,000 known contaminated sites. These sites are the so-called 'Superfund' sites that have public health problems and are not likely to be developed/redeveloped economically (Simons 1998)⁴. In Germany, it is estimated that the

⁴ Information from Syms's feedback in January 2001 reveals that 27,000 of the 40,000 sites had subsequently been delisted. Even so, the amount of contaminated land is still considerable.

number of contaminated sites exceeds 50,000, of which, some need immediate remediation. In the Netherlands, it was estimated in 1992 that there were 4000 contaminated sites in the country (New Scientist 1992). In Denmark, some 2,200 contaminated sites have been registered. It has been estimated that the total number is in the order of 7,000 and the ultimate remediation will take 30 to 100 years at an expected cost of Dkr 8 billion (\$US1.3 billion). In Britain, it is estimated that the number of contaminated sites is as high as 100,000, including 5000 former gasworks, and may cost up to £30 billion (US\$48 billion) to make good (Pearce 1992a). In Canada, it is estimated that there are 2,900 contaminated sites (Welsh 1997).

In Australia the exact number of contaminated sites is unknown, however, the number of potentially contaminated land has been estimated to range from 10,000 to over 60,000 (ANAO 1996 p.3). Information about the land area involved is unavailable. However, based on a conservative estimate of 500m² per site, I calculate that the area of contaminated land may reach 30 million m² (or approximately 3,000 football fields). Dr. Ravi Naidu of the Cooperative Research Centre for Soil and Land Management of CSIRO estimates that there are more than 30,000 contaminated sites in New South Wales and Victoria. Of which, at least 7,000 need remediation and may cost \$2 billion for full remediation (CSIRO-CRC 1996). The Kingston incident cost the Queensland government \$A800,000 for the resumption and remediation of the contaminated land (Johnsen 1992). In a study of the Australian contaminated sites industry, it is estimated that the site remediation market has grown to more than \$A60 million per annum, and is expected to grow to over \$500 million per annum over the next few years (The Clough Engineering Group 1995).

Australia is known to have a very strong agricultural industry. What is not so well known is that the farming industry is also a major cause of land contamination. A variety of pesticides and chemicals are used for farming in the areas of pest control, growth regulation of crops, cattle and sheep dips. In Australia, the use and storage of pesticides and chemicals has caused extensive contamination on agricultural land. It is estimated that in NSW alone, there are about 1700 cattle dip sites and 60,000 sheep dip sites (NSW EPA, 1995a). It should be noted that dip sites only occupy a small area on the farms concerned, the contamination caused is therefore localised. In contrast, pesticides are applied extensively on the farms and may have a bigger environmental impact.

1.6 Relationship between land contamination and population pressure and economic activities

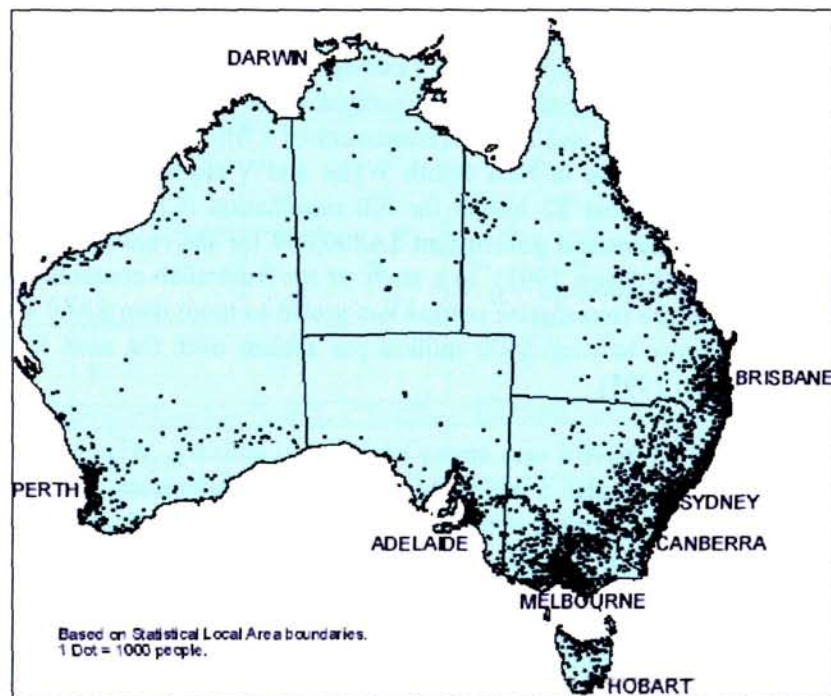
1.6.1 Population pressure

Population growth has caused a lot of concern. A nineteenth century writer Thomas Malthus predicted that the unchecked population growth would outstrip the growth of food supply and result in starvation and death (Stretton, 1999). Although this view is a bit pessimistic, population growth does demand more resources to support its existence. More land is required to meet food production, manufacturing, housing and other social needs.

As more natural resources are being exploited, the environment is subject to increasing pressure. Apart from the loss of green fields, the problems of pollution are intensified. The volume of human wastes, household wastes, and industrial wastes, etc. is increasing with time. For instance, 10,000 tonnes of municipal waste and 20,000 tonnes of industrial waste were created in Australia in late 1980s (OECD Environmental Indicators, 1991). While there are various ways to dispose of wastes, the easiest and cheapest way to deal with waste disposal problem is to adopt the "out of sight out of mind" approach, i.e. to bury the waste or dump it in remote areas. This type of intentional and unintentional waste disposals, together with accidents, have caused contamination to the land.

Population growth leads to urbanisation and expansion of economic activities. Cities have always been the centres for employment and various services. Industrialisation and modernisation since the 18th century have led to the influx of people to the cities and expedited urbanisation in all countries. By 1970, according to United Nations studies, about 37 percent of the world's people lived in cities. By 1990 the figure was about 43 percent (Compton's Interactive Encyclopedia 1994). The Australian population distribution also follows the world trend that the majority of Australian now live in big cities in the two coastal regions, see Figure 1 – 3 on the following page. At present, about 86% of the people live in the urban areas (ABS 2000).

Figure 1 – 3 Population distribution in Australia

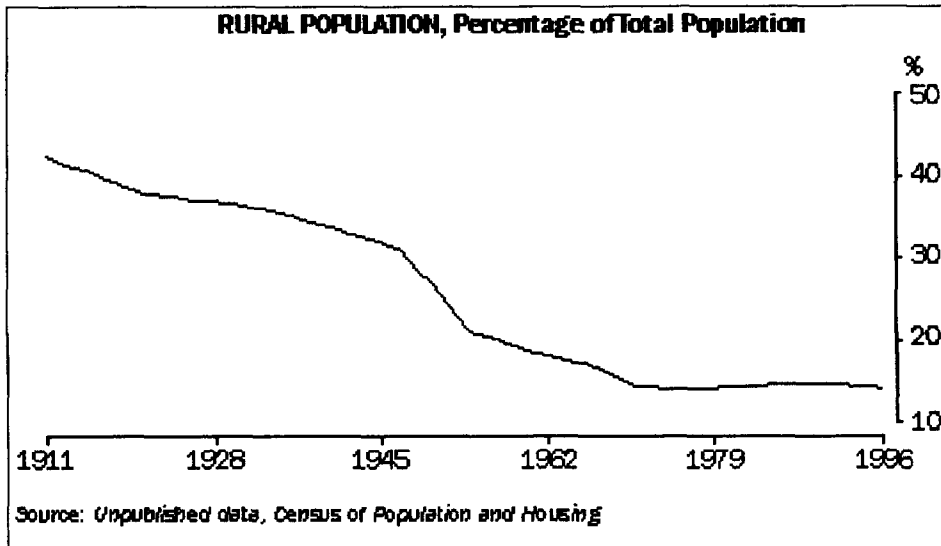


Source: ABS, 2000

The urbanisation trend can be seen from the loss of population in the rural areas. In 1911, about 43% of Australian lived in rural areas. In 1996, the figure dropped to about 14% (ABS 2000), see Figure 1 – 4.

There is no evidence that the trend of urbanisation will stop in the foreseeable future. As far as Sydney is concerned, it is projected that the population will grow from 3.7 million to 4.5 million by 2020. It follows that extra 520,000 homes are needed to cope with the rise of population in the city. In May 1995, the NSW premier Mr. Bob Carr claimed that the Sydney population is bursting at the seams and ordered an inquiry into urban sprawl brought about by the population growth (Humphries 1995).

Figure 1 – 4 Rural population in Australia



Source: ABS, 2000

Compared with the rural areas, cities have more pollution problems because of the concentration of population. The “high population densities and high levels of individual concentration that are the earmarks of urban life make pollution problems more acute in the cities.” (Jackson, McIver and McConnel 1994). The increase in population and economic activities has caused considerable environmental problems. The figures in Table 1 – 3 below may be a bit old, they nevertheless give a snap shot of the problems.

Table 1 – 3 Impact of Economic Growth on the Environment

The Economy	
Production	Global output of goods and services increased from \$US15.5 trillion in 1980 to about \$US20 trillion in 1990
Trade	World exports of all goods increased by 4 per cent each year to reach more than \$US3 trillion in 1990
The Environment	
Forest	Each year the earth’s tree cover diminishes by about 17 million hectares, an area the size of Australia
Land	Each year about 24 billion tons of topsoil from cropland are lost, about the amount on Australia’s wheatland
Climate	The amount of carbon dioxide, the principal greenhouse gas in the atmosphere is rising by 0.4 per cent each year
Air Quality	Air pollution reached health-threatening levels in hundreds of cities and crop-damaging levels in others

Source: Brown & Lester. 1991. (Cited in Beder 1993)

While there are many factors causing environmental problems, it is undeniable that population does impose considerable pressure on the environment and natural resources. Nevertheless population pressure should not bear the majority of the blame. It is well known that China and India are two most populated countries in the world. However the people in these two countries consume far less energy and resources than their counterparts in the developed countries. There

is much higher demand per capita for resources of all kinds in countries in the USA, UK, Japan and Australia, etc. (OECD 1991).

1.6.2 Economic activities — the acts of firms, individuals and governments

The allegation that more economic growth leads to more pollution appears to be logical. In reality, it is the attitude and behaviour of individuals, firms and governments that are the main cause of land contamination. While it is not to the advantage of these parties to cause or permit land contamination, their activities are still causing land contamination. Economists try to crack the puzzle from the perspective of the market mechanism. The market mechanism operates through the invisible hand of the market to regulate the supply and demand of goods and services. While the mechanism on the whole works well, it is by no means perfect. Regarding environmental matters it fails to prevent and control pollution (Collan & Thomas 1996).

Baumol et al (1992) point out that the market fails to deal properly with incidental side effects of many economic activities. Economists call the incidental side effects externalities. Externalities may be positive (beneficial) or negative (detrimental) as illustrated in the following examples:

- a) A homeowner plants beautiful flowers in his front yard. The flowers not only give him enjoyment and self-satisfaction but also pleasure to neighbours and passers-by. He receives no payment from the people who enjoy the flowers. He has incidentally and unintentionally generated a beneficial externality.

(Based on Baumol et al 1992)

- b) A manufacturer stockpiles production waste in the factory yard. The stockpile quickly becomes an eyesore in the area and the smell has caused concern among the neighbours. People who feel uneasy with the stockpile cannot receive compensation from the manufacturer who has incidentally and unintentionally generated a detrimental externality.

Along with the establishment of the concept of ownership, human beings also develop legal systems to defend property rights. Property rights are said to be well defined when the owner can defend his rights against all encroachments and infringements. Where the ownership of the resources (property rights) is well defined and marketable, anyone who wants to use resources has to pay for the privilege and entitlement. The price mechanism will drive the producers and consumers to consume the optimum amount of resources to satisfy their demand.

In the real world, however, not all resources are privately owned. In fact some resources are regarded as public goods, i.e., resources not governed by well-defined property rights such that they are fully accessible to all people. For instance, no one owns natural resources like clean air, the atmosphere, and clean water. Similarly no one owns intangible matters like tranquillity. When people have unrestricted access to such resources, i.e., they pay no compensation for the privilege and entitlement, there is no incentive to conserve the resources or use them with care.

Economic activities require the input of resources. In this regard, the laws of thermodynamics in physics can be extended to environmental economics to explain the creation of wastes as follows:

- “1. All resource extraction, production and consumption eventually results in waste products (residuals) equal in matter/energy term to the resources flowing into these sectors.
- 2. There is no possibility of the 100 per cent return (recycling) of these waste products to enter the resource flow again because of the second law (entropy) of thermodynamics.”
(Turner, Pearce and Bateman 1994)

Byrns and Stone (1992 p. 764) point out that “[r]aw materials entering production-consumption systems are ultimately converted into goods, noxious gases, dirty water, solid wastes, heat, or radiation”. It can be seen that economic activities will produce wastes as a negative side effect and cause pollution of the environment if the wastes are not disposed of properly. In general, the objective of a firm is to maximise the profit to the shareholders, not to protect the environment. Economic analysis shows that the maximum profit or benefit can be obtained when a firm continues production up to the point where the marginal cost equals to the marginal revenue (Salvatore & Diulio 1996). Unfortunately social cost is not part of the consideration. To increase revenue a firm has to try its best to cut down input costs like cost of labour, material, energy, etc. As mentioned earlier, in the course of production, it is bound to create wastes as by products. The wastes may be in form of fumes, liquid, solid. Unless the wastes can be sold or recycled, they will be disposed of by the cheapest means.

Heat, light and noise will eventually dissipate into the atmosphere and cause less immediate concern. Fumes, liquid and solid wastes are tangible matters and need to be dealt with by the producer. The economists think that as no body owns the air and rivers, it costs the producer nothing to discharge fumes into the air and liquid waste into rivers. In the absence of legal constraints, the producer will continue to do so until the condition changes, for example, the natural resources can no longer cope with the discharge or that there is action from the government regulating the activity. Solid wastes are more difficult to dispose of. To save money a firm may stockpile or bury solid wastes within the factory compound if there is capacity to hold them. Alternatively the wastes may be carted away to the nearest landfill. Some unscrupulous firms may even dump the waste on unmanned land. When wastes enter the soil via whatever route, the land is contaminated.

In comparison to the profit-orientated firms, the individuals are motivated by self-interest. Some do not care about the environmental problems unless they are affected. In general, it is relatively rare that an individual will deliberately cause serious land contamination problems. Nowadays, under normal circumstances, human and household wastes are collected and disposed of by the government. The individuals may accidentally contaminate the land when pollutants like fuel, oil, paint or other toxic materials are spilled on the ground. Contamination may also be caused by the application of excessive or inappropriate amount of insecticide or pesticide.

Individuals may also be indirectly responsible for more serious land contamination incidents. Through continuous consumption or increase in consumption of certain goods and services, there is a signal to the producers to maintain or increase production. The result is that it encourages the producers to pour contaminants into the environment continuously. Further, higher living standards have led to the consumption of more energy by the people. The burning of more fossil fuels has released more carbon dioxide, nitrogen dioxide and sulphur dioxide into the atmosphere. The result is the formation of acid rain which, upon precipitation, contaminates the land, kills vegetation and upsets the ecological equilibrium in the affected area.

Government decisions and actions, as mentioned above, also contribute to land contamination through the permission of the establishment and operation of environmental unfriendly industries. In addition, town planning zoning and provision of infrastructure may also have negative side effect and bring about unexpected environmental problems. For example, the toxic chemical storage at Coode Island near Melbourne was on fire on 21 and 22 August 1991. It was required to evacuate workers and residents nearby (Baird, 1992). The approval of uranium mining in the Kakadu National Park in Australia has invited a number of criticisms and protests from the public (Wandeman 1998, Darby 2000).

Byrns & Stone (1992 p. 771) point out that “[p]ollution can arise from either consumption or production”. The market mechanism alone cannot control or prevent pollution. In order to stop

environmental pollution including contamination of land, compulsion by legal means has to be undertaken. In recent years, relevant environmental laws have been enacted to correct the failure of market forces in this regard. Apart from the prohibition of land contamination, there are legal requirements for the remediation and recycling the use of contaminated land. As can be seen in Chapters 2 and 3, while science determines the presence and toxicity of contaminants in the soil, it is the legal requirements on remediation and land use control that have a significant impact on contaminated land value.

1.7 How contamination affects land values

Land value is affected by contamination in a number of ways, including the operation of economic forces, statutory regulation and environmental planning control. The impact of statutory regulation and environmental planning control are discussed in Chapter 2 and Chapter 3 respectively. The influence of economic forces is discussed in this section.

Land is a major constituent of the natural environment. Although it may seem abundant, land is actually a scarce resource. The scarcity and usefulness of land to mankind have made it a valuable asset. Anyone who owns it or uses it has to pay a price or bear a cost for the privilege and entitlement. Like other goods and services, the price or rent of land is determined by the forces of supply and demand. As far as supply is concerned, land resource cannot be increased by artificial means. One may argue that land may be created by reclamation. For example, the Japanese has built an artificial island for the construction of the Kansai International Airport (KIA 1999). The quantity of land created, however, is negligible in relation to the total landmass on earth. After all, the soil for reclamation is obtained from existing land. Hence land can be regarded as having fixed supply.



Kansai International Airport under construction
Source: KIA 1999

As human beings need land to fulfil their needs, it can be said that wherever there are people there is demand for land. The demand for land is proportional to the size of population and the status of the economy. The demand for land in countries with large population is higher than in countries with small population. The term demand here refers to effective demand. People in countries with high GNP generally have higher propensity to consume land than people in countries with low GNP. Given that the demand for land is ever increasing while the supply remains fixed, prices and rents are bound to be escalating.

Depending on the situation, land may have different values. When the land is not marketable for certain reasons, it retains utility to the occupier or user and has use value only. If it has both utility and marketability, it then has market value. As far as contaminated land is concerned, the utility of the land is affected by contamination. Depending on the nature of contamination, there may be no impact on the land value if the health risk, either real or perceived, of the contamination is minor. In this case the land retains its full market value. For more serious contamination, the owner will suffer loss of income and marketability.

Consider an income producing property, say, a commercial building. If the degree of contamination does not warrant the termination of an existing lease, the tenant may be bound by the lease conditions to pay full rent for the time being. When it comes to rent review, a lower rental may result because of the contamination. Even in a new letting, the contamination may also drive down the rental of the property.

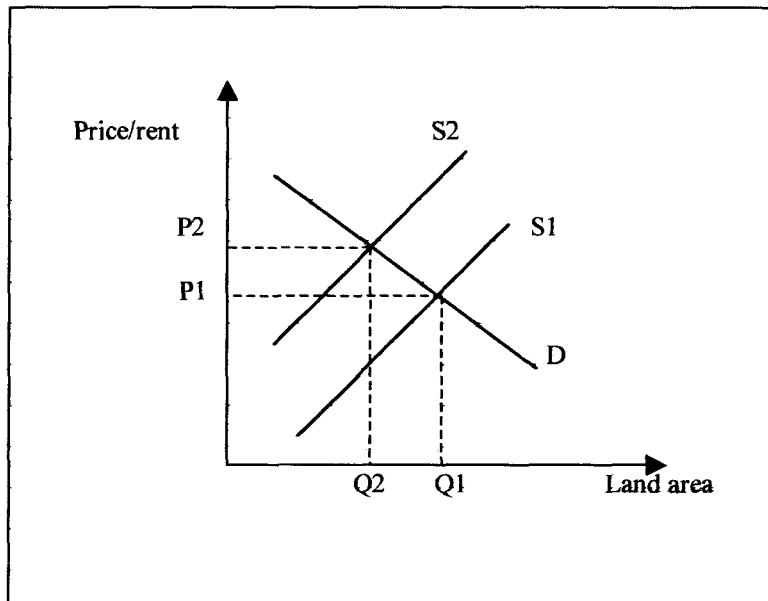
Real estate has a market value only when it is marketable. The marketability of a contaminated property is reduced because of reduction in demand and longer time is required to let or sell the property (Kinnard 1992). In the extreme case, the owner may be unable to let or sell the property, or use it as security for loan. The land has become a liability to the owner. In the above example, when the lease expires, it would take longer time to let the property and the landlord will suffer loss of income during the void period. Furthermore land contamination may affect the flexibility of putting the property to the next best use. On the whole the value of the property is affected.

Land contamination also affects the supply of land in the neighbourhood. As mentioned earlier, contaminated land has to be cleaned up before it can be put to normal use. When remediation works are being carried out, economic activities on the land have to be temporarily suspended and the land can be seen as having been removed from the market. Hence it may lead to a reduction of land supply in the area concerned. The reduction of land supply may be temporary or permanent. If the contamination is minor, it takes a shorter period for the remediation work. The land may have to be removed from the market for several months. The period will be extended when the contamination is of larger scale which requires longer time to remediate. In some cases this would mean several to more than ten years. In the United States, the average site remediation period is roughly twelve years (BOMA International 2001). In the more serious cases, it may be uneconomical or technologically not feasible to carry out the remediation work. The land has thus to be permanently removed from the market, for example, the Love Canal estate in the USA.

The remedial work to the Ampol Refinery site at Matraville, NSW, is a good example to demonstrate the time taken for cleaning up a contaminated site in Australia. The site was used for the production, storage and distribution of petroleum products for 36 years and operation ceased in 1984. The owner intended to have alternative use on the site and a site assessment exercise was carried out in October 1988. The State Pollution Control Commission (predecessor of the current Environmental Protection Authority) issued a remediation notice in August 1989 and soil remedial work started in July 1990. It took 6 years from site assessment to completion of the remedial work. The site was finally cleaned to standards that make it suitable for general industrial use under zone 4A of the relevant land environment plan. (Maslen 1994).

The reduction of land supply may lead to fluctuation of the price and rent of land in the vicinity. The influence on price and rent is illustrated in Figure 1 – 5. In Figure 1 – 5, line D represents the land demand curve, Line S1 represents the land supply curve before contamination of the subject land is known. At equilibrium, there are $Q_1 \text{ m}^2$ of land available in the area and the price/rent level is P1. After contamination of the subject land is known, the land is removed from the market pending remediation. The total land supply is reduced to $Q_2 \text{ m}^2$, pushing the supply curve to the position represented by line S2. The new equilibrium price/rent level is now raised to P2.

Figure 1 – 5 Variation of Land Prices



The price and rent movement could be temporary or permanent, corresponding to the manner the contaminated land is removed from the market. The impact of the resulting price and rent movement of comparable land in the area is eventually shouldered by the community. Owners of properties close the contaminated land may suffer from rental and capital value loss because of the proximity to the notorious property. People at a further distance in the area may have to pay higher rent or price for the privilege and entitlement to enjoy, occupy and use their property due to short supply of unaffected properties in the area. Collectively the extra costs become a social cost. Between 1994 and 1996, 556 potentially contaminated sites were brought to the attention of New South Wales Environment Protection Authority (NSW EPA 1998b). At present, the amount of accumulated social cost is not yet available. Nevertheless, it is likely to be a considerable amount.

1.8 Stigma Impact

A parcel of contaminated property, if remediation is necessary, cannot be readily put to normal use until it has been remediated to the required standards. Accordingly, the owner or occupier has to invest in a remediation program to restore the utility of the land. Besides the remediation cost, there may also be expenses for long term monitoring under a environmental improvement/maintenance program required under the relevant environmental law. If the land is allowed to be sold or let in its existing state, the investor or tenant will take the likely remediation cost and liabilities into consideration. The land value/rent is bound to be discounted. If the remedial cost is too high or if it is technologically impossible to remediate the land at this stage, the land value can be zero or a negative figure.

Even after remediation, the land value may not return to the level before contamination is known. This is because there is a market resistance (Neustein & Bell 1998) due to the risk perception of the potential purchasers and/or occupiers that the remediation may not be thoroughly carried out and that there may be future legal liabilities. Value loss of this nature is known as 'stigma'. A detailed discussion of stigma is given in Chapter 6. In this thesis, the stigma assessment study is based on the stigma impacts after remediation.

1.9 Other financial losses due to land contamination

It is well known that apart from financial losses due to higher vacancy, operation costs and transaction costs (Lentz and Tse, 1995), the landowner has also to face remediation and monitoring costs. Besides, the owner of contaminated land may receive legal claims from the adjoining landowners. The adjoining land may become contaminated when contaminants are carried onto it by surface/groundwater, or simply by leaching or permeation. If the adjoining land is proved to be polluted by contaminants emanating from the subject site, the subject landowner is liable in tort to pay compensation which could be a considerable amount.

In general, contaminated land affects the landowners and occupants. It may also cause financial problems to the government. In Australia, land taxes are based on land value (site value or unimproved value as defined) (AIVLE 1997). If there is any depreciation in land value due to contamination, it is likely to cause a reduction of revenue to the government. In countries where rates and land tax are based on the annual rent or capital value of the property, the revenue to the respective governments may also likely to be reduced if the rental of the property is depreciated due to site contamination.

As mentioned above, following the Love Canal incident, land contamination has led to the establishment of a \$10 billion Superfund by the US federal government to remediate all contaminated sites. Certain European countries such as Holland and Germany also have similar remediation plans. In principle, the remediation cost is to be recovered from the polluters. In practice polluters are not easy to identify. Even if they are identified, they may be insolvent. The sites of the insolvent or disappeared polluters are called orphan sites. The remediation cost of the orphan sites has eventually to be borne by the taxpayers. In the USA, there have been court decisions that financiers who take possession of the land or management of the mortgagor firm could be liable for the cost of cleaning up the contaminated sites (see Chapter 2 for details).

Australia has not yet established a similar national remediation program. In June 1993 the Commonwealth Environment Protection Agency (CEPA) and ANZECC published a discussion paper "Financial Liability for Contaminated Site Remediation". The purpose of the paper was to encourage debate on major issues including the role of various levels of government in respect of contaminated sites, financial liability of polluters, owners, occupiers and financiers, and the remediation funding of orphan sites, etc. Subsequently a position paper was released by CEPA and ANZECC in April 1994 recommending the role of various governments in the management of contaminated sites, the polluter pays principle, the options to the financiers and that the government may sell orphan sites to recover the remediation cost. The 'polluter pays' principle has subsequently been incorporated into environmental laws of the States and Territories. More details are discussed in Chapter 2.

1.10 Summary and Conclusion

Land contamination may cause serious environmental and health problems. From a macro-level point of view, population and economy growth are considered two major contributory factors to the problems. From a micro-level point of view, the problems are due the failure of the market mechanism because of the presence of negative externalities. In addition, the people's free access to the natural environment does not encourage conservation of the environment. If there is no legal restriction, wastes are discharged arbitrarily into the environment as it costs the polluters nothing to get rid of their waste problems in this way.

It is obvious that more economic growth leads to more pollution and the market mechanism cannot police pollution activities. However, it is not feasible to limit economic growth because it is the general desire of the people to improve living standard and to obtain better services. This goal can only be brought about through economic growth. Any attempt to give up economic growth is not acceptable and amounts to a political suicide for the ruling government. Today,

people tend to believe that advances in technology and better management of natural resources will help reducing pollution. They are more concerned with the ways to achieve sustainable economic growth.

In order to make up for the deficiency of the market mechanism, relevant environmental laws have been passed by the government to control and prevention pollution. The relevant land contamination laws define the duties and liabilities of the stakeholders of the land. While science determines the presence and toxicity of contaminants, the statutory requirements actually have more impact on the value of contaminated land. The legal duties and liabilities may have deep ramification to the parties concerned. In order to address this important issue, detailed discussions are provided in Chapter 2 and 3.

It is well known that land contamination affects income and marketability of real estate. In the extreme case, the contaminated land has to be abandoned and the owner may lose the opportunity to enjoy the land forever. Land contamination may also affect the supply of land in a district and cause fluctuation in price and rent of other properties in the area. Valuers need to have a sound knowledge about it. Apart from financial loss to the owners or occupiers, land contamination may also bring financial loss to adjoining landowners, financiers as well as the government.

As far as valuation of contaminated land is concerned, the biggest problem is the presence of stigma. Stigma is a market resistance due to the perception of future health risks, legal and financial liabilities. Even after the land has been cleaned up, the market value will not immediately return to the clean land value level. It may take a long time before the impact of stigma fades out. The fact that stigma is conceptual rather than factual makes it an unresolved problem in contaminated land valuation. Chapter 6 provides an overview of the current stigma assessment methods and Chapter 7 shows the development and construction of a new model to assess stigma.

Chapter 2

Land Contamination Law¹

2.1 Introduction

Environmental problems are not new. However, the rapid economic and industrial developments since the turn of last century (1900) have aggravated the problems. In the early days, “human populations remained small and human technology modest, their impact on the environment was localised” (Microsoft Corporation 1999). Environmental problems were generally of small scale. Today, the much increased population, economic and industrial activities have brought unprecedented impact on the environment. People now realise that environmental problems pose threats to the survival of the existing population and future generations, and demand more positive actions had to be taken to abate the problems. In connection with the environmental awareness, green parties began to appear as political parties in the late 1970s. In 1979, a Swiss, Daniel Brélaz, became the first green to be elected to a national parliament (Microsoft Corporation 1999). There are three basic approaches to abate the problems:

- a) Moral suasion - self-participation and self-regulation by individuals to avoid polluting the environment;
- b) financial incentives such as government subsidies and tax incentives to abate pollution; and
- c) direct regulation.

(Byrns & Stone 1992)

The last approach is about the control and prevention of pollution through licensing, setting up emission and discharge standards, and taking punitive actions against offenders under relevant environmental laws.

Environmental law has a long history. In Europe, medieval cities passed ordinances against throwing garbage into the streets and canals. In 16th century England, there were attempts to curb the use of coal in order to reduce the amount of smoke in the air (Compton's Interactive Encyclopedia 1994). Today, governments around the world have introduced a number of laws to protect the environment, and the volume of environmental law is increasing with time. Compared with other developed countries, environmental problems, especially land contamination problems, in Australia are relatively minor but the problems have not been ignored. Governments at federal and state levels have enacted a number of laws to protect the environment. For instance, there are over 100 environmental statutes in New South Wales (NSW EPA 1999).

Land is an important constituent of the environment. Being a factor of production and the habitat for human beings and other living things, land is a valuable asset. Its importance to human beings needs not be reiterated. Accordingly land contamination has become a major environmental concern among the people. Apart from threats to fauna, flora and human health

¹ This chapter is based on my publications as follows:

- Chan N. 1997, *Statutory Land Contamination Law in Australia*, Paper presented at the 3rd Annual Pacific Rim Real Estate Society Conference at Massey University, New Zealand, 20 – 22 January.
- Chan N. 1997, Land Contamination Law – An Overseas Experience, *The Valuer & Land Economist*, 34 (7), pp 644 – 648.
- Chan N., Jefferies, R.L. & Simons, R.A. 1998, Government Regulation of Contaminated Land – A Tale of Three Cities, *Environmental And Planning Law Journal*, 15(5), pp 321 – 337.

risk, people are concerned about the remediation costs, and who is responsible for the remediation and legal liability arising from the contaminated land.

The serious consequences of land contamination and the increasing volume of environmental laws have aroused the concern of people dealing with land, such as owners, occupiers, purchasers, financiers and valuers. Very often they only know that contaminated land will bring about serious consequences but do not have a thorough picture about the issue, furthermore not all environmental laws are about land contamination. Since most of the people do not have special knowledge in environmental laws, it is difficult for them to find out about land contamination liabilities.

This chapter provides an overview of the law governing land contamination in Australia and the legal liabilities of parties involved in contaminated land. It starts with common law and statute law on land contamination. It is then followed by an examination of the liabilities of the owner, occupier, financier and valuer. Although the study is focused on Australian laws, laws in other countries are also cited where appropriate

2.2 Common law

Common law is the body of law developed since 1066 by successive courts in the United Kingdom. It is also known as judge-made law as the development of the law is based on the doctrine of precedent which, in simple words, means that the decision of higher courts binds lower courts. Australia, like other former British colonies, inherited common law from the United Kingdom.

Traditionally common law is the area of law that protects personal and property rights. The concept of property rights could be seen in the Latin maxim "*Cujus est solum ejus est usque ad coelum et ad inferos*". In simple English it means that the land extends indefinitely upwards to the zenith and indefinitely downwards to the centre of the earth (Hyam 1995). An extension of this maxim implies the landowner's rights in the land also extend indefinitely upwards and downwards from the surface of the land. Although in theory the landowner's rights have such an extensive coverage, the range is in fact substantially eroded by the enactment of successive legislation to limit private rights in this aspect.

Since common law is aimed at protecting personal and property rights, matters of public concern may not be adequately dealt with. As far as protection of the environment is concerned, only private environmental rights are enforced at common law (Bates 1992). Like other environmental problems, land contamination may be dealt with at common law under the torts of trespass, nuisance, negligence as well as the rule of strict liability developed from the judgement in *Ryland v Fletcher* [1866] LR 265².

2.2.1 Effectiveness of common law in addressing land contamination problems

Common law remedies are aimed at protecting personal and property rights rather than matters of public concern. To get compensation, the injured party is required to initiate a legal action. Regarding environmental problems, only private environmental rights are enforced at common law, with the exception of action brought under public nuisance. There is no liability unless the pollution activities have caused sensible or material injury. As mentioned in the above section, the court generally will not entertain a complaint of trivial nuisance.

At common law, the standing of the plaintiff is relevant. As mentioned earlier, except for action under public nuisance, the plaintiff needs to own or have proprietary rights in the land affected. Hence a member of the public who is concerned with the contamination on a private land cannot

² The application of the rule of strict liability in Australia is now very limited after the rulings in *Burnie Port Authority v General Jones Pty Ltd* [1994] 68 ALJR 331.

take an action against the wrongdoer unless his/her land or proprietary rights are affected or, in the case of public interest litigation, he/she has suffered special damage. The plaintiff's action will be successful only if it can satisfy the relevant tests such as reasonableness, foreseeability, proximity and direct injury, etc. In case the injured property is not a private property but say, the ecosystems, it would be difficult for an individual to take common law action against the polluter.

As far as remedies are concerned, injunction and damages are the only awards available for a common law tort action. Except in the case of a public nuisance that is a common law criminal offence, the judge cannot impose a fine or a sentence of imprisonment. This makes it difficult for common law to protect the environment. Furthermore there is a lack of emission or discharge standards under common law to protect the environment. The court is therefore required to strike a balance between the promotion of economic activities and damage to the environment. In civil law the standard of proof is based on the principle of balance of probabilities. In the absence of emission or discharge standards, it is quite possible to result in different verdicts for similar environmental litigation.

Given the above and the problem of high litigation costs, common law is not considered an effective means to curb land contamination and other pollution activities. Accordingly relevant environmental laws have been enacted and enforced to supplement the common law.

2.3 Statute Laws

Statutes are laws passed by the parliament or other legislative body. They empower the governments to prosecute the offenders on behalf of the community and/or take other actions. As far as land contamination is concerned, background level of contamination and relevant standards of emission can be stipulated in the statute. In Australia, there are environmental statutes at federal and state level. On the whole, the federal government passes laws that are enforced nation wide whereas state and territory governments pass laws that are enforced within their respective jurisdiction only. However, the federal government has limited constitutional power to do so (see below). At present there is no comprehensive national land contamination law.

2.3.1 Federal laws

Before the Federation in 1901, Australia was made up of six British colonies, i.e. New South Wales, Victoria, Queensland, South Australia, Western Australia and Tasmania. After Federation, each of these former colonies has retained the power to pass legislation including environmental laws. The federal government is authorised by s. 51 of the Constitution to make laws, however it is not specifically empowered to make laws for protection of the environment. The federal government has thus to rely on other heads of power to make environmental laws. The following heads are those that the federal government generally relies on to make environmental laws:

- a) trade and commerce between the States and with other nations;
- b) taxation;
- c) fisheries beyond state boundaries;
- d) foreign corporations and trading and financial corporations with Australia;
- e) people of any race for whom it is necessary to make special law;
- f) external affairs; and
- g) defence

(s. 51 of the Commonwealth Constitution Act 1900)

Up to 1997 the Federal government has made around 80 pieces of environmental legislation (ANZECC 1997). The majority of Federal environmental laws are made under the heads of

trade and commerce, corporations, defence, and external affairs. For instance, the Hazardous Waste (Regulation of Exports and Imports) Act 1989 was enacted under the head of external affairs power, the Environment Protection Nuclear Codes Act 1978 was enacted under the heads of trade and commerce, corporations, defence and sovereignty powers.

In *Commonwealth v Tasmania* (1983) 46 ALR 625, the federal government succeeded to use its powers under s. 51 to prohibit the Tasmanian state government from building a dam on the Gordon River. In this case, the site of the proposed dam was listed under the Convention for the Protection of the World Cultural and Natural Heritage. To prevent the dam from being built there, the Commonwealth government passed the World Heritage Properties Conservation Act 1983 (C'th) relying on a number of powers in s. 51 of the Constitution. The High Court finally upheld the validity of the Commonwealth legislation under the external affairs power and the corporations power in s. 51 of the Constitution.

As at May 2001, the Federal government under its foreign affairs power has signed 130 international treaties for protection of the environment (CIESIN 2001). These international treaties together with foreign affairs and other powers enable the Federal government to pass some environmental laws. Between 1968 and 1992, 17 international environmental treaties were signed and led to an equal number of environmental laws enacted by the Federal government (Bates 1995 p.82). This flexibility puts the Federal government in a strong position to play a role in conservation of the environment. At present, the Federal government has legislated 43 conservation and environment law (Lawsearch 2001).

Apart from making environmental laws, the relevant heads of power also permit the Federal government to protect the environment by relying on legislation that is not environmentally related. In *Murphyores Inc. Pty Ltd v Commonwealth* (1976) 136 CLR 1, the federal government was successful in refusing export approval for mineral sand mined on Fraser Island in Queensland under the Customs Act 1901 (C'th) even though the action was initiated on environmental and social grounds.

As far as land contamination is concerned, there is at present no specific Federal law governing this area. However given the wide power conferred on the federal government under s. 51 of the Constitution, it is not impossible that there will be relevant Commonwealth legislation in the near future. The Tasmania dam case vividly demonstrates that it is legal for the federal government to make domestic environmental law under the external affairs power if the subject matter implements an international treaty.

To add more weight to the determination in protecting the environment, the Federal government established in March 1992 the Commonwealth Environment Protection Agency to implement the relevant Commonwealth environment protection legislation (Boer, Fowler & Gunningham 1994). Two years later the National Environment Protection Act 1994 (C'th) (NEPA) was enacted to establish the National Environment Protection Council. The Council is charged with the responsibility to make national environment protection measures including general guidelines for the assessment of site contamination (s. 14(1)(d)). In December 1999, the Council made the National Environment Protection (Assessment of Site Contamination) Measure 1999. This document provides nationally consistent guidelines for data collection, sample design and reporting, laboratory analysis of potentially contaminated soils, and assessment of groundwater contamination.

The Federal government also tries to regulate land contamination through environmental planning. Despite its limited influence on planning matters in the States and Territories, it was the first in Australia to formally adopt an environmental impact assessment requirement and passed the Environmental Protection (Impact of Proposals) Act (EP(IP)A) in 1974. This Act is

the Commonwealth government's principal legislation in respect of environmental planning matters (Fowler 1996).

The Act is not intended to interfere with the day-to-day land use and development control function of the local governments in the States and Territories. Instead it requires Commonwealth projects or proposals, which are matters likely to affect the environment to a significant extent, to be subject to an environmental impact assessment. The Minister is also required to ensure the outcomes from the assessment process are taken into consideration when making decision or taking action.

The EP(IP)A has been replaced by the Environment Protection and Biodiversity Conservation Act 1999 (C'th) with effect from 16 July 2000. Under this new Act, any development that has a national environmental significance is subject to the scrutiny of the Minister. Matters of national environmental significance include World Heritage properties, Ramsar wetlands (wetlands designated by the Commonwealth under Article 2 of the Ramsar Convention), nationally threatened species and ecological communities, migratory species, Commonwealth marine areas and nuclear actions (including uranium mining) (Environment Australia 1999). The new Act also repeals the Endangered Species Protection Act 1992 (C'th), the National Parks And Wildlife Conservation Act 1975 (C'th), the World Heritage Properties Conservation Act 1983 (C'th) and the Whale Protection Act 1980 (C'th).

In addition to environment protection laws, s. 52 of the Trade Practice Act 1974 (C'th) (TPA) may be cited to regulate commercial transaction of contaminated property. This section makes it an offence for a corporation, in trade or commerce, to engage in conduct that is misleading or deceptive or is likely to be misleading or deceptive. Although the Act has not defined what is misleading or deceptive conduct, an incorrect statement in the sales document will most likely be found to be misleading or deceptive.

Besides misleading and deceptive conduct, non-disclosure of information about contamination on the land may also constitute an offence under s. 52. In *Kizbean Pty Ltd v WG. & B Pty Ltd*. (1995) 184 CLR 281, the defendant motel owner failed to disclose to the purchaser of the business that part of the motel business was operating contrary to planning permission. It was held that the non-disclosure of information is misleading and deceptive conduct under s. 52.

In *Manwelland Pty Ltd v Dames & Moore Pty Ltd* [2000] QSC 432, it was held that the costing of removing contaminated soil from a former gasworks site was a prediction. The fact that the costing was done with insufficient investigation and the unqualified way that the costing was given to the plaintiff were considered to be misleading or deceptive. The defendant was held to have breached s. 52 of the TPA.

Section 53A of the TPA prohibits the making of false or misleading representations concerning the characteristics of land and the use to which it may or may not be lawfully put. Hence a land sale document that does not disclose the hidden contamination of the land may contravene the provision under this section.

In addition to the above 'stick' legislation, the Federal government also has 'carrot' legislation for protection of the environment. A number of costs incurred for conducting or financing environmental activities are tax deductible under the Income Tax Assessment Act 1997 (C'th) (ITAA). To begin with, s 400-15 under Division 400 allows deduction for expenditure incurred on an environmental impact assessment. Sections 400-55 to 400-65 of the same Division allows deduction for environment protection expenditure incurred for the carrying on an environmental protection activity. Expenditures for earthwork constructed in relation to the carrying out of an environmental protection activity are deductible under s. 43-20(5).

Section 400-60 gives a definition for environmental protection activity. In short, it is an activity “undertaken to prevent, fight or remedy pollution or to treat, clean up, remove or store waste where the waste or pollution was produced by, or is on the site of, the taxpayer’s income producing activities” (CCH 1999).

Furthermore the Act also provides a tax deduction for expenditure incurred for rehabilitation and restoration of mines and quarries sites (ss. 330-435).

2.3.2 State laws

The Federal system of government in Australia allows the States and Territories to make laws to protect the environment, prevent pollution and regulate contamination of land within their jurisdiction. They have adopted approaches similar to each other such as the ‘polluter pays’ principle and environmental audit, etc. to deal with land contamination problems. However, they also have their own approaches to address the issues. The following is an outline of the land contamination laws in the New South Wales, Victoria and Queensland. It should be aware that land contamination is indirectly governed by other environmental laws as well, the laws discussed here are by no means exhaustive.

2.3.2a New South Wales

In New South Wales the Environmental Protection Authority (EPA) established under the Protection of the Environment Administration Act 1991 is responsible for the prevention and control of pollution in the state. It replaces the former State Pollution Control Commission (SPCC) established under the State Pollution Control Commission Act 1970. At present, there are over 100 environmental laws in New South Wales (NSW EPA 1999).

To address contaminated land problems, the state government in April 1996 published the Green Paper *Managing Contaminated Land in New South Wales: Proposals for a New Legislative and Administrative Framework* for public consultation. Based on the responses to the Green Paper, the government put forward a Contaminated Land Management Package for better management of contaminated land. The package consists of three primary documents:

- the Contaminated Land Management Bill 1997
- the draft State Environmental Planning Policy – Remediation of Land
- the revised draft of the Planning Guidelines for Contaminated Land

The Contaminated Land Management Bill 1997 subsequently became the Contaminated Land Management Act 1997 (CLMA). The CLMA and other relevant legislation are discussed below.

A. Contaminated Land Management Act 1997 (CLMA)

The Contaminated Land Management Act 1997 is now the primary legislation for the regulation of contaminated land in NSW. The operation of this Act is triggered by land contamination that poses a significant risk of harm to human health or the environment. Section 7 provides that where land is actually or possibly contaminated in such a way as to present a significant risk of harm to human health or the environment, the NSW EPA can intervene to:

- make records of the evidence of the contamination, risk and harm,
- investigate that evidence and seek information,
- employ community-based strategies to minimise the contamination, risk or harm through education and public awareness,
- declare the land to be an investigation area, and order persons to investigate it,
- declare the land to be a remediation site, and order persons to remediate it,
- any other thing that the NSW EPA may lawfully do, whether under this Act or otherwise.

In enforcing the provisions of this Act, the NSW EPA is required to have regard to maintaining ecologically sustainable development (s. 10). The 'polluter pays' principle is adopted by the Act. Section 12 provides for the choice of appropriate persons for serving orders and notices in the following order:

- a person having principal responsibility for such contamination (i.e. the polluter),
- an owner of the land,
- a notional owner.

Under s. 14, a notional owner is defined as a person (not being the landowner or the Crown or the Crown's representative) who has a vested freehold interest in the land and is able to benefit from a substantial portion of the land value by vesting, disposal or dealing with the land. The mortgagee in possession of the land is also regarded as a notional owner. To ease the concern of financiers who merely have a security, legal representatives, trustees and receivers, the Act excludes them from the definition of a notional owner. This Act also binds the Crown (s. 101).

In respect of a contaminated land, one or more persons may submit a proposal to the NSW EPA for voluntary investigation or remediation to avoid an investigation or remediation order from the NSW EPA (ss. 19 & 26). Where an investigation or remediation order has been satisfactorily complied with, the NSW EPA may end declaration of an investigation area or remediation site and issue a notice to the appropriate person (ss. 16 & 22).

Where the NSW EPA thinks fit, it may issue a notice to require the owner or occupier to maintain remediation action to the land (s. 28). In addition, it may impose a public positive covenant under section 88E of the Conveyancing Act 1919 to require the current owner to maintain the remediation action (s. 29). Maximum penalty for failing to comply with the remediation maintenance notice is 600 penalty units (over \$A60,000) for a corporation and 300 penalty units (over \$A30,000) for an individual (s. 28). Where the appropriate person fails to act under the investigation or remediation order, the NSW EPA and another public authority appointed by the NSW EPA may act on that person's behalf and recover the cost from the person (ss. 30, 34 & 35).

The Act makes NSW the second state after Victoria to have a site audit system in Australia (Chan, Jefferies & Simons 1998). Part 4 of the Act provides for the accreditation of a site auditor and defines the duties and liabilities of an auditor. The auditor accreditation provision introduced by the former Environmentally Hazardous Chemicals Amendment Act 1996 is repealed (s. 113).

In relation to registration of contaminated land, the Act does not provide for the maintenance of a contaminated land register. Instead, the NSW EPA is required to maintain a record of current declarations, orders and voluntary agreements made under this Act. The records may be inspected and copies of parts may be obtained by the public (s. 58). The NSW EPA has also to inform the local authority for the area in which the land is situated about any order, notice, and voluntary agreement it has made (s. 59(1)). The local authority has to include the said information in a certificate issued under s. 149 of the Environmental Planning and Assessment Act 1979 (NSW) to an applicant (s. 59 (2)).

The Act also provides a mechanism to sign off contaminated land. Where the NSW EPA considers that the land is no longer contaminated in such a way as to present a significant risk of harm, it must publish in the Gazette notice to end the declaration or order in respect of a formerly declared investigation area (s. 16 (1)) or clean up site (s. 22 (1)).

Both the polluter and the landowner have a duty to report to the NSW EPA contamination that presents a significant risk of harm. Maximum penalty for failing to report land contamination to the NSW EPA is 1,250 (\$A125,000) for a corporation and 600 penalty units (\$A60,000) for an individual (s. 60).

If a corporation commits an offence under this Act, each director or a person concerned in the management of the corporation is taken to have contravened the same provision. They may be exempted from liabilities if they can satisfy the court that they have no knowledge, actual, constructive or imputed, of the contravention; that they are not in a position to influence the conduct of the corporation in relation to the contravention; or that they had used all due diligence to prevent the contravention by the corporation (s. 98).

Very often, it is difficult to track down the legal liability if a contaminated property has been sold by a wound up or shell company. There are provisions in this Act to pierce the corporation veil. For a wound up body corporate, the Land and Environment Court may order the director or a person concerned in the management of the wound up body corporate, or the holding company of a wound up body corporate, to comply with an investigation or remediation order. This court order may be made within the 2 years after the body corporate is wound up (ss. 63 & 65). Where the body corporate still exists, the Land and Environment Court may order the director or a person concerned in the management of the body corporate that disposed of the contaminated land to comply with an investigation or remediation order. This court may be made within the 2 years after the transfer of the land (s. 64).

Normally the NSW EPA is the authority to bring an action against an offender of this Act. Where the NSW EPA has decided not to institute proceedings, a private individual may institute proceedings in the Land and Environment Court for an offence or restrain a breach of this Act if leave is granted by the court (ss. 95 & 96).

B. Other relevant legislation

Although the CLMA has become the primary legislation for the regulation of contaminated land in NSW, it still requires other complementary environmental laws, in particular, the Protection of the Environment Operations Act 1997, the Unhealthy Building Land Act 1990, the Environmental Planning and Assessment Act 1979, the Environmental Trust Act 1998 and the Local Government Act 1993 to regulate contaminated land. These complementary environmental laws are discussed below.

a) Protection of the Environment Operations Act 1997 (PEOA)

This Act repeals and replaces the Clean Air Act 1961, Clean Water Act 1970, Pollution Control 1970, Noise Control Act 1975 and the Environmental Offences and Penalties Act 1989. In relation to the prevention and control pollution (including land contamination), a 'licence to pollute' system is adopted by the Act. A number of land contamination related activities, known as scheduled activities, have been included in Schedule 1 of the Act. A licence from the NSW EPA is required to carry out any scheduled activities on a premises (s. 48). Thus a licence is required for industries such as chemical, paper pulp, and petroleum, etc. In addition, a licence is also required to carry out scheduled development work. A scheduled development work means work at any premises designed to enable scheduled activities to be carried on at the premises (s. 47). Accordingly, a licence is required for the construction of a chemical storage facility in a factory.

Where it is reasonable to suspect that an activity has been or is being carried out in an environmentally unsatisfactory manner at any premises or by any person, the appropriate regulatory authority (i.e. NSW EPA) may serve a prevention notice under s. 96 on the occupier of the premises or the person carrying out the activity to take action specified in the notice to

ensure the future activity is carried on in an environmentally satisfactory manner. Non-compliance with the prevention notice may lead to a maximum penalty of \$250,000 for a corporation and \$120,000 for an individual. For continuing offence, there is a further penalty of \$120,000 for a corporation and \$60,000 for an individual for each day the offence continues (s. 97).

Inherited from the repealed Environmental Offences and Penalties Act 1989, Chapter 5 of this Act provides for three tiers of environment protection offences. Tier 1 offences are the most serious environmental offences under the Act including unlawful disposal of waste, unlawful spills and leaks of substances harmful to the environment and emission of ozone depleting substances. Tier 2 offences are middle range offences in relation to water, air and noise pollution. Tier 3 offences are the minor offences that warrant on the spot fines for offences such as littering.

The first two items of the Tier 1 offences are most relevant to land contamination. The Act makes it an offence for a person, without lawful authority, to:

- a) dispose of waste (s. 115(1));
- b) cause any substance to leak, spill, or escape from a container (s. 116(1)),

whether wilfully or negligently in a manner which harms or is likely to harm the environment. If the person is not the owner of the waste or substance, the owner is also guilty of an offence. Since the law does not differentiate between wilful or negligent offence and the owners' liability is contingent on the unlawful behaviour of others, Lipman and Roots (1995) considered that provisions like these effectively impose a "quasi-strict" liability on the owners. Once convicted, the defendant faces a maximum fine of \$A1 million for a corporation, \$A250,000 for an individual or 7 years imprisonment, or both under s. 119.

Similar to the s. 98 of the CLMA, s. 169 of this Act provides that each director and manager is deemed to be guilty of the same offence committed by the corporation unless they can satisfy the court that they have no knowledge, actual, constructive or imputed, of the contravention; that they are not in a position to influence the conduct of the corporation in relation to the contravention; or that they had used all due diligence to prevent the contravention by the corporation.

Section 245 allows the court to issue orders requiring a convicted person to restore the land or prevent the continuance or recurrence of the pollution. Like s. 95 of the CLMA, s. 219 of the Act also allows a private individual to take civil action with the leave of the court against the polluter in respect of a harm or likely harm to the environment.

The Act has wide application and the Crown is also bound by it (s. 315). In addition it provides extra territorial jurisdiction (under s. 170) that it can be used to deal with migration of contaminants across the borders of New South Wales.

b) Unhealthy Building Land Act 1990 (UBLA)

This Act allows the NSW EPA to investigate and declare that a site is unhealthy building land. Section 4 provides that where the land is believed to be unhealthy, the NSW EPA is required to prepare a report stating:

- | | |
|---------|--|
| Table 1 | any action that would need to be taken; |
| Table 2 | any event that would need to occur; |
| Table 3 | any condition that would need to be complied with before the NSW EPA would revise its opinion. |

A copy of the report will be sent to the minister and a copy to the landowner. If considered appropriate the NSW EPA may publish under s. 5 in the Government Gazette a notice to describe the land or part thereof and to declare it to be unhealthy building land. The term "unhealthy building land" is not defined in the Act, however there is a reference in the Act to the term "prejudicial to public health" if a building is to be built on it. This may guide the NSW EPA in carrying out its duties under this Act.

Building on unhealthy building land is prohibited by the Act. Section 6 makes it an offence to erect or complete a structure on land classified as unsuitable for building without approval from the NSW EPA. A convicted person may face a maximum fine of 50 penalty units (\$A5,000). In relation to subdivision of unhealthy building land, the Act does not prohibit the local authority from giving approval for the subdivision. S. 7 only requires the public authority consenting to the subdivision to notify the NSW EPA of such approval. There is no requirement that the landowner should inform the NSW EPA about any contamination to the land.

Section 8 imposes a duty on the NSW EPA to maintain a register or record of notices of unhealthy building land under the Act and make the register or record available for inspection by the public on payment of a prescribed fee. As at 1997, there were 407 sites recorded under this section (NSW EPA 1998). Under this section the NSW EPA is empowered to issue a certificate stating if a particular land has been declared unhealthy.

Similar to the CLMA and PEOA, where a corporation is convicted of having committed an offence under this Act, s.12(1) provides that the directors and managers of the corporation are deemed to have committed the same offence if they knowingly authorised or permitted the act or omission constituting the offence.

c) Environmental Planning And Assessment Act 1979 (EPAA)

This Act is the principal environmental planning law in NSW. Contaminated or potentially contaminated land uses and developments are dealt with under this Act. Since 1 July 1998, the old s. 90 in the EPAA has been replaced by a new s. 79C. Before the change, the scope of the local councils' duty to consider 'other risks' under the old s. 90(1)(g) was rather vague and led to litigation such as *Alec Finlayson Pty Ltd V Armidale City Council* (1994) 84 LGERA 225. In this case, the council was found negligent for approving homes to be built on contaminated land. It was held that the former s.90 imposes a duty of care on the councils to consider the unsuitability of the land by reason of its being subject to any risk. Under the new s. 79C(1)(b) and (c), the position has been made clear. A consent authority has to consider, *inter alia*, the likely environmental impacts on both the natural and built environments and the suitability of the site for the development. Apart from imposing a duty on the consent authority, it also formally empowers it to consider these matters.

Section 90 is now about integrated development which generally includes developments that will pollute the environment. Local councils are not working alone but have to work with other approval bodies such as the NSW EPA and the NSW Fisheries to consider development applications. Since the local councils have to impose conditions consistent with granted by other approval bodies, it effectively gives the local councils power to require remediation of a contaminated site prior to development. Where a development may cause land contamination, the local council may require the applicant to submit an environmental impact statement under ss. 77(3) & 112(1).

To remove the planning authorities' concern about future legal liability in respect of contaminated land, a new Part 7A was inserted by the Environmental Planning and Assessment Amendment (Contaminated Land) Act 1996 into the EPAA. The new s. 145B(1) provides that a

planning authority does not incur any liability when discharging in good faith its planning functions that relate to contaminated land. Therefore unless the councils act negligently, they are protected by this provision. More discussion about this Act can be found in Chapter 3.

d) Environmental Trust Act 1998 (ETA)

This Act establishes an environmental trust to encourage and support restoration and rehabilitation projects, to prevent or reduce pollution or environmental degradation, to promote research into environmental problems, to promote environmental education, and to fund land acquisition for national parks (s. 7). Under s. 8(a), the trust may make grants for projects prescribed under section 7.

In connection to land contamination, the trust may expend money on measures for the removal, dispersal or mitigation of serious pollution, and on measures for the analysis, removal, storage, treatment or disposal of waste materials that has been placed or disposed of on premises unlawfully (s.16). Unlike the 'Superfund' in the USA, there is no provision for a comprehensive remediation program. Also the fund is not financed by a levy from any industry. Instead, money mainly comes from the Consolidated Fund and an amount of \$13.5 million is credited into this fund in each financial year (s. 19(1)).

e) Local Government Act 1993 (LGA)

This Act also empowers the local councils to control and prevent land contamination. Section 124 of the Act provides that a council may order a person to do or refrain from doing a thing in Column 1 of the table below the section. The matters relevant to land contamination are contained at Paragraphs 21 and 22. Column 1 of Paragraph 21 requires persons "To do or refrain from doing such things as are specified in the order to ensure that land is, or premises are, placed or kept in a safe and healthy condition". Column 1 of Paragraph 22 requires persons "To store, treat, process, collect, remove, dispose of or destroy waste (other than waste that is dealt with under the Waste Disposal Act 1970) on land or premises in the manner specified in the order."

In summary, there are over 100 environmental laws in NSW. Only the ones with more direct relation with contaminated land are discussed here. The CLMA is a specific legislation that deals with contaminated land. The PEOA has streamlined the body of environmental laws. It repeals and replaces the Clean Air Act 1961, Clean Water Act 1970, Pollution Control 1970, Noise Control Act 1975 and the Environmental Offences and Penalties Act 1989. Other significant statutes that regulate contaminated land include UBLA, the EPAA, the ETA and the LGA. Despite the attempt to streamline this area of law, the wide array of land contamination laws still causes problems to stakeholders.

2.3.2b Victoria

There are about 90 environmental laws in Victoria (ANZECC, 1997). Of these, the Environment Protection Act 1970, the Planning and Environment Act 1987, the Agricultural Chemicals and Veterinary Chemicals (Control of Use) Act 1992, and the Catchment and Land Protection Act 1994 are the most important laws for regulation of land contamination and will be discussed below.

a) Environment Protection Act 1970 (EP Act (Vic))

This Act is the principal law that deals with environment protection issues including the regulation of land contamination. The Environment Protection Authority established under the Act is the body responsible for prevention and control of pollution in Victoria. The Authority has administratively maintained a Priority Sites Register to record contaminated land (Cochrane 1998). In general, sites listed on the register are subject to a notice under s. 62A for remediation

and/or management. The Act provides for extra territorial jurisdiction on territorial seas adjacent to the coast of Victoria (s. 3).

The Act introduces a works approval system to prescribed industries. Before the industries or processes are established, the Authority has an opportunity to scrutinise the prescribed industries or processes through the works approval and licensing system. The Act defines premises on which the industry or process is carried on as scheduled premises. There are six types of scheduled premises:

- Schedule 1 – waste discharged or likely to be discharged to the atmosphere
- Schedule 2 – waste discharged or likely to be discharged onto any land or into any waters
- Schedule 3 – noise is or is likely to be emitted
- Schedule 4 – sites which accept any prescribed waste for the purposes of reprocessing, treatment, storage or disposal; or which generate and then reprocess, treat, store or dispose of certain wastes (listed in the Environment Protection (Scheduled Premises And Exemptions) Regulations 1995)
- Schedule 5 – premises where EPA may require a financial assurance to cover future clean up costs
- Schedule 6 – premises which any ozone depleting substance is handled

Any person who wants to establish the relevant industry or process on a scheduled premises has to apply for a works approval before any work can be undertaken (s. 19A). Premises under Schedule 2 and 4 are most likely to cause land contamination. A Schedule 2 premises is one on which waste is discharged or likely to be discharged onto any land or into any waters. Schedule 4 premises are sites which accept any prescribed waste such as acid, alkaline, lead and lead compound, etc. for reprocessing, treatment, storage or disposal; or which generate and then reprocess, treat, store or dispose of prescribed wastes (Vic EPA 1999). A full description of the prescribed wastes can be found in the Environment Protection (Prescribed Waste) Regulations 1998. After the industry is built, the occupier needs to obtain a license from the Authority under s. 20 to carry out operation on the premises.

Regarding regulation of land contamination, the Authority is empowered to serve a pollution abatement notice on the occupier of a premises on which pollution activities is or likely to be carried on (s. 31A). The Act also prohibits any person from polluting land (s. 45(1)), and makes it an indictable offence if a person intentionally or recklessly pollutes the environment or intentionally causes or permits an environmental hazard that results in serious damage to the environment (s. 59E).

In addition to the common “polluter pays” principle outlined in s. 62, the Act also deals with land contamination problems by an environmental audit system. Victoria is in fact the first state that has an environmental audit system. This system comprises two elements: environment improvement plan and environmental audit. Under s. 31C(1), the Governor in Council may make an order applicable to an industry. Under s. 31C(4)(a), the Authority may require individual members of the industry to conduct a specified environmental audit using an environmental auditor appointed under s. 57AA if they do not participate in a s. 31C(6) environment improvement plan endorsed by the Authority. In short the contents of an environment improvement plan include compliance with environment protection policy, regulation and licence conditions, waste emission standards for the industry, monitoring compliance with the environment improvement plan, evaluation by the community about performance, up-grading plant and equipment to meet the objectives, assessment of new or emerging technology in the industry, and contingency or emergency plan.

The meaning of environmental audit is defined under s. 4(1) as “a total assessment of the nature and extent of any harm or detriment caused to, or the risk of any possible harm or detriment which may be caused to, any beneficial use made of any segment of the environment by any industrial process or activity, waste, substance (including any chemical substance) or noise”.

An environmental audit under s. 57AA is triggered by a planning amendment, by a notice from the Authority under this Act or the voluntary action of the occupiers/landowners. It has to be carried out by an auditor appointed under s. 57. Under s. 31C(4)(b), an occupier is required to publish the result of the environmental audit in a manner and at intervals specified by the Authority. The occupier will face a penalty of 2,500 penalty units (\$250,000) or 2 years imprisonment or both if he makes a false statement about the environmental audit. Hence where the site has been audited, a potential purchaser can have an understanding of the site condition by inspecting the environmental audit result.

Under s. 57AA an environmental auditor is required to issue a certificate of environmental audit if he considers appropriate in respect of the subject site certifying whether the condition of the segment of the environment in question is detrimental or is potentially detrimental to any beneficial use of that segment. Under s. 57AA(1) the auditor has to notify the Authority the client's name, the segment of the environment to be assessed and the proposed completion date of the assessment. Whether issuing a certificate or not, the auditor needs to prepare and submit to the Authority an environment audit report stating if a certificate will be issued, the environmental quality of the site; if remediation is necessary, and any remediation recommendation (s. 57AA(2)).

In the course of carrying out the assessment, the auditor is required under s. 57AA(3) to have regard to any guidelines issued by the Authority, any beneficial use of the segment: and any state environmental policy or waste management policy. The auditor is required under s. 57AA(4) to refuse the issue of the certificate if the site is detrimental or is potentially detrimental to any beneficial use of that segment. If a certificate is not issued, the auditor can submit with the environment audit report a statement of environmental audit specifying the beneficial use of the segment (s. 57AA(5)).

Cameron and Dowse (1990) identify the environmental audit system to have the following advantages:

- “a) to a vendor, the audit may be used as a means of assuring a purchase that the land is not contaminated, thereby improving the marketability of the land; and
- b) to a purchaser, the audit may be used as a means of ascertaining the status of the land and of securing protection against possible future clean-up liabilities.”

The advantages of environmental audit are well received by environmentalists. Gunningham (1993 p.229) has described environmental audit as “[having] the potential to play an innovative and important role in curbing environmental degradation” and “[a]udits are also proving to be of value to regulatory agencies as an adjunct or as an alternative to direct regulation.” The environmental audit concept has subsequently been borrowed by NSW, Qld and other States and Territories.

The operation of the environmental audit system relies heavily on the expertise and integrity of the auditors. However the Act neither specifies the qualification and experience nor provides the accreditation of an environmental auditor. It only mentions that the auditor is to be appointed by the Authority upon payment of 170 fee units to the authority. In this regard, the Authority has prepared administrative guidelines for the appointment of environmental auditor (Vic EPA

1997b). To control the integrity and quality of auditors, the Act imposes a maximum penalty of 200 penalty units (\$20,000) or 2 years imprisonment or both on any environmental auditor convicted for giving false or misleading information to the Authority (s. 57AA(6)).

The Act also confers on the Authority power to revoke the appointment of any unsuitable environmental auditor (s. 57AA(7)). In *Graham v Environmental Protection Authority & Anor* (1996) 15 ELR 96-086, the applicant was appointed as an environmental auditor pursuant to s. 57 of the Act. He was later engaged to carry out an environmental audit of a site earmarked for sensitive use (including residential). After assessment he issued a certificate in mid 1992 certifying that the site was neither detrimental nor potentially detrimental to any beneficial use. His assessment in fact was incorrect in that some 21,000 cubic metre of highly odorous and visually contaminated soil had to be removed from the site during development in 1995. The Authority found the certificate erroneous and revoked the applicant's environmental auditor appointment. The Supreme Court judge upheld the Authority's decision to revoke the appointment as it was within the power of the Authority.

b) The Planning And Environment Act 1987 (PEA)

This is the principal environmental planning law in Victoria. Section 4(1) states that protection of the environment is an objective of the Act. Land use and development controls are exercised under a system of planning schemes. Section 6(2)(e) provides that a planning scheme may "regulate or prohibit any use or development in hazardous areas or in areas which are likely to become hazardous areas".

Under s.12(2)(a), a planning authority is required, in preparing a planning scheme and amendment, to have regard to Minister's Direction No. 1 Potentially Contaminated Land. The authority must satisfy itself that the potentially contaminated land (ie. land used or known to have been used for industry, mining or the storage of chemicals, gas, wastes or liquid fuel) is or will be suitable for a sensitive use (ie. a residential use, a child care centre, a pre-school or a primary school), agriculture or public open space. They are also required to have regard to the findings of a statutory environmental audit prepared under s. 57AA of the EP Act (Vic). However, this Act does not provide for the requirement to carry out an environmental impact assessment. The requirements are provided in sections 3 & 8 of the Environment Effects Act 1978 (Vic) under which a local authority may require the submission of an Environmental Effects Statement and Preliminary Environment Report.

When considering a planning permit application, planning authorities within the state are required to consider "any significant effects which the responsible authority considers the use or development may have on the environment..."(s. 60(1)(a)(iii)).

c) Agricultural Chemicals And Veterinary Chemicals (Control Of Use) Act 1992 (ACVCA)

The Act provides requirements for labelling (s. 18), manufacture (s. 27), sale (s. 25) and use (s. 25A) of agricultural and veterinary chemicals. It also regulates spraying of agricultural chemicals (s. 38) and prohibits the use of unregistered chemical products (s.6).

Regarding contaminated land, s.50 empowers the authority (Agriculture Victoria) to issue a land restriction notice prohibiting the growing of plants or the keeping of stock on that land if there are reasonable grounds to believe that it would likely result in the production of contaminated agricultural produce or the contamination of the stock. Contravention of the notice may lead to a penalty of 200 penalty units (\$20,000).

d) Catchment And Land Protection Act 1994 (CLPA)

This Act provides for the development of catchment management plans in order to integrate land use with catchment management issues. Section 20 imposes general duties on landowners to conserve land, prevent land degradation, and control weeds and pest animals. The Secretary (a body corporate set up under Part 2 of the Conservation, Forests and Lands Act 1987 (Vic)) may impose land use conditions (s.33) and/or a land management notice (s. 37) on land owners to protect both land water resources. Violation of the land use conditions may lead to a penalty of 10 penalty units (\$1,000) for the 1st offence and 20 penalty (\$2,000) for the 2nd offence. There is also a penalty of 4 penalty units (\$400) for each day the offence continues (ss. 35 & 41).

The Act also prohibits the carrying out of unauthorised extractive activity. Any offender may be liable to same penalty as provided in s. 35. The public has a right to know what land use conditions and land management notices have been issued. The Secretary is required under s.91 to keep a register for this purpose.

2.3.2c Queensland

Queensland has a track record of treating land contamination problems seriously. It was the first state that introduced a specific environmental law, the Contaminated Land Act 1991 (CLA), to regulate land contamination following the Kingston incident. At present, there are about 80 environmental laws in Queensland (ANZECC, 1997). Up to November 1997, the CLA had been the principal law that governs identification, management and remediation of contaminated land in the state. While the CLA was in force, there had been concern among stakeholders and interested parties about lender liability, the separation of 'risk' and 'low risk' sites and remediation costs (QLD DoE, 1998). In response to the concern, the Queensland government in November 1997 integrated the provisions of the CLA with the existing provision of the Environmental Protection Act 1994. Coupled with the Integrated Planning Act 1997, these laws are now the core legislation for regulation of land contamination in Queensland.

a) Environmental Protection Act 1994 (EP Act (Qld))

This Act imposes a general environmental duty on any person not to cause environmental harm (s. 36). It has extra-territorial power (s.22) and binds all persons including the state (s. 19). Part 9B is dedicated to the regulation of land contamination in Queensland. The Act clarifies the position of mortgagees such that they are held as the owner of a contaminated site only if they have exclusive management and control of the land (s. 118D.(2)). Accordingly they are not liable to the duties and responsibilities under the Act unless they have exclusive management and control of the land.

Regarding remediation liability, the 'polluter pays' principle is adopted by the Act (s. 118Y). As a measure to manage contaminated land, the landowner, occupier and the relevant local council all have a duty to notify the administering authority (i.e. the Environmental Protection Agency (Qld EPA)) about any notifiable activity undertaken on the premises (ss. 118E & 118F). There are 38 notifiable activities as listed in Schedule 3 of the Act. In general, they are activities that will cause adverse impact on the environment. Similar to the New South Wales and Victoria legislation, this Act provides for a licensing system to control pollution (Part 4).

Under the former CLA, land was classified by as:

- a possible site;
- a probable site;
- a confirmed site;
- a restricted site;
- a former site; or
- a released site.

There was no consideration for the separation of 'low risk' sites and 'risk' sites. This Act abolishes the CLA land classification system and identifies sites on the basis of risk assessment (QLD DoE 1998). Under this approach, 'low risk' sites are recorded on the Environmental Management Register (EMR) and 'risk' sites are recorded on the Contaminated Land Register (CLR). To protect the interest of a proposed occupier or purchaser, ss. 118 ZZB & 118ZZC respectively require the owner of land recorded on the EMR or the CLR to give written notice to the proposed occupier or purchaser that the land has been recorded on the relevant register.

Part 5 of the Act allows the Qld EPA to require the carrying out of an environmental audit if a licensee does not comply with licence conditions; a person does not comply with a development condition of a development approval; or a person does not comply with an environmental protection policy or management program (s. 72). For a site on the EMR, the owner or any authorised person may conduct or commission a voluntary site investigation to assess if the land is contaminated in a way that is a risk to human health or the environment (s. 118I). Despite the voluntary action, the Qld EPA may require the polluter, the relevant local government or the owner to conduct or commission a site investigation (s. 118J).

The Act does not directly mention the term 'environmental auditor'. Nevertheless s. 118O and s. 118ZC.(1) specify who is eligible to carry out a site investigation and who may prepare a validation report respectively. In general, environmental auditors accredited in Victoria and New South Wales are recognised by the Qld EPA (O'Brien 1998). Sections 118Q and 118ZC require persons carrying out site investigation or validation work for the purpose of removing sites from the EMR or CLR or to change an EMR listing to permit a particular land use to provide a statutory declaration which certifies the work undertaken.

After the land has been investigated and the Qld EPA is satisfied that remediation is required to prevent serious environmental risk, the land will be recorded on the CLR. Risk sites on the CLR may be subject to remediation notices issued under s. 118Y. Non compliance with the notice may lead to a maximum penalty of 1000 penalty units (\$75,000). For a site on the EMR, the Qld EPA may prepare a site management plan or require the polluter, the relevant local government or the owner to prepare a draft site management plan for its approval (s. 118ZM). The plan incorporates conditions to manage contamination for specified land uses so as to protect human health and the environment. Non-compliance with the plan may lead to a maximum penalty of 1665 penalty units (\$124,875) or 2 years imprisonment.

b) Integrated Planning Act 1997 (IPA)

This Act introduces an integrated development approval system (IDAS) to streamline the decision making process in development approvals (Homel 1999). Under the IDAS, development assessment managers (planning authorities) in the course of assessing development application have to consider applicable codes and common material (s. 3.5.4(2)). Common material is defined in Schedule 10 as:

“a) all the material about the application the assessment manager has received in the first 3 stages of IDAS, including any concurrence agency requirements, advice agency recommendations and contents of submissions that have been accepted by the assessment manager; and

b) if a development approval for the development has not lapsed – the approval”

Under the Integrated Planning Regulation 1988, the EPA is one of the concurrence authorities if:

- the land is on the EMR or CLR;
- the most recent use of the land was a notifiable activity under the EP Act, Qld;
- the proposed use is a sensitive land use like residential, recreational, educational, or childcare, etc. while the immediate preceding use of the land is or was industrial;
- the land is wholly or partly within an area that is subject to an Area Management Advice for industrial activity or natural mineralisation and the proposed use is a sensitive land use;
- the land is wholly or partly within an area that is subject to an Area Management Advice for unexploded ordnance.

An Area Management Advice is a written notice given by the EPA to a local government about planning for or managing land contaminated because of natural mineralisation, industrial activity or unexploded ordnance (Clause 2A, Integrated Planning Regulation 1998).

The planning and development control process under the Act is closely related to the use and development of contaminated or potentially contaminated land. Section 3.1.4(1) of the Act provides that a development permit is necessary for an assessable development. The carrying out of an assessable development without a development permit may lead to a maximum penalty of 1665 penalty units (\$124,875) (s. 4.3.1(1)). Assessable developments are developments specified in Part 1 of Schedule 8 of the Act. They include the carrying out of building work, plumbing or drainage work, operation work, reconfiguring a lot, material change of use of premises and development prescribed under a regulation under the EP Act (Qld).

The term 'material change of use' has a big implication on the use or development of contaminated or potentially contaminated land. Section 70A of the EP Act (Qld) provides that where the holder of an environmental authority carries out works for the construction or alteration of premises or for the installation or alteration of plant or equipment; and the construction, alteration or installation will result in an increase of 10% or more in the release of contaminant into the environment under the authority or approval, the increase is regarded as a material change of use of the premises for the IPA. Under s. 82 of the EP Act (Qld), the EPA may, in the capacity of a concurrence authority, require the applicant to submit an environmental management program for its approval as a condition to a development approval under the IPA.

Under ss. 3.5.5(2) & 3.5.5(3), the assessment manager must carry out any impact assessment regarding any development in or outside a planning scheme area. The assessment manager may under s. 3.3.6(2) send a written request to the applicant for the submission of further information needed to assess the application. Accordingly the assessment manager can ask for an environmental impact statement for consideration.

2.4 Comparison of Federal and relevant States Land Contamination Laws

The above sections have provided an overview of the current land contamination laws. Tables 2 – 1 below and 2 – 2 on the next page provide a comparison of the relevant land contamination laws and management approaches between the Commonwealth and the three States:

Table 2-1 Comparison of Federal and State (NSW, VIC & QLD) Land Contamination Laws

Items	Commonwealth	NSW	VIC	QLD
Dedicated land contamination law	No	Yes CLMA	No	No
Principal land contamination law	No	CLMA	EP Act (Vic)	EP Act (Qld)
Other major land contamination related laws	Related laws: EP(IP)A TPA NEPA ITAA	PEOA UBLA EPAA ETA LGA	PEA ACVCA CLPA	IPA

Table 2-2 Land Contamination Management Approaches

Legal requirements	Commonwealth	NSW	Vic	Qld
1. Prohibition of land contamination activities	No	Yes	Yes	Yes
2. Requirement to report land contamination incidents/ accidents	No	Yes	Yes	Yes
3. Licence to control pollution	No	Yes	Yes	Yes
4. Polluter pays principle	No	Yes	Yes	Yes
5. Voluntary investigation/ cleanup	No	Yes	Yes Under environment improvement plan	Yes
6. Environmental audit requirement	No	Yes	Yes	Yes
7. Contaminated land register	No	Yes Under UBLA	Yes Priority site register	Yes EMR & CLR
8. Environmental planning control to regulate land contamination	Yes EIA for Commonwealth projects only	Yes	Yes	Yes
9. Clarification of financiers' position	No	Yes	Yes	Yes
10. Cleanup program	No	Yes Only piece-meal projects under the ETA	No	No
11. Financial incentive for prevention/ cleanup	Yes Income tax deduction	Yes Grants under ETA	No	No

It can be seen that there are consistent approaches in the three States to deal land contamination problems. In comparison, the current Federal legislation is relatively weak in addressing land contamination issues. Although there are Federal environmental laws, none of them are specifically enacted to regulate land contamination. Enforcement of these laws is limited to environmental issues falling under specific heads of power such as external affairs, trade and

commerce, etc., under s. 51 of the Constitution. Environmental problems outside the ambit of the heads cannot be addressed. The situation may improve after the operation of the National Environment Protection (Assessment of Site Contamination) Measure 1999. Nevertheless, the power of the National Environment Protection Council is still limited. It has no power to compel the States and Territories to carry out the measures.

It was mentioned above that generic laws such as the Trade Practices Act 1974 (C'th) and the Income Tax Assessment Act 1997 (C'th) help control land contamination problems. Nevertheless the effect is limited. The former deals with misleading or deceptive acts committed by corporations. Where the offence is committed by an individual, the offender cannot be prosecuted under this Act³. The latter provides tax relief to costs incurred for conducting or financing environmental protection activities. It certainly encourages taxpayers to be environmentally conscious, but it has no application if the taxpayers choose not to conduct or finance any environmental protection activity.

At a state level, as noted by Nathan (1992), the approaches in the regulation of land contamination are very similar. Apart from "polluter pays" principle and site audit requirements, the relevant state laws also provide for extra territorial jurisdiction across state borders, contaminated land register, control through environmental planning, etc. Under the provisions of current land contamination laws, a contaminated site in the relevant States will receive more or less the same treatment.

Although the approaches taken by the States are similar, there are differences in fine-tuning. Some land contamination laws are more innovative, comprehensive and/or stringent than others. In New South Wales, the Protection Of The Environment Operations Act 1997, which inherits the Environmental Offences And Penalties Act 1989 (NSW), is probably the toughest law of its kind in Australia as it effectively imposes a "quasi-strict" liability on landowners. The Environmental Trust Act 1998 is an initiative to remediate contaminated land. However, unlike the 'Superfund' scheme in the United States⁴, it lacks a goal to systematically remediate all contaminated land in NSW. Nevertheless, the financial assistance offered would be helpful in restoring contaminated land value (see Section 2.8 'How Land Contamination Laws Affect Contaminated Land Value' for details). The drawback of the current New South Wales contaminated land legislation is that identification, notification, remediation, registration of contaminated land, and waste management are still under an array of environmental laws. It may cause confusion among stakeholders and interested persons.

In Victoria, the Environment Protection Act 1970 (Vic) is the first in Australia to introduce an environmental audit system to address environmental problems including contaminated land. Under the system, only environmentally acceptable land will be issued a certificate by the auditor. It follows that it can be difficult to sell or let industrial land without an environmental audit certificate. The certificate clearly benefits both the vendor and the purchaser of industrial land. The problems with the system are that the Act does not specify the professional qualifications of an accredited auditor and that it applies to any industry declared by an Order in Council under s. 31C(1) only. The former pitfall leads to a query like "Environmental Auditing: Who Audits the Auditors?" (Gunningham 1993). In this regard, the Victoria EPA has prepared administrative guidelines for the appointment of environmental auditors. Regarding the second problem, the system has no application to non-industrial land or land occupied by industries not subject to an Order in Council. Despite the criticisms, it is an effective means to safeguard

³ The offence by an individual is dealt with by the relevant state law, for example, the Fair Trading Act 1987 (NSW)

⁴ The 'Superfund' scheme is a trust fund set up by United States federal government under the Comprehensive Environmental Response, Compensation And Liability Act 1980 (CERCLA) for the remediation of contaminated sites. See section 2.51 for more information.

human health and the environment, and the concept has been borrowed and incorporated in the land contamination laws in other States and Territories. Finally, Victoria also has the same problem as New South Wales that there are a number of relevant environmental laws governing land contamination issues.

In Queensland, the state government had changed its approach to regulate land contamination and integrated the provisions of the CLA with the existing provisions of the EP Act (Qld). The integrated Act (ie EP Act (Qld)) recognises the importance of treating 'low risk' and risk sites separately and of recording the types of sites in the EMR and CLR respectively. The Act also has provisions for environmental audits. However, it also does not specify the qualifications of an environmental auditor. This Act has some innovations in the regulation of land contamination. It imposes a duty on the local government to notify the Qld EPA of any notifiable activity carried out on land within its jurisdiction. This is a big improvement that local governments are now required to take a more positive attitude towards the management of contaminated land. In addition, where the local authority is negligent in approving an environmentally harmful activity to be carried out on land, the Qld EPA may require the local government to remediate the land.

Regarding the combined action with the IPA to regulate land contamination, there are criticisms that the definition of material change of use under s. 70A of the EP Act is impractical. Homel (1999) considers that the criterion of 10 percent increase in discharge of contaminant into the environment is difficult to enforce because many authorities do not specify rates of contaminant release. On the other hand, it will be a complex task requiring a high level of technical competence to make accurate estimation of emission.

2.5 Land Contamination Laws in Other Countries

The above sections have outlined the current conditions of land contamination law in Australia. The following sections give an overview of the overseas experience.

2.5.1 USA

The USA has a strong industrial base and consequently environmental problems in the country are particularly serious. Unlike the Australian Constitution, the Commerce Clause of the United States Constitution confers on the federal government extensive power to make any type of federal environmental law. Early environmental legislation in the 1950s and 1960s was mainly enacted to deal with clean air, clean water and the disposal of solid waste. In the 1970s the problems with hazardous waste had caused public concern and the Resource Conservation and Recovery Act (RCRA) was enacted in 1976 to deal with the current and future treatment of hazardous waste (Murchison 1994). The EPA is given the power to establish a "cradle to grave" system to govern the generation, transportation, treatment, storage and disposal of hazardous waste (Andreen 1992 p.101).

Regarding land contamination problems, wide publication of the Love Canal incident in 1977 eventually led to the enactment of the Comprehensive Environmental Response, Compensation And Liability Act (CERCLA) in 1980 by the federal government. The Act, also known as 'Superfund', provides the establishment of a 'Superfund' program for the remediation of contaminated sites.

Broadly speaking CERCLA has 3 main aspects:

- “(a) a comprehensive federal-state mechanism for a rapid response to releases or threatened releases of hazardous substances into the environment at facilities where the owner or operator is unwilling or unable to do so;

- (b) a federal trust fund [the Superfund], financed in the main by private industry, to pay the cost of response actions by federal or state agencies or private “volunteers”; and
- (c) a federal cause of action for recovery of cost incurred for responses to hazardous substances releases from four categories of person – current owner and operators, owners and operators at the time of disposal, generators of the hazardous substances, and transporters who selected the facilities.” (Tromans & Turrall-Clarke 1994 p.491).

Regarding item (c) above, s. 107 of the above Act imposes a joint and several liability on any potentially responsible party from the listed categories. The party involved may be held liable, regardless of fault, for the costs of remediating the land that has been wholly or partly contaminated. The liability is imposed absolutely regardless of:

- (a) when the contamination took place (i.e. retrospective liability); and
- (b) whether the parties concerned had complied with all then applicable laws and applied the best technology then available in the operation.

McMahan (1989) comments that the liability throws a relatively broad net with a view to catch as many potentially guilty parties as possible. This draconian rule causes great concern among financiers. Subsequently s. 101(20(A) of the CERCLA was amended to grant exemption to persons who take over ownership of the property primarily to protect a security interest, provided that they do not take part in the management of the business (ANZECC 1993). The Superfund Amendments And Reauthorization Act 1986 (SARA) was also amended to remove the liability from an innocent purchaser (McMahan 1989).

Non compliance with the order under the Act may lead to a fine of \$US25,000 per day under s. 106. Besides, the EPA has the power to recover costs of investigation and remediation from the offender by virtue of s. 107. The section also makes an innocent party such as lender responsible for the remediation once they take possession of the land. Today the CERCLA together with the RCRA form the backbone for the control and prevention of land contamination in the USA.

As far as the control and prevention at state level is concerned, the States play a subordinate role in environmental protection as any state program for the administration and enforcement of environmental statutes has to be approved by the federal EPA (Murchison. 1994). The States have enacted their own land contamination laws. As they must comply with federal standards, these laws are closely modelled on the CERCLA. In order to avoid intervention from the federal bureaucrats, these laws are very often more stringent and complex than the federal laws. For example, the New Jersey law requires that prior to the disposal of industrial land or the cessation of a business, the owner or vendor of the business must guarantee the state that there had been no deposit or release of hazardous substance on the site.

It is interesting to note although contaminated sites are to be cleaned up according to a national priority list; there is no contaminated land register in the USA. The latest development is that a number of state governments implement a voluntary remediation program to encourage developers/landowners to remediate contaminated sites. After the sites have been cleaned up to the specified standard, a ‘no further action letter’ will be issued to the developers/landowners to guarantee that no future legal action will be taken against them regarding the former land contamination (Chan, Jefferies & Simons 1998).

2.5.2 Canada

In Canada there is no comprehensive national law governing land contamination. There is minimal control of land contamination at federal level. The Canadian Environmental Protection Act S.C. Ch.22 (1988) (Can.) only regulates designated substances. The Fisheries Act R.S.C. Ch. F-14 (1985) (Can.) deals with land contamination only if the contaminant affects a stream or body of water (AIC 1992 p.24). In October 1989, the National Contaminated Sites Remediation Program was established by the Canadian Council of Ministers of the Environment. It was intended to achieve agreement on a national approach on land contamination problems and to foster full participation of all federal, provincial and territorial governments (ANZECC 1993).

The control and prevention of land contamination are mainly enforced at provincial level and the problems are considered as matters relating to property and civil rights (Tromans & Turrall-Clarke 1994). Basically each province has a Waste Management Act, "Special" or "Toxic" Waste Regulations, and Health Act, etc. to deal with environmental problems (Dybvig 1992). Regarding land contamination, each province has its own legislation and approach to deal with the issue. For instance, in Ontario, s. 16 of the Ontario Environmental Protection Act R.S.O. Ch. 141 (1984) (Ont.) imposes absolute liability on the owners and controllers of a spilled contaminant and provides for the recovery of costs of remediation from the persons concerned. Section 17 empowers the authority to serve an administrative order on the owners or controllers to make good the condition where the existence of a contaminant is likely to cause an adverse impact on the environment. This section was amended in 1990 to extend the liability to the previous owners and controllers.

In Quebec, the government announced a Contaminated Sites Rehabilitation Policy in 1988 to deal with contaminated industrial sites. Local governments are required under this policy to identify contaminated sites and report to the Ministry of Environment.

In Alberta, British Columbia, Ontario and Quebec, the environmental law allows the remediation costs to be added to the tax rolls. It therefore has priority over the first mortgage and all other previously registered encumbrances (Dybvig 1992). This is a good idea and the Australian legislators should seriously consider a similar approach.

2.5.3 Germany

Germany is one of the most advanced industrialised countries in Europe. Before the reunification with the former East Germany, there were less environmental problems in West Germany. Today, it has serious land contamination problems mainly because the former East Germany had severe environmental problems. At present, there is no comprehensive land contamination legislation such as those in the USA to deal with the problems. Instead, a number of different environmental laws are relied on for the purpose.

The Federal Waste Act 1960 (Bundesabfallgesetz) provides the control of pollution and imposes liability for damage caused by emission of waste substance into ground and surface waters from property used for the production, processing, storage, deposit, transportation or discharge of the substances. The Waste Disposal Act 1972 (Abfallbeseitigungsgesetz) encourages prevention and re-utilisation of wastes. For wastes that cannot be prevented or re-utilised, the Act requires them to be disposed of in a manner not detrimental to the environment. It does not deal with the remediation of old contaminated sites.

The Chemical Substance Law 1982 (Chemikaliengesetz or CHemG) regulates the use and disposal of chemical substances. The Environmental Liability Law 1991 (Umwelthaftungsgesetz or Umwelt HG) primarily deals with compensation to victims who

suffer death, personal injury or damage to property arising from environmental damage. It does not deal with the remediation of contaminated sites.

In addition to the above federal laws, each state has enacted its own environmental laws within the framework of the federal laws. Nevertheless neither the federal nor the state legislation has retrospective power, i.e. they cannot deal with land contamination which occurred before the Acts come into force. It should also be noted that public officers in Germany are empowered under the state police law to issue an abatement order to the polluters or owners of contaminated land if the public is endangered (ANZECC 1993). The police law is in essence intended to deal with matters of public order and security. It is similar to the law of public nuisance in Commonwealth countries and the USA.

2.5.4 The Netherlands

To deal with the mounting land contamination problems, the Netherlands government in 1993 began a massive program to identify, list and order clean-ups of contaminated industrial sites at an estimated cost of 50 billion guilders. At the moment there is no specific contaminated sites statute as in the USA. There are, however, a number of laws that can be used for the control of hazardous substances that may contaminate land.

The laws include the Nuisance Act 1952 (Hinderwet) as amended in 1988 which requires notification of industrial accidents with site-external risks to the responsible authority; the Dangerous Substance Act 1963 (Wet Gevaarlijke Stoffen) which regulates the transport of dangerous substances; the Chemical Waste Materials Act 1976 (Wet Chemische Afvalstoffen) which requires that the dumping of toxic waste products must be isolated, manageable and controllable; the Waste Products Act 1977 (Afvalstoffwet) which regulates all but chemical and radioactive waste and used oil; the Soil Clean-Up (Interim) Act 1982 (Interim Wet Bodemsane Ring) which deals with remediation programs for contaminated land; and the Substances Dangerous To The Environment Act 1985 (Wet Milieugevaarlijke Stoffen) which regulates the use and disposal of toxic substances, etc. (ANZECC 1993).

Of the above-mentioned legislation, the Soil Clean-Up (Interim) Act 1982 (Interim Wet Bodemsane Ring) was enacted as a response to the Lekkerkerk incident. This was a land contamination incident in a suburb near Rotterdam. In 1980, some 800 people had to be evacuated from their houses where toxic chemicals found their way into drinking water serving the housing development. Investigation showed that between 1972 and 1975 268 dwellings were built on a former refuse tip (Pearce 1992a). The Act empowers the provincial authority to draw up an annual remediation program to deal with contaminated land (s. 2), to enter and investigate private land in connection with the program, and to issue orders to the owner or controller to suspend land contamination activities (s. 11). The Minister of Housing, Physical Planning and Environment may issue an order to the responsible person to eliminate the source of contamination or to restrict the impact of contamination as far as possible (s. 12(1)). Under s. 21, the provincial authority may remediate the contaminated land and recover the costs from the responsible person. Also the Minister may sue the polluters of old dumpsites for the remediation costs. In practice, however, many clean-ups are carried out voluntarily by the responsible person for fear of legal action by the government (Tromans & Turrall-Clarke 1994). Syms (2001)⁵ points out that the Dutch government also has a policy of 'multifunctionality' that requires remediation to a uniformly 'clean' standard, regardless of intended uses. This indicates a change towards a more risk-based approach to tackle land contamination problems.

2.5.5 Denmark

Like other industrialised countries in Europe, Denmark also has serious land contamination problems. Some 2,200 contaminated sites have been registered. It has been estimated that the

⁵ Information from Syms's feedback in January 2001.

total number is in the order of 7,000 and the ultimate remediation will take 30 to 100 years at an expected cost of Dkr 8 billion (\$US1.3 billion). Contaminated land is dealt with by the Danish Waste Deposits Act 1990, which provides for the identification and remediation of land used for deposit of chemical waste. Contaminated sites identified are registered. Once registered, no building can be erected on the land without application to, and investigation by, the local authority or the National Agency for Environment Protection (Miljøstyrelsen). Alternatively the owner may carry out investigation at his own cost.

Registration under the above Act effectively freezes the future of contaminated sites and devalues the property. To reduce the blighting effect on property value, the Waste Deposits Act was amended in 1993. Under exceptional circumstances agreed by the Minister of the Environment, development of registered sites are allowed provided that the development shall not make future investigation and mediation impossible or substantially more expensive (Tromans & Turrall-Clarke, 1994). In addition, the Value-Lose Act 1993 was enacted to help an innocent owner of a registered residential site such that the owner may ask the government to immediately carry out the remediation work which will otherwise have to wait for many years. The owner pays 60,000 Dkr which is about 10 - 15% of the remediation cost (Berveling 1994).

2.5.6 Britain

Many of the environmental problems in Britain date back as far as the 19th century. There had been various attempts to solve the problems. The latest development was the enactment of the Environment Act 1995 which received Royal Assent on 19 July, 1995. The Act became the principal legislation governing land contamination in the country. Before the enactment of this law, there were different government bodies and agencies responsible for protection of the environment, such as the National Rivers Authority, Her Majesty's Inspectorate of Pollution, etc. Section 2 of the Act creates an Environmental Protection Agency (EPA) that takes over the responsibility of these agencies. Section 57 inserted a new Part IIA, consisting of sections 78A to 78YC, into the Environmental Protection Act 1990 (McIntyre 1996). Although the legislation was amended in 1995, it was only brought into effect on 1 April 2000 (Syms 2001).⁶

Section 143 of the Environmental Protection Act 1990 proposed the creation of registers of potentially contaminated land to alert buyers and lenders, etc. to the risk of land contamination and likely regulatory action. There was vigorous opposition from landowners and financiers who were concerned about causing a wide spread "blighting" of land values (Lewis 1995). In response, this controversial section was repealed by the current Act which confines the application of the law to land which is actually causing or posing a threat of harm. The local authorities are required to compile a register which lists land which is actually contaminated rather than having simply been used for contaminative purposes (Chartered Surveyor Monthly 1995).

The Act placed upon the local authority the responsibility to identify contaminated sites that are causing harm to the local ecology or human habitation (Wilbourn 1995). Section 78B requires each local authority to "cause its area to be inspected from time to time for the purpose of identifying:

- "contaminated land, i.e. not potentially contaminated;
 - closed landfill sites; and
 - closed land fill sites which appears to the authority to be suitable for designation as special sites."
- (Wood 1995).

⁶ Information from Syms's feedback in January 2001.

The EPA working in conjunction with the local authority may serve remediation notices (abatement orders) upon “appropriate persons” as defined under s. 78(F) of the Act. In short the appropriate persons are those who caused or knowingly permitted the land contamination. Where such person or persons cannot be identified, the existing owner or occupier becomes the appropriate person.

Other features of the Act include the following:

1. Limitation of liabilities on landowners – landowners are relieved from the joint and several liability (compared to the American Superfund). Under s. 78F(3) of the Act, a polluter is only liable for remedial works “which are to any extent referable to substances which he caused or knowingly permitted” to be present on the land. Section 78F(7) provides that where two or more persons are responsible for the same remediation, they have to bear the remediation cost in proportion determined in accordance with ministerial guidance (Lewis 1995 p.1094).
2. Before enforcing action for remediation, the local authority must consult the responsible person (s. 78M) so as to determine what should be done for remediation (Lewis 1995).
3. The Act (s. 78Q) provides a second class of contaminated land called “special sites” which are contaminated land which is likely to cause “serious harm” or “serious” water pollution. Where a special site is designated, the relevant powers are transferred from the local authority to the EPA for action (Environmental Law & Management. 1995 p.166).
4. Where contamination migrates from one site to another and affects the latter, s. 78K provides that the polluter, i.e. the person who caused or knowingly permitted the original contamination, is liable for the cost of remediating the contamination of the infected land and the original land. There is also a ‘hardship’ provision that if the parties concerned cannot afford to carry out remediation works, the local authority has to bear the cost (Syms 2001).⁷

S. 78M of the Act imposes on offenders a scale of fines with a maximum up to (£20,000 and a daily rate thereafter of up 10% of the initial fine (Barret 1995).

2.5.7 New Zealand

The Resource Management Act 1991 is an all-embracing legislation for the regulation of environmental problems including land contamination. Under this Act, the national government is responsible for setting overall guidelines and policy directives regarding land contamination control. The regional government is involved if land contamination affects water or air quality. The local government is the primary regulatory authority for land contamination issues. A local authority must keep a land information memorandum (LIM) for every property under its jurisdiction. This document keeps record of all dealings and local authority information regarding the property including the types, concentration, location and management, etc. of pollutants on the site (Chan, Jefferies & Simons, et al, 1998).

2.6 Comparison of Land Contamination Laws in Australia and other countries

Among the countries discussed above, only the United States, United Kingdom and New Zealand have a national contamination law. Like the rest of the other countries, Australia does not have a national contamination law. Australia and the United States both have a federal

⁷ Information from Syms’s feedback in January 2001.

system of government. While the states in both nations have legislative power, the Commerce Clause of the United States Constitution gives the United States Federal government wider power to make environmental laws. This leads to the legislation such as the well-known Comprehensive Environmental Response, Compensation, and Liability Act 1980 (CERCLA) (Chan 1997). The United States state-laws have to comply with the federal law standards. The federal government is taking a leading role in handling the problems. In contrast, the Australian federal government has limited power to make environmental laws. To date there is no federal contaminated land law. The States are responsible to enact laws to regulate land contamination within their jurisdiction.

At the moment, the United States Superfund law is the toughest of its kind in the world. Apart from setting up a special fund to remediate all contaminated sites in the country, the law provides joint and several liability. As far as control of hazardous wastes is concerned, the Resource Conservation and Recovery Act 1976 provides a “cradle to grave” approach to control the wastes. In Australia there are also laws, such as the Environmental Restoration and Rehabilitation Act 1990 (NSW) and the Environmental Trust Act 1998 (NSW), that set up a fund for remediation costs, but the scale is far less than the Superfund. Furthermore the funds created are not aimed at cleaning all contaminated sites in the country. There is also draconian law, such as the Protection Of The Environment Operations Act 1997 (NSW), in Australia. However they are no match for the Superfund law in the United States.

Regarding assessment of the problems, contaminated land laws in the countries concerned empower the relevant government agencies to investigate and identify contaminated sites. In particular laws in the UK and Quebec in Canada require the local government to take the initiative to identify contaminated sites. The Netherlands law even goes a step further by requiring local authorities to draw up an annual remediation program to deal with contaminated land. In contrast, the Australian laws do not impose the same responsibility on local governments. In Australia such a mandate does not exist. The most similar law is the Environmental Protection Act 1994 (Qld) which imposes a duty on local councils to notify the Qld EPA about any notifiable activity carried out on land within its jurisdiction. In general, local governments are required to take land contamination into consideration when exercising town planning power.

The United States has a harsh approach that the CERCLA imposes a strict liability on any potentially responsible party regardless of when the contamination took place⁸. A similarly draconian law is not found in Australia or other countries under study. Of all overseas countries under study, only the USA and Britain have passed specific legislation to deal with land contamination problems. In Australia, New South Wales and Queensland are the States that have specific laws to deal with land contamination issues.

All the countries discussed above have legislation to regulate contaminated sites and prohibit development on such sites. Most of them have a contaminated land register. Although the registers alert the public to contaminated sites, they nevertheless also freeze the value of the relevant sites. To address the blighting problem, the Denmark statute has the most favourable provision to help owners of contaminated sites. The Minister is empowered to approve development on contaminated sites on condition that the development will not make future investigation and remediation impossible or substantially more expensive. For innocent owners of contaminated land, they are required to contribute about 10% to 15% of the remediation costs and the government shoulders the rest of the costs. This is a positive step to help landowners, perhaps Australia should seriously consider enacting similar legislation.

⁸ There is an exemption for financiers if they are not involved in the management of the polluter's business, see Section 2.51 above.

From the above analysis, it can be seen that Australian land contamination laws are similar and comparable to its foreign counterparts. The laws in the countries concerned have their respective strengths and weaknesses, and it is difficult to tell which country's laws are the best. Nevertheless Australia needs to learn from the experience of its overseas counterparts and keep on improving the laws according to actual needs in the country.

2.7 Stakeholders' Liabilities under land contamination laws

With the increase in people's awareness of environmental problems and government regulation, land contamination laws are becoming increasingly important to people dealing with contaminated land. People like the owner, occupier, purchaser, financier and valuer should be well aware of the implications under the laws.

2.7.1 Owners and occupiers

The owners or occupiers of contaminated land are sitting on a 'toxic time bomb', as they are liable for both civil and criminal liabilities arising from the toxic land. The occupiers, depending on the situation, may be the owner, a tenant or a licensee. According to the 'polluter pays' principle, if the owner or occupier is the polluter, he/she needs to bear the legal responsibility. However where the polluter cannot be identified or located, the owner or occupier may be held responsible for cleaning up of the site.

In the past, the executive or management of a corporation that caused pollution was allowed to escape individual liability under the corporate veil. If the corporation were convicted, fines would be the penalty. The recent development in this area of law has changed the situation. In March 1995, a Perth court became the first Australian court to send a company executive to jail for 12 weeks when the company was found guilty of discharging 22,000 litres of toxic waste into drainage system (Lawson 1995). In NSW, the Land and Environment Court now has power under the Contaminated Land Management Act 1997 to backtrack two years to order a director or manager of an existing or wound up company to comply with an investigation or remediation order (ss. 63 – 65).

2.7.2 Purchasers

The purchaser of land that may be contaminated is exposed to considerable risks. He/she may have difficulty in getting finance for the transaction. Even if there is no problem with getting finance, he/she will step in the shoes of the former owner or polluter and assumes all the liabilities associated with the land. In the USA, the CERCLA imposes an absolute liability on the landowner. In *State of New York v Shore Realty Corp.* [1985] 759 F. Ed 1032, a current owner who did not take part in contaminating the land was held liable for the remediation cost.

The Australian laws are not as strict as their American counterpart. For example, there is no joint and several liability on any potential responsible party. Nevertheless there are also harsh provisions. Chapter 5 of the PEOA in NSW imposes a 'quasi strict liability' on the owners. Although the defendants are allowed to defend themselves as outlined in s. 98 of the Act, there is still a possibility that they will be convicted. As prevention is always better than cure, the purchaser should take every care to investigate if the land is contaminated before committing the acquisition. One convenient source of information is from the EPA and the available contaminated land register.

2.7.3 Financiers

Financier's liability has become a major issue in Australia and overseas. Schwaiger (1993) conducted a survey of 18 Australian banks and found that 92% of the banks were either concerned or very concerned about their liability under the current environmental legislation.

Normally a lender will not be liable for land contamination as it can avoid financing the purchase of contaminated land or accepting contaminated land as security for a loan. If the land becomes contaminated after the mortgage, the lender will suffer two losses explicitly and implicitly. The explicit loss is incurred because of the loss in land value due to the contamination. The land is no longer worth the amount advanced and becomes a bad security. If the mortgagor defaults, the lender is unlikely to recover the outstanding loan by selling the land.

While the explicit loss causes concern among lenders, the implicit loss brings real problems to the lenders. Extra loss is brought about by the liability associated with the contaminated land after the insolvency of the mortgagor. Where the remediation work is done by the authority, the costs may be recovered as a charge upon the property. The land contamination law in all three States provides for the recovery of costs incurred by the authority in this regard. In comparison, New South Wales and Victoria have the strictest provisions. Under ss. 41 & 40 of the Contaminated Land Management Act 1997 (NSW), the costs may be registered as a charge against the land concerned, and the charge has priority over every other prior charges or encumbrances to the land. Under s. 62(12) & (13) of the Environment Protection Act 1970 (Vic), the charge also takes priority over other charges or encumbrances on the property. This affects the mortgagor's right to recover the outstanding loan. Queensland does not have similar provisions.

In normal circumstances, the mortgagee will take up possession of a mortgaged property once the mortgagor defaults. In the case of contaminated land, taking possession of the property will immediately put the lender or receiver in the position of an owner and thus liable under the land contamination laws. However, in Australia, the state land contamination laws have clarified the legal position of financiers. In general, if they merely have a security or are a legal representative, trustee and receiver of the property, they will not be held responsible for the remediation.

The American CERCLA is the most stringent law in this aspect among industrialised countries. In *United States v Maryland Bank and Trust Co.* [1986] 16 E.L.R. 20557 (D. Md., 9 Apr.), a bank which foreclosed on a contaminated property was held liable for the remediation cost of \$US460,000 because the previous owner was insolvent. In response to the concern among financiers, s. 101(20(A) of the CERCLA was amended to grant exemption to persons who take over ownership of the property primarily to protect a security interest, provided that they do not take part in the management of the business (ANZECC 1993). In *United States v Fleet Factors* 15 Env. Rep. 209994 (E.D. Pa., 1985) it was held that a lender could be liable if it participated "in the day to day management of the business or facility before or after the business ceases operation." The decision might lead to the abandonment of the site by the financier rather than taking possession or participate in the management of the mortgagor's business (Lee 1993 p.102).

2.7.4 Valuers

Like other professionals, a valuer owes his/her client a duty of care under contract and the law of tort. The law does not require a valuer to possess an extraordinary degree of skill or highest professional attainment, but he/she must have the competence and skill that is usual among valuers and he must exercise due care. A valuation report that does not adequately report the strength and weakness, including contamination, of the property is valid evidence that the valuer has breached the duty of care under contract as well as tort.

Apart from the client, a valuer also owes a third party a duty of care in the law of negligence where the relationship of the two parties are reasonably close and it is reasonably foreseeable that the third party will act on his/her advice and suffer loss. In *Yianni v Edwin Evans & Sons*

(1982) QB 438, the plaintiff applied for finance from a building society for the purchase of a dwelling house. The defendant valuer was instructed by the building society to prepare a valuation report. There was a warning on the loan application form that the applicant should obtain a separate valuation report. Being short of money the plaintiff did not obtain such a report. Based on the recommendation the loan was approved. Soon after moving in the house, the plaintiff discovered cracks in the house and a building surveyor was called in for investigation. It was found that the cracks were caused by subsidence that existed before the plaintiff bought the house. The plaintiff then sued the defendant valuer for negligence. It was held that the defendant owed the plaintiff a duty of care, as it was evident to the valuer that the plaintiff would rely on the valuation report. The defendant had to compensate the plaintiff for the loss suffered.

In addition to liability under common law, valuers should also note the Trade Practices Act 1974 (Cth) if they are incorporated. Section 74 of this Act provides an implied warranty that due care and skill will be used in providing service. Section 53A prohibits the making of false or misleading representation concerning the interest, price, location, characteristics, use, existence/availability of facilities associated with land. Although not specified by the Act, the word 'characteristics' no doubt includes land contamination.

A valuer is not an expert in land contamination matters. However he/she has to take great care during site inspection. In *Roberts v Hampson & Co.* [1988] 2 EGLR 181 the court imposed on valuers a duty to 'follow the trail' of a defect. If he/she fails to notice any obvious sign that suggests the need for further investigation of contamination, the valuation is bound to be incorrect and he/she is likely to be found negligent. Even if there is no obvious sign of contamination on the site, the valuer should check the history of the site from available sources such as the neighbours and council records. He/she should also check the contaminated site register, if available, and consult the EPA if any notice or order was issued against the site. Information regarding inspection of contaminated land is covered in Chapter 4.

Valuers should be aware that once convicted or held negligent, they will face a large amount of compensation pay out. In *Kenny & Good Pty Ltd v MIGICA (1992) Ltd* [1999] HCA 25, as the result of a negligent valuation, the valuers were held liable to the all consequential losses suffered by the plaintiff, including losses due to a subsequent fall in the property market. In addition to financial compensation to the claimant, a negligent valuer may also be subject to disciplinary actions from the valuers registration authority and the professional institution. In the most serious case, his/her name may be removed from the professional register.

2.8 How Land Contamination Laws Affect Contaminated Land Value

The above sections have outlined land contamination laws in Australia and some overseas countries. The laws prohibit land contamination acts and impose a statutory duty on the polluters or other responsible parties. Apart from the legal responsibilities and liabilities, the laws also have a significant impact on the value of contaminated land.

a) Remediation costs

If the environmental protection authority thinks necessary, the polluters are required to remediate the site to the satisfaction of the authority. If the polluter cannot be identified, the landowner, even though he may not be responsible for the land contamination, is liable to the site. As mentioned above, the financiers may also be held liable. Depending on the nature of contamination, the remediation cost may range from a small sum to an astronomical figure. In the USA the average cost of remediating a contaminated site is \$US25 million (NYSDEC 2000). The NSW EPA has estimated that depending on the level of contamination and the remediation method, the clean-up cost was between \$A50,000 to \$A1 million per hectare (Powell cited by Waste Management and Environment 1993). For small size petroleum retail

sites, the remediation costs are approximately \$A50,000 - \$A100,000. For bulk storage sites and larger industrial complex, the cost could be as high as \$A20 million (Smith 1996). In addition, there may be long term monitoring costs to pay. The necessary outgoings will eventually be off set from the land value. The land value is thus affected. If the land has not been cleaned up, the purchaser will certainly make a deduction from the purchasing price. As pointed out in Chapter 5, the remediation cost is one of the major considerations in the valuation of contaminated land.

b) Costs of environmental audits

An environmental audit report of a contaminated property is required in a number of circumstances. It is now a common practice that an environmental audit report is necessary for a loan application which uses a contaminated or potentially contaminated property for security. In the sale of a contaminated or potentially contaminated property, a potential purchaser will require the vendor to provide an environmental audit report for reference. An environmental audit report may also be required pursuant to a notice from the authority under the relevant environmental law.

As far as the cost is concerned, the instructing party may have to pay \$A3,500 to \$A25,000 for a Stage 1 investigation report, depending on the site characteristics (Ramsay 1998). In general, the expense could be from \$A30,000 to \$A70,000 for industrial properties and over \$A100,000 for commercial and retail properties for a full diligence process (MacKay 1998). More information in this aspect can be found in Chapter 4.

c) Costs of environmental impact assessment (EIA)

The value of a contaminated or potentially contaminated property is dependent on the permitted use on the land. Where there is material change of use of a parcel of contaminated or potentially contaminated land that requires an application for planning permission, the local council (the consent planning authority) will require the applicant to submit an environmental impact assessment (EIA) report and other related information for consideration. Apart from having to pay the environmental consultant for the preparation of the necessary document, it will take considerable time to prepare the document. There was a study in South Australia that the mean time is 34 weeks for preparing an EIA document and 21.5 weeks for preparing a supplement (Harvey 1994). No doubt time is of an essence in any investment. The lengthy time required for the preparation of an EIA document would surely have a substantial impact of the development/redevelopment project. In the extreme case, the proposal may have to be shelved resulting in a huge loss to the applicant. A detailed discussion of this issue is given in Chapter 3.

d) Blighting impact of contaminated land registers

Most land contamination laws provide for the establishment of a register. Once the land is registered, development on the site will be restricted or prohibited. As the register can be inspected by the public or interested parties, the status of the land is readily known and hence the marketability of the property is hampered. Accordingly the land value is adversely affected. Theoretically the existing use value may be retained, however, there is no guarantee this will happen. Depending on the nature of the contamination, activities on the land may have to cease and the occupiers may have to evacuate under occupational safety and health legislation or other health laws.

The blighting impact is a real fact. In the UK, there was an attempt under the Environmental Protection Act 1990 to register potentially contaminated land. There was strong opposition from landowners and financiers who were concerned about the imminent blighting impact on land values. The British government was forced to abandon the proposed registers in 1993 (Syms 1996c). In Queensland, the contaminated land register under the former

Contaminated Land Act 1991 (Qld) did not provide for separation of 'risk' and 'low risk' sites. The pressure from the stakeholders has forced the Queensland government to repeal the Act. Under the integrated Environmental Protection Act 1994(Qld), 'low risk' sites are now recorded on the Environmental Management Register and the 'risk' sites on the Contaminated Land Register.

e) Financial incentives

Contaminated land is a burden to the society. The Australian government has adopted a 'stick and carrot' approach to tackle the problems. The 'stick' approach is exercised through the enforcement of relevant environmental laws to prevent and control land contamination, and to require the responsible party to remediate the site. The 'carrot' approach is through the use of financial incentives to encourage voluntary prevention and remediation actions. In this regard, a number of costs incurred for conducting or financing relevant environmental activities is tax deductible under the Tax Assessment Act 1997 (C'th). In New South Wales, a grant is also available under the Environmental Trust Act 1998 (NSW) for the analysis, removal, storage, treatment or disposal of waste materials that has been placed or disposed of on premises unlawfully. The financial assistance will help reduce the remediation costs and lower/eliminate discount on the land value.

2.9 Conclusion

In the wake of increasing concern about land contamination problems, governments over the world are trying to contain the problems. It has been seen in Chapter 1 that the market mechanism is not effective in the control and prevention of land contamination. On the other hand, self-participation, self-regulation and financial incentives, etc. may help control and prevent the problems, but they lack the power of compulsion and determent. The vacuum is filled by enforcing relevant laws. In Australia this is achieved by the application of common law and statute.

At common law, land contamination is actionable under the torts of trespass, nuisance and negligence. Since the spirit of common law is to protect individual property rights rather than matters of public concern, only private environmental rights are enforceable. In general, a member of the public who is concerned about the contamination on private land cannot sue the wrongdoer unless his/her land or proprietary rights are affected. This is not an effective means to control or prevent land contamination.

Statute laws are laws passed by the parliament or legislative body. They can be designed to fix the deficiency of common law to protect the environment. In Australia, land contamination statutes are enacted by the state/territory governments. The federal government is not specifically empowered to make environmental laws. At present, there is no comprehensive national land contamination law. In recent years, the States and Territories have passed a number of new laws or amendments of existing laws to regulate land contamination.

In other countries, apart from the USA and Britain, countries like Canada, the Netherlands, Germany, and Denmark, etc. do not have specific legislation to deal with the problems. The power to control and prevent land contamination is found in a basket of different legislation. In comparison, Australia is not behind these countries in land contamination legislation. Nevertheless, these western countries have more experience in dealing with land contamination problems, Australia still has a lot to learn from them in the control and prevention of the problems, including the making of appropriate laws. The USA, being the forerunner in dealing with land contamination problems, will definitely have a strong influence on Australia's approach to deal with the issue.

Apart from imposing legal responsibilities and liabilities on the responsible parties, land contamination laws also have a significant impact on the value of contaminated or potentially contaminated land. Land value may be greatly reduced because of the costs and time required for obtaining various services to meet the legal requirements (see Section 2.8 above). As will be seen in Chapter 6, legal liability is a criterion for the determination of 'stigma'. This is a perception that the land is not cleaned up sufficiently such that there may future legal responsibilities and liabilities to the landowner. Nevertheless, land contamination laws are not all negative. There are tax incentives and grants under the relevant laws to encourage responsible parties to up keep and make good the contaminated property. The value of a contaminated or potentially contaminated property is highly dependent on the permitted use on the site. Accordingly the environmental planning law has an important role to play. This important topic is covered in Chapter 3. A valuer should thus have adequate consideration of the legal impacts when valuing a contaminated property. Finally, although it has nothing to do with contamination of contaminated property, it should also be noted that legislation alone is not a panacea to cure land contamination problems. The people (including firms) must be motivated to participate to achieve the goal. Adequate resources should therefore be set aside to educate the people to prevent land contamination.