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Global Approaches to Site Contamination Law

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For Joseph, Anna and Harry

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CRC CARE was established in 2005 under the Australian Government's Cooperative Research Centres (CRC) Program and links researchers with end users to innovatively and effectively tackle environmental issues affecting soil, water, and air quality.

Notable research outcomes achieved by CRC CARE include:

- *Engaging the Community*: *A Handbook for Professionals Managing Contaminated Land* (available at www.crccare.com);
- An award-winning novel invention in the form of MatCARETM, an adsorbent clay material which remediates soil affected by fire-fighting foam (MatCARETM was the recipient of the 2009 CRCA Star Award);
- The Contaminated Sites Law & Policy Directory (a resource providing vital information about the legal framework surrounding contaminated sites in international jurisdictions; available at www.cslawpolicy.com);
- A national workshop series and a training DVD based on the Australian health screening levels (available at www.crccare.com);
- The Australian Remediation Industry Cluster (an information and issue management service for the Australian remediation industry—free membership is available at www.remediationaustralasia.com);
- A suite of technical reports (available at www.crccare.com).

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Contents

Chapter 1
Introduction

1.1 Site Contamination Law in the Broader Context of Environmental Law

The term 'environmental law' is a recent one, even though traditional societies have always used customary law to ensure the protection of their surroundings and sources of survival (Weeramantry J, *Hungary v Slovakia* 1998). 'Environmental law' describes the body of legislation and common law that relates to all aspects of protecting the natural and human environment. It embraces a broad range of often interlinked issues, such as nature conservation, pollution prevention, urban planning and environmental management. It also cuts across several types of law, including civil, administrative and criminal law. For the purpose of this book, the term 'environmental law' will be used to refer mainly to law with environmental protection objectives.

In the developed world, some common law courts have dealt with pollution issues since the fourteenth century. At that time, as is still often the case, protection of public health—rather than the environment—tended to be the primary objective of pollution laws (Bates 2010: 5). In Britain, the earliest anti-pollution statutes dated back to the Middle Ages (Nuisances in Towns Act 1388, Bill of Sewers 1531), and several other, similar laws were passed between the late nineteenth and mid twentieth centuries (Public Health Act 1875, 1936; Rivers (Prevention of Pollution) Act 1876; Clean Air Act 1956: Bates 2010).

Town planning legislation was also first enacted by the British Parliament in 1909 (Housing and Town Planning Act), and subsequently revised several times over the twentieth century (Housing and Town Planning Act 1919; Town and Country Planning Act 1932, 1947, 1990). These efforts reflected an emerging trend among developed countries in the first two thirds of the twentieth century of enacting legislation to address specific public health problems, including those that were associated with air and water pollution, but which did not encompass a comprehensive approach to environmental protection (Lewis 1985; Bates 2010).

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The modern development of environmental law dates from the late 1960s and early 1970s (Bates 2010). At that time, governments of countries such as the United Kingdom, United States, Australia and several European countries (particularly Germany) began to respond to a growing community concern about environmental issues with more comprehensive, detailed legislation to address specific pollution issues (Waite 2005:35; Bates 2010:5). One example of early environmental protection legislation is the United States' National Environmental Policy Act 1969. The environmental statutes of that era generally sought to preserve the 'capital' of natural resources, to ensure a continued income for sectors of the population. However, they still had separate approaches for distinct issues; the recognition and integration of linkages between them came later, in the 1990s.

Robinson (2003: 28–29) identifies five phases in the development of environmental law: (1) the application of traditional rules (e.g. tort law) to decide environmental matters; (2) as natural resource depletion becomes extreme, the adoption of conservation laws to restore or secure their sustainable use; (3) as agricultural, chemical and industrial pollution become acute, the enactment of environmental laws to abate pollution; (4) as this body of statutes grows, attempts are made to streamline the increasingly complex field of environmental law; and, finally, (5) efforts to incorporate basic principles of environmental justice into constitutions.

It was not until the late 1970s that awareness first emerged among developed countries of a more specific environmental issue requiring regulation: the presence of potentially toxic pollutants in soil, surface water and groundwater. When the problem was first noticed, the primary concern once again was public health, such as access to safe drinking water in communities that were heavily dependent on groundwater sources. However, several major incidents of large-scale contamination in a handful of countries soon raised further concerns about the broader, longer-term impacts of such pollution.

In the United States, contamination from a chemical waste dumping site in Love Canal, New York, was discovered in a nearby residential area in 1977 (Collin 2006: 75). The Love Canal incident is widely credited as being the catalyst for federal legislation on liability for cleanup of toxic sites, the Comprehensive Environmental Response, Compensation and Liability Act, which was promptly passed in 1980 (Switzer and Bulan 2002: 3; Fletcher 2003: 35).

In the Netherlands, heavy soil contamination was identified at a new housing estate at Lekkerkerk in 1980 (de Roo 2003: 168–169). This led to the introduction of the Soil Clean-up (Interim) Act and non-statutory Soil Clean-up Guideline in 1983. The Guideline subsequently became the predominant soil remediation standard in other parts of Europe (Christie and Teeuw 1998: 182).

In Austria, the discovery of contamination at the former Fischer landfill site in the 1980s led to the Federal Act on the Cleanup of Contaminated Sites being passed in 1989 (Huber 2007: 4; Schamann 1997: 4). Again, this pre-dated legislation on site contamination in most other European countries by several years, although legislation dealing with some types of contaminated sites had been enacted in Denmark as early as 1974 (Environmental Protection Act 1974).

Large-scale, man-made site contamination 'has its roots in the industrial revolution' (Christie and Teeuw 1998: 175), although in some places small amounts of site contamination can be traced back even to Roman times (CLAIRE 2010). In addition, site contamination can be attributed to natural causes in many countries, such as the wide-scale contamination of groundwater by naturally-occurring arsenic in South and East Asia (World Bank 2005).

Site contamination can be found in both rural and urban areas, although it tends to be concentrated in the latter due to the intensity and duration of industrial activities in cities. While the problem was recognised over 30 years ago by some developed countries and by environmentalists within some Communist countries, its extent only became apparent to the broader public in the 1990s (Boyd 1999: 9). In much of the developing world, public awareness of site contamination has emerged only very recently.

The issue of site contamination has now progressed through at least two 'generations' of law in most developed countries. Lin Heng and Manguiat (2003: 2) discuss the 'first generation' and 'second generation' of environmental laws generally, in the context of the Asia Pacific region. It is important to note that the terms 'first' and 'second generation' laws can have different meanings in countries at different stages of development.

The 'first generation' of site contamination law is typified by a 'command and control' approach, which primarily deals with issues of remediation and liability (see Fowler 2007: 4–5). Relevant legislation commonly addresses matters such as the investigation and identification of contaminated sites, potentially responsible parties, development of remediation plans, the imposition of specific types of liability, and cost recovery (Lucas et al. 2003: 302). Some developing countries are still going through the 'first generation' of laws in dealing with their more recently discovered site contamination problems.

The 'second generation' of site contamination law is characterised by measures to address 'brownfields' and encourage voluntary remediation (Fowler 2007: 4–5; Lucas et al. 2003: 302; Lin Heng and Manguiat 2003: 7). These measures range from tax incentives, liability relief, and transfer of liability, to loans, grants and a variety of other financial tools. It is important to note that the term 'brownfields' generally relates to any land that has been previously developed, and that contamination may not necessarily be present on such sites. The term should be distinguished from 'greenfields', meaning land which has not already been developed.

In some highly urbanised Western countries, such as the United Kingdom and the Netherlands, land scarcity is a pressing issue and there is a resulting need to utilise brownfields for housing, recreational commercial and other forms of land-use. Although land owners or developers generally prefer to use greenfields, to avoid costly remediation and the prospect of future liability, such countries have restricted their use and employ the incentives referred to above to promote brownfield 'revitalisation' wherever possible.

1.2 Terminology of Site Contamination

In this book, the term 'site contamination' will be used. The term is not widely or consistently used in regulatory schemes around the world, but its use is preferred here because it most accurately captures the subject of the book. Many other terms or words are used, often interchangeably, to describe aspects of the 'site contamination' issue. There are essentially two sets of alternative definitions that can be used to describe the issue, and these are outlined below.

1.2.1 'Site' Versus 'Land, Soil and/or Water'

A 'site' is commonly understood as 'a space occupied or to be occupied by a building; a situation; the place or scene of something' (Webster's English Dictionary 2009). The word 'site' generally refers to an identifiable, geographically delineated area (Landcare Research 2007) rather than a specific element, such as soil or water. It is taken to include all natural and man-made elements contained within a proprietary boundary and therefore includes groundwater that is found below the surface of the relevant land.

In the context of contamination, the word 'site' can refer more specifically to a 'parcel of land' (see the National Environment Protection (Assessment of Site Contamination) Measure (Australia) 1999: 2), and it generally does not include areas that are underwater (such as the seabed) unless contamination can be traced to a particular location which is adjacent to the affected body of water. Use of the word 'site' allows for a degree of specificity without limiting the range of sub-issues to be addressed. Management of sites affected by contamination requires a holistic approach, which deals with all physical (and legal) aspects of the relevant area, in particular the contamination of both soil and any underlying groundwater.

'Soil' is commonly understood as comprising the layer of materials between the bedrock and the topsoil, inclusive of the latter. More specifically, it can be defined as 'the natural dynamic system of unconsolidated mineral and organic material at the earth's surface', which is made up of organic matter, clay, silt, sand and gravel 'mixed in such a way as to provide the natural medium for the growth of land plants' (Houghton and Charman 1986: 115).

Terminology that refers to soil impliedly excludes other physical attributes that are present at a particular site, such as surface water, groundwater, plants and manmade materials like concrete. Contamination often affects not only the soil surface, but the 'unsaturated zone' (the layer between the land surface and the water table, consisting of porous materials) and the 'saturated zone' (including the water table and any areas beneath it that also contain water) as well.

In everyday language, the concept of 'land' is much broader than 'soil' because it is generally understood to include geological, territorial and spatial dimensions, as well as some bodies of water (European Commission 2002). However, when used in the context of contamination, the word 'land' is more imprecise than 'site' because it does not specify geographical or proprietary boundaries. The term 'site' is sufficiently broad to include both natural and manmade materials and substances within a defined area, to extend to unsaturated and saturated zones, and to include some bodies of water. Despite some limitations, the word 'site' is preferred here for these reasons.

1.2.2 'Contamination' Versus 'Pollution'

The word 'contamination' has been used to describe many different types of damage from diverse sources. The Australian National Environment Protection (Assessment of Site Contamination) Measure (1999: 2) defines 'contamination' as

> the condition of land or water where any chemical substance or waste has been added at above background level and represents, or potentially represents, an adverse health or environmental impact.

However, in Europe, there is often a compartmentalised view of contamination. For example, groundwater contamination is covered by the European Groundwater Directive (2006), and soil contamination is targeted by the draft European Framework Directive on Soil Protection (2006).

The word 'contamination' also encompasses situations where natural contamination is present, i.e. where human action has not been a contributing factor (Hassan 2006: 12; Shoebridge 1993: 153). The verb 'to contaminate' is commonly defined as 'to render impure; to pollute' (Webster's English Dictionary 2009). This implies that the relevant substance is poisonous, harmful or polluting *to* something or someone.

In some jurisdictions, such as the United Kingdom, the presence of a 'receptor' or 'target' (DEFRA 2008: 4), and a pathway linking the source of the substance to the receptor, are needed for the substance to be characterised as a 'contaminant' in the context of contaminated land. The fact or likelihood of the relevant substance causing 'significant harm' to the receptor is a prerequisite to a finding that 'contamination' exists (except in the case of 'controlled waters', where only the fact or likelihood of pollution is required) (Part 2A, UK Environmental Protection Act 1990). The vulnerability of the receptor—whether it is the local community or the surrounding environment—can therefore determine the degree of contamination.

The Environmental Protection Act 1990 (UK) defines 'harm' as 'harm to the health of living organisms or other interference with the ecological systems of which they form part, and in the case of man, includes harm to his property' (sect. 78A(4), Part 2A). The definition of 'significant harm' is provided in statutory guidance (DEFRA 2008). In everyday language, the concept of 'harm' is taken to include basic notions of damage, injury, or detrimental effects. However, it can be more difficult to define 'harm' in the context of contamination, because a very minor change in the environment—such as discharge of warm water into a stream, or the muddying of waters—may also be considered 'harm'.

The UK Royal Commission on Environmental Pollution (1972) defines the word 'pollution' as

> The introduction by man into the environment of substances or energy liable to cause hazards to human health, harm to living resources and ecological systems, damage to structure or amenity or interference with the legitimate uses of the environment.

In Australia, the key element in the statutory definition of pollution is that it encompasses anything that may cause a detrimental change in the quality of the surrounding environment, affect the safety or health of humans, or harm wildlife (Bates 2010: 537). Statutes often define 'pollution' so broadly that even the most minor and temporary alterations to the environment could conceivably be captured by the term. However, in practice, courts and regulatory authorities tend to apply a 'common sense' approach to the definition, directing resources to significant rather than trivial sources of harm (Bates 2010: 537).

When drawing comparisons between the various terms used, it is important to note that the types of environmental regulation used to address particular problems also differ. Regulatory regimes for site contamination or contaminated land are generally reactive, targeting damage caused in the past ('historical' contamination). By contrast, the regulation of 'pollution' tends to be proactive, aimed at the management of ongoing or future harmful activities. Pollution or waste regulations may allow certain activities to continue under a 'licence' or 'permit' system if adequate safety measures and reporting requirements are in place. This type of regulation is not relevant to past contamination, although it may have some limited application to future contamination where it occurs despite existing legislation.

The term 'site contamination' is preferred for the purposes of this book primarily because it is non-specific in relation to soil, land or water, and embraces all physical features within a delineated boundary. For the purposes of the book, the term 'site contamination' will encompass the contamination of soil and groundwater, but not air. Clearly, contamination of the air can be caused in equal measure to soil and groundwater contamination at many sites, but once polluted air migrates off-site, it can no longer be managed through a site-based approach. It is acknowledged that this can also be a characteristic of water contamination, in that contaminants may be borne off-site by a surface watercourse or underground water system. However, instances where contaminants conveyed by these means can be traced to a particular land-based source would generally be captured by the term 'site contamination'.

Site remediation involving groundwater contamination often necessitates treatment of a 'plume' of contamination that has moved beyond the surface boundaries of the land that has been contaminated (*Cambridge Water Co. v Eastern Counties Leather* 1994; Wilkinson 1994). With regard to air pollution, most regulatory regimes deal with the issue separately from soil and groundwater contamination, and that distinction will be maintained to facilitate a more focused discussion of the site contamination issue in the present context.

Contamination generally falls into one of two categories: local (or ‘point source’) and diffuse contamination. Local contamination originates from clearly confined sources and is most often associated with mining activities, industrial facilities, waste landfills and other facilities, both in operation and after closure (European Commission 2003: 3). Diffuse contamination is the result of a contaminant being deposited over a wide area, with common contributors being industry, transport, households and agriculture. As mentioned above, the concept of site contamination generally refers almost exclusively to point-source contamination, because both terms connote impacts on a particular, confined area. For this reason, diffuse contamination will not be discussed further here.

The next chapter (Chap. 2) presents an overview of the site contamination phenomenon around the world, describing its common sources, features and impacts. Chapter 2 also examines the distribution and extent of site contamination around the world, as well as the range of technical approaches to site remediation.

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Chapter 2
The Nature and Extent of Site Contamination

2.1 Introduction

During the 1970s and 1980s, a number of serious site contamination cases brought the issue to the attention of the public and lawmakers in a handful of countries, such as the United States, Japan and the Netherlands (see, e.g., Okubo and Yagi 1998). Interim regulations were promptly enacted in response to these politically sensitive incidents, followed a few years later by more detailed legislation on site contamination and liability for remediation. The international reporting of such high profile incidents, and an increase in general public concern about site contamination on the domestic scene, motivated other countries to introduce legislation of their own.

Developed countries have begun collating and analysing national data on site contamination, with some also compiling publicly accessible site registers. Whilst site contamination was at first perceived in terms of relatively rare incidents (Nathanail and Bardos 2004:1), it is now recognised as a problem capable of affecting large sections of the population in a range of different ways. A wealth of practical experience is being gained and exchanged in all aspects of site management around the developed world, and scientific research is contributing to a far greater understanding of the issue.

By contrast, there is little or no understanding of the issue in many developing countries (Fowler 2007: 3; United States International Trade Commission 2004: 2–6). This generally reflects a domestic situation where the issues of poverty and poor health understandably take priority over less visible and direct problems, such as environmental harm. The subordination of environmental concerns to economic and health priorities was evident in economies in transition in the late 1990s (Boyd 1999: 3–5). However, an effort began in 2009 to compile a global inventory of contaminated sites, with an emphasis on developing countries (Blacksmith Institute 2012a), to help overcome the lack of public awareness of the issue.

There are also other possible explanations for the failure to address site contamination in some countries: a lack of recognition of soil as a vital natural element and resource for human survival and development (European Environment Agency

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2007a: 115); the fact that site contamination often occurs on privately owned land, out of the public eye and beyond the reach of regulations; the absence of reliable, detailed information on the scale and severity of potentially contaminated sites; the lack of scientific knowledge regarding the processes and effects of site contamination; and the complex nature and political sensitivity of the issue (Boyd 1999).

Even where a major incident of site contamination affects public health on a large scale in a developing country, the need for national regulation of the issue may not be recognised. It may be perceived as a 'one-off' or local problem rather than one which could be repeated in other locations around the country. While some developing countries are now becoming aware of wide-scale contamination within their borders, they are struggling to formulate an effective response to it.

Developing countries could potentially be assisted in their efforts to address contaminated sites by the broad experience of developed countries, in particular through technology transfer and the availability of a model framework for managing site contamination. Such a model framework should distil all the lessons learned by developed countries over the past 30 years and comprise the key elements for effective site contamination management.

In whatever form it takes, an international instrument on site contamination is needed in the near future because it is clear that this complex issue is not being addressed comprehensively or at all in some countries. Developing countries in particular remain ill-equipped to deal with the challenges of responding to site contamination as it emerges as a significant threat to human and environmental health.

An awareness of site contamination as a valid and important environmental issue is lacking at the highest domestic and international levels, resulting in an absence of political pressure to act. An international instrument would help to raise awareness of site contamination and provide a fundamental framework for individual countries to take regulatory action. The justifications for an international instrument on site contamination are explored in more detail in Chap. 7 below.

2.2 Sources and Effects of Site Contamination

2.2.1 Common Types of Contaminating Activities

The types of activities which commonly cause site contamination vary between countries, primarily depending on the industries and contamination levels permitted in each country. However, in most developed countries the main cause of site contamination is industrial activities. In North America, such activities include the operation of factories, mines, smelters, electrical power plants and other production facilities, and harbours. Other common sources of contamination are above-ground and underground fuel storage tanks, fuel pipelines, dry-cleaning facilities, military bases, airports, laboratories, landfills, municipal and medical waste incineration plants, and use of contaminated soil for residential development.

Industrial causes of site contamination also predominate in Australia and New Zealand, with additional causes (both past and present) including cattle and sheep dipping, manufacture and use of fertilisers and pesticides, and timber treatment (Rae 2006; New Zealand Ministry of Environment 2007). As for other developed countries, the main sources of contamination in Japan and Korea are the chemical and electroplating industries, together with mines, refineries, and agricultural fertilisers (United Nations Environment Programme 2002).

In the more industrialised countries of the Caucasus and Central Asia, large-scale contamination has been caused through a combination of agricultural practices, mining (uranium and metal ore), oil and gas extraction, nuclear power generation and waste disposal (European Environment Agency 2007a: 118). In many of these industries and sectors, accidents and poor management have compounded the problem.

Europe reflects a similar trend to North America and Australasia, with typical contaminating activities including industrial production and commercial services (chemicals and heavy metals), town gas manufacturing, oil processing, municipal waste treatment and disposal, industrial waste treatment and disposal, power plants, storage, transport spills on land, mining (such as disposal of tailings, acid mine drainage and use of catalytic reagents) and military sites (ammunition, fuel and chemical usage and storage) (European Environment Agency 2007a, b). In Eastern Europe, major sources of site contamination have been military installations, nuclear reactors and storage of hazardous chemicals, resulting in a legacy of contamination which will take decades or longer to remediate, at great cost to taxpayers (United States International Trade Commission 2004: 2–11).

The predominant sources of contamination in developing countries are also industrial activities, particularly in the form of untreated industrial or chemical waste disposal. Groundwater contamination is particularly widespread in developing countries (Kao 2004). The United Nations Environment Programme (UNEP) identifies discharges of untreated urban and industrial effluents, chemical leaks from storage facilities, and solid waste disposal as among the most serious problems (UNEP/ADEME 2005: 3). However, some of the other activities commonly causing site contamination are similar to those in developed countries: mines and smelters, tanneries, battery processors, chemical manufacturers and other industries (Blacksmith Institute 2007).

On the African continent, contaminating activities include mining operations, pesticide and fertiliser use, oil exploration and transport, waste disposal and untreated sewage discharges (Coles 2008). Waste disposal and wastewater discharges are also common causes of contamination throughout South and South-east Asia, where lead contamination presents particular problems (UNEP 2002). Groundwater contamination may be caused by accidental spills from surface waste ponds, underground and aboveground storage tanks, pipelines, landfills, injection wells, septic tanks, radioactive waste disposal sites, land application of wastes and pesticides, saltwater intrusion, and acid-mine drainage (Kao 2004: 66).

In Latin America, industrialisation of some regions after World War II led to the intensive mining and processing of raw products such as crude oil and wood, together with the growth of the metal-working and chemical industries in the 1960s and 1970s (Marker et al. 2007: 2). Rapid urban expansion in the large cities of the region also resulted in many waste disposal problems, and an increasing reliance on landfills. These activities have resulted in significant contamination in Latin American countries, particularly in the major metropolitan areas of São Paulo, Rio de Janiero and Buenos Aires (Marker et al. 2007).

Even in Antarctica and the Arctic, site contamination presents a problem. Petroleum and diesel spills are the leading sources of contamination in polar regions, with the already harmful effects exacerbated by the extremely cold conditions (Snape et al. 2008: 1). Land-based crude oil spills in the Arctic are generally attributable to broken pipelines, and shoreline spills are caused by tankers. Snape et al. (2008: 3) note that spills are usually caused 'by infrastructure failure, human error during fuel transfer, "third party actions" (e.g. sabotage), or natural hazards.' Remediation can also be a lengthier and more challenging process in cold regions, due to rapid migration of contaminants off-site, slow natural attenuation rates and the prohibitive costs of excavation and removal (Snape et al. 2008: 1–2).

Naturally occurring site contamination is an additional issue in some countries, and has a particularly deep impact on developing countries because of their reliance on untreated groundwater for consumption, irrigation and other uses. Since the 1980s, naturally occurring arsenic has been found in Bangladesh, India, Cambodia, China, Mongolia, Taiwan, Laos, Burma, Nepal, Pakistan and Vietnam (World Bank 2005; Singh 2004). Some 60 million people live in the affected areas. According to the World Bank (2005), much research has been carried out into the causes and effects of natural arsenic contamination and possible mitigation measures, but significant uncertainties remain, so the issue will continue to present a challenge.

Naturally occurring contamination can also present potential health problems in some developed countries. For example, in California, natural deposits of selenium pose a high risk to the health of humans and animals (e.g., Orange County Nitrogen and Selenium Management Program). Selenium in small amounts is necessary to sustain life, but it can be toxic at high levels, and it is bio-accumulative. Groundwater containing selenium can be discharged into surface water when it is disturbed by activities such as urban development, thus causing further contamination and affecting humans and animals more directly.

2.2.2 Common Contaminants

Contaminants may be either organic or inorganic elements or compounds. Organic compounds are derived from plant or animal sources and contain carbon. As contaminants, they include pesticides and herbicides (such as dioxins, polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs)) and volatile organic compounds, such as benzene. Inorganic contaminants are of mineral origin and include, among others, lead, mercury, chromium, cadmium, arsenic, copper, nitrates, cyanide, asbestos and sulphuric acid.

Given the similarity between contaminating industrial activities in developed countries, it follows that they also have the most prevalent contaminants in common. In Europe, the main contaminants are heavy metals (37%) and mineral oil (33%), together with polycyclic aromatic hydrocarbons, aromatic hydrocarbons, phenols, chlorinated hydrocarbons and cyanides (European Environment Agency 2007a, b). Common contaminants in the United States and Canada include dioxins, furans, lead, mercury, asbestos, arsenic, PCBs, benzene, cadmium, PAHs and benzene by-products. Similarly, in Australasia, common contaminants include hydrocarbons (from petroleum storage), hexavalent chromium, lead, arsenic, trichloroethylene, tetrachloroethylene, dioxin concentrates and cadmium (from fertilisers) (UNEP 2002).

The Blacksmith Institute has compiled a list of contaminants that are typically found in developing countries, which includes mercury, arsenic, chromium, lead, cadmium, cyanide, PCBs, pesticides, persistent organic pollutants, coal, volatile organic compounds, asbestos, dioxins, PAHs, petrochemicals, fluorides, abandoned chemical weapons and radionuclides (Ericson 2011: 24).

Early results of the Blacksmith Institute's Toxic Sites Identification Program indicate that some contaminants are particularly prevalent in certain areas: for example, cadmium (India and Asia), pesticides (India, Central and South America) chromium (Eastern Africa, India, China and South America), arsenic (South America, India and China) and radionuclides (Asia and the Caucasus). Lead is considered a global threat (Ericson 2011: 29).

2.2.3 Effects of Contamination

The physical effects of contamination are diverse, and can be both direct and indirect. As Layard (2006: 133–134, citing McEldowney and McEldowney 1996: 170–171) observes,

> contaminated land can [. . .] prevent or inhibit the growth of plants and have toxic effects on invertebrates and vertebrates, it can contaminate water, enter the food chain, be ingested, inhaled or make skin contact, it can cause the chemical degradation of building materials or cause fire or explosion.

The release of contaminants into the soil may also result in damage to, or loss of soil functions, which are essential to sustaining life. Indirect contamination occurs when the contaminant is transferred to its final destination via the environment or an organism.

Concern regarding the health effects of contaminants on humans, in particular, is usually the factor generating wider awareness of, and motivating political responses to, the site contamination issue (Blacksmith Institute 2007: 2). Health effects can be long-lasting, and depending on the nature of the contaminant, the vulnerability of the individual affected, and the level of exposure, may include an increased risk of cancer, respiratory illness (possibly including asthma), disease, reproductive problems, impairment of neurological functions and hormone disruption (European Environment Agency 2007b: 68–71). In addition, an individual's exposure to a contaminant may have delayed effects, by either remaining dormant in that individual until some later date, or being passed down to the next generation, where it then manifests itself in an illness (European Environment Agency 2007b: 70).

There are also serious socio-economic impacts of site contamination. The confirmed or suspected existence of contamination on a site can result in high investigation and remediation costs (Ericson 2011: 38). It can also affect property value and marketability, as prospective purchasers or developers may not want to take on the financial and legal burden of remediation. This is particularly so where there is uncertainty as to the degree of contamination, the level of cleanup required or the allocation of responsibility for such cleanup.

In addition, property stigma (or 'blight') can occur where a contaminated site has already been remediated, but its previously contaminated status causes the market value of the property to remain depressed (Wolf and Stanley 2003: 308). Property blight was a major concern when a national register of potentially contaminated land was proposed in the United Kingdom, such that the relevant provision (sect. 143) in the Environmental Protection Act 1990 was promptly withdrawn before it entered into force.

The stigma of a contaminated site, particularly in urban areas, may also affect the morale of the people living and working nearby. The presence of a suspected or known contaminated site can undermine the confidence of local residents and businesses, resulting in avoidance of the area and increased use of cars for commuting (Royal Commission on Environmental Pollution 2004: 1). Investment in the area may be discouraged, leading to further abandonment and dereliction. Meanwhile, vandalism, graffiti and other antisocial behaviour may increase on or near the relevant site because of a perception that it is useless and worthless. In rural areas, the identification of a contaminated site in or near a village can even result in the entire village being stigmatised and parts of it subsequently abandoned (Barnes et al. 2005: 277).

The consequences of site contamination can extend well into the future where the contaminants involved are particularly long-lasting, the chosen remediation method is not completely effective, or where liability for remediation is disputed and the relevant public authorities have insufficient funding to carry it out themselves. 'Orphan' sites—those which have been abandoned by owners or operators, and for which no party can be made liable for remediation—continue to pose a problem for governments in many countries, even decades after their closure. Although new environmental protection laws in some countries may eradicate the problem of prospective orphan sites, historical orphan sites must still be addressed using other methods.

2.3 Extent of Site Contamination

2.3.1 Geographical Locations and Trends

As a general rule, site contamination occurs as a result of industrialisation processes, which means that it is a problem mainly experienced in developed countries, or those countries currently undergoing economic transition or rapid urbanisation. In Europe, the largest and most affected areas are the heavily industrialised regions of north-western Europe (European Commission 2002). However, as mentioned above, the former Communist countries of Eastern Europe have extensive site contamination problems caused by decades of intensive industrial activity (United States Environmental Protection Agency 2008a), military operations, uranium mining and mismanagement of nuclear reactors (Blacksmith Institute 2009a, b).

North America has extensive historical site contamination problems, particularly in its urban centres. Likewise, serious site contamination problems are characteristic of the populous areas of Australia and New Zealand (UNEP 2002: ch 2). Site contamination is now emerging as an issue for countries in Eastern Europe, the New Independent States of the former USSR, Central and South America, Africa and Asia. The Blacksmith Institute (Ericson 2011: 23, 41) estimates that up to 100 million people may be affected globally by point-source contaminated sites that involve industrial chemicals or other similarly harmful contaminants.

As the 2007 Bellagio Principles note (Blacksmith Institute 2007), with particular emphasis on developing countries,

> efforts continue [in] every country to rein in ongoing sources of toxic discharges. However, some of the most significant sources of pollution are legacy or “orphan” sites. [. . .] Often, legacy pollution is intermingled with toxins from active polluters, and both must be addressed together.

Despite the clear correlation with industrialisation and urbanisation, contaminated land can also be found in rural areas, particularly where fertilisers have been applied to the soil for agricultural purposes, contaminated water has been used for irrigation of crops (e.g., China: see Xu 2007), or chemicals have been used to treat farm animals (e.g., Australia and New Zealand: see Craig 2003: 109). Contaminated sites in rural areas—especially in developed countries, but increasingly also in developing countries—typically result from mining operations, timber processing facilities, railways, petrol stations, septic tanks, landfills and farming. Generally, these contaminating activities receive less public attention because of their location and subsequent lack of visibility. In addition, a smaller population may be affected by the contamination in rural areas, and there are not the same pressures as are felt in urban areas to remediate and redevelop contaminated sites.

2.3.2 Number of Contaminated Sites and Proportion of Land Mass Affected

The total number of contaminated sites that have been identified and require remediation worldwide has been estimated to be in the hundreds of thousands (e.g., Industry Canada 2005: 1). However, this is likely a conservative estimate, because the individual figures given for each country are also in the high hundreds of thousands. A handful of studies and surveys have been undertaken into the global market for remediation services over the past decade. One survey by Industry Canada (2005: 4) estimates the annual global remediation market to be worth between US$12 billion and US$35 billion. However, as the survey notes, it is difficult to accurately quantify both the actual number of contaminated sites and the value of their remediation, because many countries have not completed the identification and assessment of sites (Industry Canada 2005: 4).

A UNEP-funded project, GLASOD, produced a world map in 1990 showing the global extent of several different types of human-induced soil degradation, of which pollution was one. Almost 20 years later, the Blacksmith Institute announced that it would develop a inventory of 'polluted places' around the world, called the 'Global Inventory Project' (Blacksmith Institute 2009a, b). The Project is supported by other international actors, including the European Commission and the World Bank.

The Global Inventory Project has since been renamed the 'Toxic Sites Identification Program' (TSI Program), and represents an international effort to "identify and assess contaminated sites with an impact on human health in low and medium income countries" (Ericson 2011: 19). Countries with no or minimal industrial activity, those subject to civil conflict, and those with oppressive or uncooperative political regimes were excluded from the TSI Program. While it is not intended to provide a comprehensive inventory of all contaminated sites, the aim of the TSI Program is to promote an understanding of the global scale of the contamination problem (Blacksmith Institute 2012b).

The Blacksmith Institute originally estimated that around 500 sites would be identified and assessed over the duration of the TSI Program (Blacksmith Institute 2009b). However, more than 2,095 sites have now been identified, and more than 1,500 of these have also been assessed (Ericson et al. 2012; Ericson 2011: 28). Although 80 countries were prioritised on a 'final list' for inventory purposes, a lack of funding has meant that work is only being carried out in just over half of those (Ericson 2011: 22). Following the compilation of a national site inventory for each country, the TSI Program encourages the relevant government to prioritise sites and commit funding for intervention purposes (Blacksmith Institute 2012b).

Many countries have not yet carried out a comprehensive and systematic national survey, so it is difficult to assess the proportion of the global land mass that is likely to be currently affected. As Layard (2006: 136) points out in the context of Europe, there are several problems in estimating the number of potentially and actually contaminated sites. First, even though much data exists at the local level, little of it is of direct use and there are data gaps at the regional level. Second, monitoring and data collection procedures at the national and regional levels are not harmonised, so they remain inconsistent. Third, data flows between data collectors and the organisations responsible for reporting have not been established at the national and regional levels (European Environment Agency 2000: 26, cited in Layard 2006: 136).

These factors are also relevant to other developed regions of the world, particularly in countries with federal systems, where individual states or provinces may have developed their own methods of identifying contaminated sites and there is minimal coordination of data at the national or federal level (e.g., Australia, Canada, the United States and Germany). Although most developed countries now collate such information at the national or federal level, it will take time for data collection methods at the local, state/provincial and/or regional levels to be harmonised. Therefore, inconsistencies are likely to persist for some time.

However, despite the gaps in data and the inconsistent methods used to collect information on site contamination around the world, it is possible to gain some idea of the estimated scale of site contamination. In general, it is not difficult to find information relating to countries which already have a long history of industrialisation, or highly urbanised countries. It is much more challenging to form a picture of the extent of site contamination in less developed, or developing, countries. In many cases, this information may not exist, be unavailable to the public, or require translation, a task which is beyond the scope of this book.

In Europe, there are estimated to be around three million potentially contaminated sites, of which about 250,000 are thought to be actually contaminated and in need of remediation (European Environment Agency 2010: 21). According to the European Environment Agency (2007b: 117), estimates of potentially contaminated sites in the European Union have increased significantly in recent years due to the progress made in conducting site investigations, monitoring and collecting data. Further increases in these estimates are expected in coming years as more information becomes available.

In the United States, around 1,300 sites are currently on the 'National Priorities List' for remediation under the federal Comprehensive Environmental Response, Compensation and Liability Act 1980 (also known as 'Superfund') and about 3,750 additional sites are in need of corrective action under the federal Resource Conservation and Recovery Act 1976 (United States Environmental Protection Agency 2012a, b). However, many other contaminated sites are also being addressed at the State level: an example is the remediation of over 11,000 underground petroleum storage tank sites in the 2011 fiscal year alone (United States Environmental Protection Agency 2011a).

Approximately 30,000 contaminated sites have been identified in Canada, of which about 21,000 are, or were previously, owned or operated by the federal government (Government of Canada 2012a, b). British Columbia alone has an estimated 9,000 potentially contaminated sites (British Columbia Ministry of Environment 2009: 1). Estimates of potentially contaminated sites in Australia range from 60,000 to 200,000, with no reliable source of national data available (Deegan and Ji 2008: 284, cited in Fowler and Cole 2010: 1). New Zealand has so far identified 559 'high-risk' sites for remediation, but there are likely to be many more contaminated sites, such as former sheep dip facilities, requiring some kind of remedial action (Ministry for the Environment (New Zealand) 2007: 247–248).

In Eastern Europe and the New Independent States of the former USSR, some data exists on the extent of site contamination, although it is now dated (e.g., Andersen 2000). In most South-Eastern European, Caucasus and Central Asian countries, the actual extent of contamination remains unknown, because inventories have only been made for specific sites—such as mining or landfill sites—or regions, or do not exist at all (European Environment Agency 2007b: 118).

Some efforts are now being made to quantify total site contamination in individual countries of the South and East Asian region, but they tend to be 'ballpark figures' rather than based on systematic inventories (European Environment Agency 2007b: 118). In China, an estimated 10% of the total arable land is affected by soil or water contamination, with contamination concentrated in the urbanised areas of the country (Xu 2007). The area of potentially contaminated land in Japan is believed to exceed 113,000 ha (Government of Japan 2007: 13–14). However, this figure relates only to privately-owned land, and contaminated land which is subject to public use may increase the estimate significantly.

In Latin America, individual countries are beginning to undertake inventories of potentially contaminated sites. Brazil, Chile and Mexico are in the process of establishing, or have already established, national inventories (Kadas et al. 2008: 1). However, little information is available as to preliminary estimates of site numbers or the proportion of land affected. There are thought to be approximately 50,000 ton of chemical waste requiring remediation throughout Latin America generally, although the number of sites over which the waste is distributed is not given (Hopkins 2005).

Estimates for particularly industrialised cities or regions are quite easy to obtain: for example, the state of São Paulo in Brazil had at least 700 contaminated sites in 2002 (Business News Americas 2003). Mexico, which has done considerably more than its southern neighbours to address site contamination, has identified 300 contaminated sites requiring remediation, which comprise a total area of 200,000 ha (Commission for Environmental Cooperation 2008: 46).

There is currently a lack of information on the extent of site contamination in Africa, even though the common types of contaminating activities are known (Coles 2008). One source estimates that at least 27 million kilograms of obsolete pesticides are causing significant soil contamination across the African continent (Food and Agriculture Organization of the United Nations 2012). This presumably does not include sites affected by other common sources of contamination in developing countries, such as mining operations, oil production and waste disposal. The extent of land affected in African countries may therefore be much higher than might otherwise be expected of less industrialised, urbanised countries.

2.4 Remediation of Site Contamination—Common Approaches

Remediation of a contaminated site essentially involves the removal of the risk of contaminants at a particular site from causing harm to humans or the environment. It does not necessarily involve removing the contaminants themselves, although that was a common practice from the 1970s to the 1990s and is still done today. The aim of remediation is usually to restore the relevant site to a standard at which the current or proposed site use may proceed with minimal risk to humans and the environment.

Generally, options for site remediation include the excavation and removal of contaminated materials for off-site landfill or treatment; treating the contaminated material on-site to remove or neutralise the contaminants; and securing or containing the contaminants to prevent further migration (Nathanail and Bardos 2004: 125; Langworthy 2007). If a variety of contaminants are present at a site, it may be necessary to use a combination of two or more remediation methods.

Until recently, the excavation and removal (or 'dig and dump') approach was favoured in the majority of remediation decisions in developed countries, and it continues to be widely used (Randall 2007: 61–62). In some countries (e.g., the Netherlands), this was because sites had to be restored to a high standard so as to be suitable for any use. Remediation to a high standard is no longer required in most cases, with the lower standard of 'fitness for current or proposed use' being applied in many developed countries (Preston 2008: 167; Luo et al. 2009: 1131).

In cases where time is not a critical factor, on-site and in situ remedial methods can offer a less expensive alternative, which is more closely attuned to the conditions and requirements of a particular site. Nathanail and Bardos (2004: 143) state that 'as a general rule of thumb, the greater the amount of time available for remediating a site, the greater the range of applicable in situ solutions.' Considerable research has been undertaken since the 1990s into the effectiveness of various on-site techniques, allowing for a more informed remediation decision to be made.

Apart from the regulatory context and applicable soil standards, several factors affect the decision as to which remediation method should be used for a particular site (Carlon et al. 2008: 113). These include the intended land use, time available for remediation, developer's knowledge, and available finances (Contaminated Land Rehabilitation Network for Environmental Technologies in Europe 2002: 1). As Pollard et al. (2001: 2) note,

> Increasingly, approaches to site remediation are being scrutinised by reference to their full life-cycle costs, and social, economic and technical factors are being considered alongside one another in appraising risk management options.

Other important factors include the results of the risk assessment and evaluation process, any liability issues, the outcome of any public participation, and the political sensitivity of the particular site. While not all of these factors may influence every remediation decision, it is evident that reaching a decision in itself can be a complex and detailed process. There is also the possibility that the remediation decision has to be revisited at a later date if the selected remedial method proves to be ineffective.

In general, excavation and removal of contaminated materials is a short-term remediation solution, which is used when remediation needs to be carried out quickly and completely (Carlon et al. 2008: 116). Where the excavated contaminated materials are not treated, but only removed to another location, the contamination is relocated but not resolved, and may present a problem in the future. However, the impact of the contaminated materials that have been relocated may be minimised if they are deposited at an approved landfill site where mitigation measures (e.g., liners) are in place to prevent seepage or leaching. Medium-term remediation options may involve removing the contaminated materials, treating them off-site to remove or neutralise the contaminants, and returning the treated soil or water to the site. Some ongoing monitoring may be required in these scenarios, but generally these methods are effective.

Long-term approaches tend to involve containment or securing of the contaminants in situ, because they normally require ongoing monitoring and possible future remediation if they are not fully successful. There is greater potential for remediation to be partially or even completely ineffective when these solutions are used, because the contaminants are still present. In addition, the 'brownfields movement' in countries such as the United States has resulted in the re-use of many sites retaining residual contamination. In response, developed countries have begun implementing institutional and engineering controls to ensure the long-term sustainability of sites.

Bioremediation, where natural processes and organisms are used to remediate the contaminated area gradually, is another long-term option. This method has received much attention in recent years, particularly in light of calls for a more sustainable and less costly approach to land management (United States Environmental Protection Agency 2008b: 1). It is also considered a very safe remediation method for people working on, or living near, the relevant contaminated site. Bioremediation can involve phytoremediation (using plants), bioventing (using air), biosparging (using air and water), and/or 'flushing' (with water). Phytoremediation is a relatively recent, innovative method. It uses plants in various ways to restrict the availability of contaminants to humans, by minimising surface erosion, runoff, dust generation and skin contact (Nathanail and Bardos 2004: 174–175).

2.5 Progress in Remediation

Progress in the remediation of contaminated sites in Europe has been slow, with only approximately 80,000 sites being remediated in the last 30 years (European Environment Agency 2007a). This is a reflection of the high costs and legal complexities involved in the remediation process. Nevertheless, some progress has been made in recent years in western and central European countries, and some south-eastern European countries, where the average number of cleaned-up sites increased by more than 150% between 2001 and 2006 (European Environment Agency 2007b: 119). This increase probably reflects a response by site developers and owners to the abandonment of the multifunctionality standard for remediation, together with the introduction of brownfield initiatives in some European countries.

At the same time, improvements to site identification and data collection procedures have resulted in an average 40% increase in the total number of sites awaiting remediation, and a doubling of the estimated number of sites at which potentially polluting activities have taken place (European Environment Agency 2007b). Preliminary investigations into potentially contaminated sites are well advanced in Europe, because this stage requires fewer resources and less time (European Environment Agency 2007a). However, the associated costs and effort increase with each stage after this point, including detailed site investigations, remediation decision-making and the actual remediation works, and this has been attributed to their much slower progress.

In the United States, cleanup remedies have been completed for about two-thirds of the sites listed on the National Priorities List over the past 30 years (United States Environmental Protection Agency 2011b: 1). Progress is good for the remediation of the less heavily contaminated sites, many of which are being returned to use under voluntary cleanup programs and other brownfield initiatives (United States Environmental Protection Agency 2005). In Canada, 650 federally-managed sites have been remediated since 2005, and thousands more have been cleaned up in the provinces to date. In addition, 6,400 federal sites have been assessed for potential contamination since 2005 (Government of Canada 2012b).

Remediation in Australia is progressing differently from state to state, with some reporting that remedial efforts are now catching up with the number of identified sites (New South Wales Department of Environment, Climate Change and Water 2006: Fig. 4.1; Queensland Environmental Protection Agency 2007: 124). Out of a total of 1,238 contaminated sites that were reported by regional councils in New Zealand for the period 2006–2007, just under half had been remediated (New Zealand Ministry for the Environment 2007: 249). In Japan, a total of 91 designated sites required remedial treatment between 2003 and 2007, but approximately 1,700 sites were remediated voluntarily in 2005 alone (Sato 2007: 7).

In Eastern Europe, the Caucasus and Central Asia, minimal progress has been made in the remediation of contaminated sites. While some remediation has been carried out by public authorities and private companies, the actions that have already been taken in the region are said to be 'far from satisfactory' (European Environment Agency 2007b: 119). Few countries in these regions have managed to compile national inventories of contaminated sites or establish national remediation programs, although the Blacksmith Institute's Toxic Sites Identification Program aims to help rectify this problem in low- and medium-income countries (Blacksmith Institute 2012b).

The considerable costs of remediation are 'frequently beyond the scope of the public purse in countries where the polluters often cannot be made liable' (Blacksmith Institute Blacksmith 2012a, b, c, d). The situation is similar in Latin America.

While some Latin American countries (e.g., Brazil, Chile, Columbia, Mexico and Peru) are actively engaged in identifying and prioritising contaminated sites, and compiling inventories, they have yet to address the remediation issue in any substantive way (Kadas et al. 2008).

Specific information on site remediation is difficult to find for other developing parts of the world. Market research indicates that developing countries as a whole may represent only a 'small fraction' of the global demand for remediation services (United States International Trade Commission 2004: 7–2). Explanations for this include the lower levels of industrialisation (and hence less production of contaminants) in developing countries, a lack of public and political awareness of threats posed by existing contamination, a lack of data and documentation on the scope of contamination, and an absence of regulatory measures, enforcement infrastructure, and economic incentives relating to remediation (United States International Trade Commission 2004: 7–2).

However, the early results of Toxic Sites Identification Program so far indicate that remediation activities are likely to increase in developing countries in coming years due to a greater awareness of contaminated sites and their detrimental impact on public health (see, e.g., Ericson 2011). International efforts to identify contaminated sites and help governments to prioritise their remediation are underway (see, e.g., Blacksmith Institute 2012c), and producing some positive results (Ericson 2011). Remediation efforts may also be driven by the increasing visibility of pollution, and the implementation of new regulatory measures (United States International Trade Commission 2004: 7–4).

Where remediation is already being undertaken in developing countries, it is usually funded either by a multilateral lending institution, a multinational corporation or an international organisation. According to the United States International Trade Commission (2004: 7–1),

> Anecdotal evidence suggests that demand for remediation services in developing countries may be driven by the cleanup activities of European- or North American-based multinational corporations which have established operations in developing economies.

However, most remedial works carried out by international organisations or multinational corporations tend to focus on a particular industry, such as mining, or a group of contaminants, such as pesticides or persistent organic pollutants (e.g., the Obsolete Pesticides Programme of the Food and Agriculture Organization). Except in a handful of cases, they are unlikely to lead to the implementation of a nationwide remediation strategy to address all types of site contamination.

One interesting example of remediation work led by a group of international organisations across several countries is the Health and Pollution Fund (formerly the Global Pollution Remediation Fund). This project was launched in 2007 by representatives of five developing countries and two developed countries, as well as the World Bank, the United Nations Industrial Development Organization (UNIDO), Green Cross Switzerland, the Blacksmith Institute and 'leading researchers from within the public health and pollution remediation fields' (Health and Pollution Fund 2012a).

An 'inception meeting' of these participants was sponsored by the Rockefeller Foundation and coordinated by the Blacksmith Institute in Bellagio, Italy, in 2007. A consensus was reached and the 'Bellagio Principles' were agreed at that meeting, resulting in the launch of the Fund (Health and Pollution Fund 2012b). The Bellagio Principles state at the outset the rationale for collaborative global action to address the worst contaminated sites (Global Pollution Remediation Fund 2007: 1):

> Toxic pollution is found throughout the developing world. It is [a] significant cause of disease and death and especially harms children. It is a moral imperative to deal with this issue, one made all the more compelling by the globalization of industry.

There is also a clear recognition of the responsibility on developed countries to share their knowledge and experience on managing contaminated sites (Global Pollution Remediation Fund 2007: 1):

> Technologies for cleaning up these problems are well known in the west, but little has been done because of inadequate resources at the local level, and a lack of technology transfer. Affected communities and local authorities often struggle to do what they can with very limited financial and technical resources.

The HPF initiative is primarily sponsored by the United States and Germany, although funding is sought from various national development agencies, multilateral development banks, international aid organisations and 'high net-worth individuals' (Health and Pollution Fund 2012a). The project aims to remediate the worst contaminated sites in the developing world at a cost of US $400 million over the next 5–10 years. Although the HPF does not necessarily provide funding for full completion of remedial works at all sites, it focuses on achieving sufficient remediation to meet specific health targets. In addition, local people are to be trained to carry out any further necessary remediation.

At the launch of the Fund, it was indicated that remediation would be undertaken at 420 'critical' sites—including 250 small-scale, 150 medium-scale and 20 large-scale sites—in China, India, the Philippines, Russia, Kenya and Mozambique (Health and Pollution Fund 2012c). Many of these sites have been contaminated by industrial, mining and military activities (Health and Pollution Fund 2012a).

According to the HPF website, the intention is that 'projects initiated by HPF will efficiently channel funds to local stakeholders with technical support and oversight provided by a central, international, Secretariat' (Health and Pollution Fund 2012a). Already it appears that work has commenced, or indeed has already been completed, at some HPF-nominated sites (e.g., Dzerzhinsk, Russia; Rajasthan, India; Manica, Mozambique; Haina, Dominican Republic; and Wenshan, China: Blacksmith Institute 2012b).

The Blacksmith Institute also launched the 'Global Alliance on Health and Pollution' (GAHP) in mid 2012, in an effort to bring the global problem of toxic sites to 'the next level' on the international agenda (Blacksmith 2012c). The GAHP brings together several governments, international agencies and organisations (such as the United Nations Environment Programme and the Asian Development Bank) and aims to assist countries in developing national strategies for tackling pollution 'hotspots'. More specifically, GAHP will be helping countries (e.g., Senegal, Indonesia and the Philippines) conduct technical investigations and implement remediation projects (Blacksmith Institute 2012c). It is hoped that initiatives such as this will contribute significantly to the progress of remediation in developing countries, as well as raising political awareness of the issue more generally.

2.6 Economic Considerations in Remediation of Site Contamination

It is widely recognised that contaminated site remediation can be an expensive process, and that the associated costs often present an obstacle to the timely clean-up and re-use of contaminated sites. Nathanail and Bardos (2004: 6) observe that

> A major issue for all industrialised countries is how to reduce the cost of dealing with land contamination without compromising public health and water quality, or business confidence in the benefits of land regeneration and sustainable use of soil.

As noted earlier, publicly-funded site remediation is beyond reach for some developing countries, because other public health or environmental issues (e.g., such as sewage treatment and air pollution) are more immediately felt and are prioritised accordingly (United States International Trade Commission 2004: vii; Cairney and Hobson 1998: 9). Privately-funded remediation in developing countries generally does not take place in the absence of a strong regulatory regime for site contamination.

However, a small amount of remediation is undertaken by multinational corporations and international organisations in developing countries even in the absence of a strong legal regime. The work of international organisations in particular tends to be highly dependent on political and economic factors in both the donor and recipient countries, and operational issues also present problems. For example, the Africa Stockpiles Programme (2008) reported a funding gap of US $10.5 million in 2007–2008, together with other economic and logistical obstacles to the successful implementation of its goals.

It is also possible to develop a remediation approach that matches the financial capability of an individual country, where funding is very limited. Hanrahan et al. (2007: 2) note that

> [M]any clean-up initiatives can be accomplished with minimal amounts of money and can achieve substantial results in short time periods. It is often possible to clean up the worst aspects of a particular polluted site with inexpensive and effective technologies, and mitigate much of the health risk to quite a large population as a result.

The Blacksmith Institute's Toxic Sites Identification Program promotes the prioritisation by governments of their worst polluted sites, with a view to committing funds and taking 'intervention' measures as soon as possible. The Blacksmith Institute refers to 'initial intervention' to mitigate the health impacts of contaminated sites, rather than full site remediation (Ericson 2011: 38).

In Europe, the costs of remediation works to date have been substantial, although only a small percentage of historical site contamination has yet been remediated (European Environment Agency 2007a). Expenditure on managing contaminated sites also varies widely between countries. While most European countries spend between 100 and 250 million Euro per year on contaminated land management, some countries spend much less (e.g., Macedonia) or considerably more (e.g., France) (European Environment Agency 2007a). The factors affecting remediation costs are diverse, and include the extent of site contamination, awareness of the issue, the regulatory context, the remediation methods used, and the current and future land use. On average, about 60% of each country's total costs of managing site contamination are for remediation measures, and the remaining 40% are for site investigations (European Environment Agency 2007a).

Likewise, there is much variation between European countries in the extent to which private actors are made to pay for remediation. On average, approximately one-third of total expenditure on contaminated site management comes from public funds (European Environment Agency 2007a). However, there are notable exceptions to this figure: in some countries, taxpayers provide 100% of the funding (Czech Republic, Spain and Macedonia), but in others, private actors meet almost all of the costs themselves (France, Italy and Norway) (European Environment Agency 2007a). To some extent, the high figures for public funding reflect the proportion of sites that were contaminated by state-owned entities. However, governments may also undertake remediation on the assumption that it will not be completed quickly enough if left to private actors.

In the United States, the federal Environmental Protection Agency (USEPA), under the auspices of the Superfund Program, allocated nearly US$443 million to emergency response and removal operations at contaminated sites for the 2010 financial year (United States Environmental Protection Agency 2010b). For the same period, USEPA also secured private funding commitments of nearly US$1.6 billion for both future remediation works and in repayment for past remediation actions carried out by USEPA (United States Environmental Protection Agency 2010a: 3). In Canada, CDN$344 million was earmarked for the remediation of around 380 high-priority federal contaminated sites for the period 2012–2013 (Government of Canada 2012b). The total cost of remediating contaminated sites in Australia is purportedly in the range of US$3–4 billion (Cooperative Research Centre for Contamination Assessment and Remediation of the Environment 2012: 2).

As the past 30 years have shown, there are also regulatory challenges to the effective management of site contamination. Until recently, regulation of site contamination in most developed countries was fragmented and ad hoc, as it was generally thought that existing measures for environmental protection, waste management, pollution control and planning were sufficient (see, e.g., New Zealand Ministry for the Environment 2006: 28). This approach prevented the effective and prompt remediation of many contaminated sites for a few reasons.

First, it was rarely possible under such general legislation to impose liability retrospectively on site operators or owners who had caused site contamination, so the financial burden of remediation was eventually passed to the taxpayer (see Kingsbury 1998; Environment Protection Authority (South Australia) 2004: 3–4). Second, the use of scientific values underlying remediation decision-making was not clearly regulated, resulting in the wrong values being used to trigger remediation works or set cleanup standards (National Environment Protection Council (Australia) 2006: 3). Third, the piecemeal approach to site contamination could mean that one aspect of the issue was well regulated while others were not, leaving site contamination professionals without any clear legislative guidance when making complex site-related decisions.

The allocation of legal and financial responsibility for remediation of contaminated sites has been a particular challenge facing regulators, but it is seen as essential for stimulating the clean-up and re-use of contaminated sites. According to the United States International Trade Commission (2004: vii),

> The primary force behind the establishment of remediation services markets worldwide has been the passage of legislation which requires cleanup of polluted sites and which assigns liability for the associated costs.

While the 'polluter pays' principle is the legislative ideal in many developed countries, in practice there are difficulties in its implementation for all contaminated sites. In the context of Europe, it is observed (European Environment Agency 2007b) that

> Contamination can be a legacy stretching back many decades or centuries. As a consequence, the responsibilities for pollution and, therefore, remediation are often difficult to identify because the polluters are often no longer in business. This in turn contributes to making it difficult, time-consuming and costly on the public purse to manage contaminated sites.

Developed countries have generally accepted that, where the original polluter of a site no longer exists or is insolvent, other parties may be required to pay for remediation. These include 'knowing permitters', that is, anyone who knowingly permitted contamination to occur at a site, even though they did not actually cause the contamination themselves (e.g., 'Class A persons': sect. 78K(1), Environmental Protection Act 1990 (UK)). Liability may alternatively be imposed on site owners or occupiers, regardless of whether they actually caused the contamination (e.g., 'Class B persons': sect. 78F(4), Environmental Protection Act 1990 (UK)). Where no alternative liable party can be found or made to pay, the government must take on the responsibility of remediating the site at the cost of taxpayers. This is also the case where publicly-owned companies or agencies have caused much of the contamination (Boyd 1999: 6).

In developing countries, the challenges to implementing the polluter pays principle are even greater because the requisite political and regulatory conditions may be absent (Luo et al. 2009: 1126). The successful implementation of the polluter pays principle depends on four preconditions: the legislation of environmental standards, a climate of regulatory enforcement, an absence of bureaucratic corruption, and an environmentally conscious public opinion. Often, not all of these factors are present in developing countries. While this may not prevent multinational companies from bearing responsibility for sites they have contaminated in developing countries, it can be a major impediment to enforcing liability on domestic companies.

2.7 Regulatory Trends in Remediation of Site Contamination

2.7.1 Historical Perspective—Trend to Site-Based Risk Assessment

Early approaches to the remediation of contaminated sites generally reflected a lack of understanding as to how contaminants could spread, how they affected humans and the environment, and what constituted a 'safe' standard of remediation. In the 1970s and 1980s, remediation was largely carried out on an ad hoc basis, as and when governments became aware of sites which were heavily contaminated (Vegter 2001: 100). Identification and remediation of sites took place in the absence of an overarching regulatory framework. Contaminated sites were mostly perceived and treated as isolated incidents rather than as part of a widespread problem requiring a systematic approach (Nathanail and Bardos 2004: 1).

Two countries that are widely considered 'pioneers' in the formulation of national site contamination law and policy are the United States and the Netherlands. In 1976, the United States Government passed the Resource Conservation and Recovery Act, which enables site contamination on licensed, operating industrial facilities to be regulated. The discovery of large-scale contamination at Love Canal in New York State in 1977 led to the passage of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, commonly known as 'Superfund') in 1980, which deals primarily with abandoned or 'orphan' contaminated sites. Both of these statutes are designed to ensure that the polluter pays principle is applied wherever possible and that orphan sites are remediated (United States International Trade Commission 2004: vii). Some other jurisdictions have subsequently adopted the Superfund model in their own domestic approaches to site contamination (United States International Trade Commission 2004: vii; Fletcher 2003: 35–36).

In 1983 the Dutch Government introduced the 'multifunctionality' approach to remediation of contaminated sites in response to a high-profile contamination incident at Lekkerkerk in 1980. This was implemented through the Soil Cleanup (Interim Measures) Act 1983 and the Soil Protection Act 1987 (de Roo 2003: 169; Honders et al. 2003: 2). The multifunctionality approach aimed to maximise risk control by setting very high standards for soil quality in remediation (Luo et al. 2009: 1131). The approach was intended to render sites safe for any use, regardless of their actual or proposed use (Luo et al. 2009: 1131; Visser 1993: 45–46).

However, by 1997, the costs of the multifunctionality approach proved prohibitive, and the Dutch Government turned to a site-based risk assessment approach and other strategies for contaminated site management (Dutch Ministry of Housing, Spatial Planning and the Environment 1997; Luo et al. 2009: 1131). Under this approach, the need for, and means of, remediation are determined by reference to the current, or proposed, use of the relevant land and may also take into account the likelihood of human exposure by reference to bioavailability and other attributes of the contamination.

At first, several countries emulated the Dutch multifunctionality approach throughout the 1980s and 1990s, but eventually they also found the costs excessive (Layard 2006: 136). Since the late 1990s, most developed countries have moved to adopt less stringent remediation standards. As Nathanail and Bardos (2004: 1) observe:

> It is now widely recognised that drastic hazard or contaminant control, e.g. cleaning up all sites to background concentrations or to levels suitable for the most sensitive landuse, is neither technically or economically feasible nor is such control compatible with sustainable development.

This is particularly relevant for ‘brownfields’ and ‘orphan’ sites, many of which are likely to remain unused for a considerable time if a rigid and expensive cleanup standard is applied to any potential redevelopment (Preston 2008: 167). It has therefore become more common to apply a standard of remediation that renders sites sufficiently ‘clean’ for their current or proposed use. A site-based risk management approach can be used to inform the decision as to which standard and method of remediation is appropriate in each case (Preston 2008: 167).

One of the consequences of the multifunctionality approach, particularly at the time it was first implemented, was that it necessitated the use of intrusive remedial techniques. To ensure that a very high standard of soil quality was attained, contaminants were often removed and treated off-site, or secured within thick concrete casing (Vegter 2001: 98). The ‘dig and dump’ approach to remediation (which usually involves the removal and disposal of contaminated soil to landfills) became a widespread practice in developed countries, attracting criticism that it was simply moving the contamination problem elsewhere (Luo et al. 2009: 1126). In response to the adoption of less stringent remediation standards, and calls for more ‘sustainable’ and cost-effective remediation approaches, techniques for the retention of contaminants in situ began to emerge in the 1990s (Nathanail and Bardos 2004: 111; Preston 2008: 166–167).

2.7.2 Modern Approach—From Regulation to Brownfields Redevelopment

It was only in the 1990s that most developed countries began to take stock of their site contamination legacies and formulate strategies for progressive, prioritised remediation. Most developed countries now have nationwide remediation programs in place, and other countries are in the process of preparing their own. Those countries with national programs usually prioritise particular sites, such as those with the heaviest contamination or presenting the highest risk to surrounding populations.

However, in tandem with the departure from the high remediation standard of multifunctionality in the late 1990s, there has been a shift in focus in many developed countries from a regulatory (or 'command and control') approach to a market-based one (see generally, Fowler 2007). This is due not only to the high costs of regulatory compliance and enforcement, but also to the associated liability issues and procedural delays involved in redeveloping contaminated sites. Few developers would knowingly take on previously contaminated sites, resulting in many sites remaining idle for years.

The United Kingdom and the United States are examples of countries that now address most of their less contaminated sites (particularly 'brownfields') through a market-driven approach (Guignet and Alberini 2008: 1). Voluntary remediation of such sites—which is often undertaken by developers—is encouraged through a combination of measures, such as liability relief and financial incentives (Guignet and Alberini 2008: 1–2; United States Environmental Protection Agency 2006a, b). This has resulted in significant reductions in the number of sites awaiting remediation (United States Environmental Protection Agency 2005: 23–24). In this regard, the market-driven approach has so far been viewed as more effective than the command and control approach, although more sites are now being remediated to a lower standard and with minimal regulatory supervision. This in itself has the potential to cause problems in terms of liability for any residual or new contamination, and long-term restrictions on site uses. It is important that these issues be addressed adequately in any modern regulatory framework for site contamination.

2.7.3 Post-remediation Measures ('Long-Term Stewardship')

As preferences have grown for more cost-effective remediation solutions, and there has been greater reliance on in situ and on-site cleanup methods, it has become more important to consider 'aftercare' or post-remediation measures. In the United States, this is called 'long-term stewardship' (LTS), and it generally applies to 'sites where long-term management of contaminated environmental media is necessary to protect human health and the environment' (United States Environmental Protection Agency 2006b).

Post-remediation measures should be part of the overall management plan for any site at which there remains a risk of future contamination following the completion of remediation works. The proportion of remediated sites at which such a risk remains is growing (e.g., in the United States), but the regulatory regimes in many developed countries have been slow to recognise the need for clear and detailed regulations on post-remediation.

Post-remediation measures usually involve a combination of two broad types of measures: engineering (or 'physical') controls and institutional (legal and/or administrative) controls. Engineering controls comprise the physical barriers or structures designed to monitor and prevent or minimise exposure to contamination, such as gas extraction and combustion, or containment (United States Environmental Protection Agency 2006b: 6). Institutional controls include administrative or legal instruments that minimise the potential for human exposure to contamination by limiting land or resource use, such as zoning, notices and warnings, easements, restrictive covenants, permits and administrative orders (United States Environmental Protection Agency 2006b). All of these measures need to be able to adapt to changing uses and conditions of the relevant site over time, to ensure ongoing requirements for protection are met.

Long-term stewardship is becoming a contentious issue, due to the questions of liability that arise in connection with the transfer of affected sites, the potential for remedial works to be re-opened in the future, and the uncertainties regarding costs (United States Environmental Protection Agency 2006b: 1). USEPA noted in 2006 that roles and responsibilities for long-term stewardship stakeholders were often not clearly delineated and required elaboration, along with other issues (United States Environmental Protection Agency 2006b: 14–15).

The duration of the post-remediation phase depends on many factors, such as the characteristics of the contaminant(s), their ability to migrate, proximity to receptors, the sensitivities of the surrounding population, and the intended site use. The use of a site may be restricted until the necessary aftercare is completed, which may be several months, years or even indefinite (United States Environmental Protection Agency 2006b: 1). Post-remediation measures normally include regular monitoring as a minimum, but may also involve ongoing passive or active controls.

There may be several private and public stakeholders involved in the aftercare of a particular site. These may include government agencies (sometimes at both a national and sub-national level), private parties who either own the site or have an interest in it, local communities and other interest groups affected by the site, together with developers, lenders, insurers and trustees. Each stakeholder has a particular role in the aftercare process, whether it is implementation, monitoring or enforcing the relevant institutional and engineering controls. Ideally, their responsibilities are clearly defined in a legal or other formal document to ensure the smooth and timely operation of post-remediation measures (World Federation of Scientists 2004: 4).

However, legal, political and practical obstacles often do prevent remediated sites from being returned to use within an appropriate timeframe. In response to these problems, and in an effort to achieve a consistent approach to long-term stewardship across the United States, a model law has been developed and actively promoted over the past several years (Strasser and Breetz 2002; see also Chap. 5, Case Study 5.2). The Uniform Environmental Covenants Act (UECA), which by 2012 had been enacted in 24 states across the country (Uniform Law Commission 2012), aims to eliminate the obstacles to using institutional controls to manage sites where residual contamination remains.

The UECA allows the use of voluntary environmental covenants that attach permanently to individual sites. An environmental covenant may involve a land use control such as protection of a concrete cap, a restriction on certain site uses, or maintenance of monitoring equipment. Environmental covenants are binding on subsequent site purchasers and tenants, and are therefore enforceable. They are also listed on the local land registry (Kerr 2006: 1).

However, the UECA leaves some aspects of long-term site management to be dealt with by Federal or State governments. For example, each State may decide the relevant remediation standards that are to apply to affected sites, and whether liability for remediation should be limited and/or transferable between parties. Individual site remediation plans must still be approved by Federal or State regulatory agencies, and one of these agencies must be a signatory to the environmental covenant. In addition, notice of the environmental covenant must be provided to all relevant parties with an interest in the site (Kerr 2006: 1).

The UECA effectively removes the practical and legal barriers standing in the way of site redevelopment, and facilitates greater certainty in real estate transactions (Strasser and Breetz 2002). As a result, valid environmental covenants cannot be inadvertently extinguished by application of various common law doctrines, adverse possession, tax lien foreclosures, less restrictive zoning changes and marketable title statutes (Kerr 2006: 2).

Proponents of the UECA (Strasser and Breetz 2002) noted in the early stages of its drafting that

> Institutional controls offer great promise to improve environmental cleanup and the reuse of contaminated property. These controls make risk based cleanups possible by protecting against the risks presented by the residual contamination. Yet to achieve this protection, the terms of the controls must be clearly established and their enforcement must be realistically assured.

The need for effective, practical post-remediation measures is particularly evident at former landfill sites, where a wide range of contaminants may have been deposited over many years, potentially forming a highly toxic and unpredictable combination. Monitoring of former landfill sites may be required for at least 15–30 years, depending on the jurisdiction. For example, India requires post-closure monitoring for 15 years, Australia for 25 years and the United States for 30 years (Agamuthu 2006). In the European Union, there is no specified timeline at all, but monitoring of former landfills must be carried out for as long as necessary and until the site is certified safe (Agamuthu 2006, citing the European Directive on Landfill of Waste 1999, art. 3).

In relation to other high-risk contaminated sites, the World Federation of Scientists (2004) has prepared a draft memorandum of understanding (MOU) on aftercare measures for sites contaminated with radioactive materials and hazardous wastes. The purpose of the MOU (World Federation of Scientists 2004: 2–3) is to initiate a dialogue that will

> promote a greater level of consistency, effectiveness and public health and environmental protection at contaminated properties associated with government activities throughout the

> world and should help foster a stewardship ethic into remediation and post-remediation activities.

The MOU outlines several principles to guide the design, management and implementation of long-term stewardship functions and activities (World Federation of Scientists 2004: 4–6). It also sets out the 'site components' that should be included in all aftercare situations, such as documentation on site history and contamination, aftercare management plans and several other plans and procedures for a range of stakeholders and activities (World Federation of Scientists 2004: 6–7).

2.8 Conclusions

Site contamination has presented a major challenge to developed countries since the 1970s, particularly in heavily industrialised regions, and regulatory measures have evolved significantly over the last decade. Non-regulatory measures for addressing contaminated sites, particularly brownfield sites, have also been formulated in some developed countries to encourage the prompt remediation and re-use of sites which might otherwise be sidelined. Issues of funding and liability are most likely the main impediments to remediation in countries that do not yet have such initiatives in place.

Different regulatory approaches, site management methods and remediation standards are used around the world to address site contamination, making it difficult to discern one common approach, method or standard. However, it is recognised that the introduction of relevant regulations is essential to instigating the identification and remediation of contaminated sites in any country. As the United States International Trade Commission (2004: vii) notes:

> The primary force behind the establishment of remediation services markets worldwide has been the passage of legislation which requires cleanup of polluted sites and which assigns liability for the associated costs.

In developing countries there is a need to promptly identify which sites need remediation, and prioritise them, so that adverse effects can be minimised and sites can be returned to their intended use as quickly as possible. Through initiatives such as the Obsolete Pesticides Programme and the Toxic Sites Identification Program, developing countries are gradually compiling inventories of potentially contaminated sites. Although their progress in remediating sites has so far been modest, it is likely to gain strength in the future as specific policies and regulations are introduced (United States International Trade Commission 2004: 7–4; Blacksmith Institute 2012c).

As the rate of site identification and assessment increases, developing countries will need to have clear and comprehensive national laws or policies in place to guide decision-makers and other stakeholders in remediation efforts. As Amparo et al. (2011, citing Hanrahan et al. 2007: 9) observe:

> Developing countries are particularly vulnerable to the effects of toxic pollution on human health due to insufficient technical and financial resources as well as a lack of regulation and enforcement; remediation is often considered secondary to more pressing government priorities such as education and primary health care. This lack of resources means it is crucial that cleanup efforts be focused and effective.

This highlights the need for either some form of international instrument concerning site contamination or other means of ensuring take-up of 'best practice' legislation by developing countries.

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Soil Cleanup (Interim Measures) Act (1983) (The Netherlands)

Soil Protection Act (1987) (The Netherlands)

Chapter 3
Current International Law Relating to Site Contamination

3.1 Introduction

To date, there has not been any detailed review of the international law on site contamination, although there have been several studies and brief surveys of domestic site contamination laws around the world (e.g., Visser 1993; Ferguson 1999; Christie and Teeuw 1998; Kadas et al. 2008; Andersen 2000; Isted and Lawrence 2012). Some reviews of international law have been undertaken which are of limited relevance to site contamination, mainly because they focus on related issues of soil protection, environmental liability and hazardous substances (Hannam and Boer 2002; Brunnée 2004; Daniel 2003; Lammers 2007). However, none of these surveys specifically address the issue of site contamination and there remains a distinct lack of dialogue on the subject at the international level.

The obvious explanation for this situation is the absence of any multilateral environmental instrument or other global initiatives specifically directed to site contamination to date. However, in the many hundreds of international agreements on environmental matters, including regional and bilateral arrangements, there is at least the potential for some of these to have relevance to the subject of site contamination, or to provide a vehicle for the future development of more specific measures on this subject. The examination of site contamination law at the international, regional and bilateral levels in this chapter will be divided into two parts: regulatory measures and liability measures. Section 3.1 (regulatory measures) will focus on soils, pollution/hazardous substances and general environmental protection, while Sect. 3.2 (liability measures) will focus on state responsibility and civil liability for environmental harm.

These are the particular elements of international environmental law that are potentially of most relevance to site contamination. The issue of soil protection, for example, has attracted increasing attention at the international and regional level since the late 1990s resulting in some efforts to improve domestic soil legislation. These controversial initiatives are still being developed, and thus are yet to be

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implemented at the domestic level, but they provide valuable insights into how efforts to promote domestic site contamination law might be pursued.

Some similarities between the soil protection, pollution/hazardous waste and site contamination issues, particularly in terms of public awareness and the legal implications of regulation, allow useful lessons to be drawn for the purposes of this book. General environmental protection laws, although they tend to contain little or no explicit reference to site contamination, may in some cases be the only existing legislation with any (albeit indirect) bearing on the issue. Such general laws also tend to be the pre-cursor to specific legislation on site contamination in many countries, and it is instructive to understand the process by which domestic legislation evolves in this regard.

Likewise, the principles of state responsibility and civil liability for environmental harm have been selected for analysis because they have potential implications for the domestic regulation of site contamination. States have a responsibility to prevent unlawful acts or omissions within their own borders from causing environmental harm in neighbouring States, and to remedy any harm that is caused. This principle could arguably extend to some instances of site contamination, where there is a transboundary element involved. Civil liability for environmental harm usually involves obligations to make restoration for harm caused by dangerous or hazardous (but not necessarily unlawful) activities. The polluter pays principle is one example of a civil liability measure, and is widely cited in support of regulating site contamination. Other forms of civil liability with potential relevance for site contamination have also been proposed, with varying degrees of success.

Although some of the legal instruments that are discussed below exclusively address one of the above issues, others are not so clearly defined, and may be capable of falling into more than one of the above categories. Where appropriate, links between categories are referenced.

3.2 Terminology

3.2.1 International Law

The term ‘international law’ will be used here to include multilateral, regional and bilateral agreements, decisions of international courts and tribunals, customary international law, and soft law, such as resolutions and declarations by international organisations. International law is generally understood to have an essential function of regulating the conduct of States in their relations with each other and is grounded in the consent of States (Desai 2004: 105).

3.2.2 Regional Law

Legal initiatives at the regional level will be examined primarily in accordance with the geographical location and/or economic groupings of countries. On this basis, the following regional law-making bodies are referred to: the United Nations Economic Commission for Europe (UNECE); the European Union (EU); the Commission for Environmental Cooperation for North America (CEC); the Association of Southeast Asian Nations (ASEAN); the South Pacific Regional Environment Programme (SPREP); and the African Union.

The UNECE was founded in 1947 and is one of five regional commissions of the United Nations. It has 56 member countries, although any interested member of the United Nations and even some non-governmental organisations may participate in its activities. The UNECE provides a forum for cooperation on issues such as economic integration, environment, housing and land management both in Europe and elsewhere.

The CEC was created in 1994 through the North American Agreement on Environmental Cooperation, a side agreement to the North American Free Trade Agreement. The CEC comprises three member countries (Canada, the United States and Mexico) and promotes cooperation on environmental issues of 'continental concern', including those arising through trade-related activities between the member countries.

ASEAN was formed in 1967 and currently has ten member countries: Indonesia, Malaysia, Philippines, Singapore, Thailand, Brunei Darussalam, Vietnam, Laos, Burma and Cambodia. SPREP, which in 2004 was renamed the Pacific Regional Environment Programme, was established in 1982 to promote regional cooperation, environmental protection and sustainable development. It has a total of 26 participating countries, including all 22 South Pacific island countries and territories and four countries with direct interests in the region (Australia, France, New Zealand and the United States).

3.2.3 Bilateral Law

'Bilateral law' describes instruments or arrangements involving two countries, which may or may not be geographically adjacent to one another. The arrangements, such as bilateral agreements, exchanges of notes and memoranda of understanding, may exist between governments and/or agencies and organisations (e.g., the United States Environmental Protection Agency and its foreign counterparts).

3.2.4 Soft Law

The term 'soft law' generally refers to non-binding instruments, such as United Nations resolutions and declarations, memoranda of understanding or exchanges of notes between heads of state or national organisations, statements, principles, codes of conduct, recommendations and action plans made by major international organisations (Hannam and Boer 2002). Non-binding instruments may exist at the international, regional or bilateral level. Soft law consists of general norms or principles rather than rules, and is therefore not readily enforceable through binding dispute resolution (Boyle 1999: 901). An important aspect of soft law is its potential for becoming law in the future, through state practice (Shelton 2008: 13). It also offers an advantage in that it is more flexible and more quickly negotiated than 'hard law' (Shelton 2008: 15).

3.2.5 Customary Law

Norms of customary international law evolve from two main sources: the general and consistent practice of States (state practice) and the belief by states that they are legally obliged to follow this practice (*opinio juris*) (Roberts 2001: 757). A useful distinction between these two sources is made by Roberts (2001: 757, citing D'Amato 1971: 49) in categorising the former as actions and the latter as statements. State practice may be evidenced by, for example, national legislation, government statements, restatements of the law, and diplomatic instructions. Treaties and declarations are generally thought to represent *opinio juris* because they are statements about the legality of action, rather than examples of that action (Roberts 2001: 758). Roberts further distinguishes between 'traditional custom', which emphasises state practice, and 'modern custom', which focuses on *opinio juris*.

Article 38 of the Statute of the International Court of Justice (ICJ) states that the ICJ, in making its decisions, shall apply 'international custom, as evidence of a general practice accepted as law' (art. 38(1)(b)), as well as 'judicial decisions and the teachings of the most highly qualified publicists of the various nations' (art. 38 (1)(d)). The latter are to be applied as 'subsidiary means for determination of rules of law'.

3.3 Regulatory Measures

3.3.1 Soil Protection

Soil protection legislation involves measures that are specifically directed to the prevention and management of erosion, pollution and degradation of soil, particularly through promotion of the conservation and sustainable use of soil (Hannam and Boer 2002: 23, citing Christy 1971). Therefore, site contamination is merely one issue affecting soil use and soil protection. In some instances it might be assumed that protective measures are inadequate or come too late to safeguard soil quality where a site has already been contaminated. However, the concept of soil protection may be important not only at the pre-contamination (preventive) stage, but also in the management of ongoing contamination, closure of facilities, and remediation works.

Particularly in Europe, soil protection initiatives are being used as a vehicle for the prevention, assessment, management and remediation of contaminated soils, as distinct from—or sometimes in combination with—other site elements such as groundwater. On this basis, soil protection measures warrant closer scrutiny.

3.3.1.1 International Level

In response to a perceived increase in awareness of soil issues at the international level, a survey of international and regional measures relevant to soil protection was completed by Hannam and Boer for the IUCN in 2002. In their report, Hannam and Boer (2002: 57–78) review both binding and non-binding legal instruments and initiatives on soil. They conclude that, while some multilateral environmental treaties 'contain elements that can assist in achieving sustainable use of soil, [. . .] none are sufficient in their own right to meet the requirements of international environmental law in relation to soil' (Hannam and Boer 2002: 59). They note (at 62) that the provisions of relevant multilateral agreements are generally 'tangential to the needs of the soil as such.' This view has subsequently been supported by Wyatt (2008: 192).

To date, the only binding international agreement with a specific, clearly defined role of soil protection is the 1994 United Nations Convention to Combat Desertification (UNCCD). UNCCD focuses primarily on the prevention and mitigation of soil degradation in arid, semi-arid and dry sub-humid regions, which together comprise approximately one-third of the world's land area. These regions are particularly susceptible to desertification, a process which already affects millions of inhabitants as well as fragile ecosystems. The definition of 'land degradation' in the Convention is expressly limited to these specific regions, thereby excluding any form of land degradation in most developed countries.

The Convention promotes measures for the sustainable development of affected land areas, including activities aimed at the prevention or reduction of land degradation, rehabilitation of partly degraded land, and reclamation of desertified land (art. 1(b)). According to Article 1(b)(f) of the Convention, the term 'land degradation' describes a

> reduction or loss, in arid, semi-arid and dry sub-humid areas, of the biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes[.]

Degradation may be induced by both natural causes and human activities, and may take a variety of forms, including soil erosion, vegetation loss and the 'deterioration of the physical, chemical and biological or economic properties of soil' (UNCCD, art. 1(b)(f)). The latter is the most relevant to soil contamination, although it is clearly limited to particular types of land (i.e. rural areas) which may not be the most heavily impacted by contaminating activities, as these tend to be located in urban or industrial centres.

Parties to the Convention are required to develop domestic legislation to support its objectives. Under Article 5(e), signatories undertake to

> provide an enabling environment by strengthening, as appropriate, relevant existing legislation and, where they do not exist, enacting new laws and establishing long-term policies and action programmes.

This obligation could encompass soil protection legislation, but again only in developing countries affected by desertification issues. National, sub-regional and regional action plans for combating land degradation are required by the Convention (UNCCD, Part III), and non-affected developed countries must provide financial, technical and scientific assistance to help affected countries meet their obligations (UNCCD, arts. 16–21). The annexes to the Convention provide specific implementation plans for five affected regions, comprising Africa, Asia, Latin America and the Caribbean, the Northern Mediterranean, and Central and Eastern Europe (UNCCD, annexes I-V).

The limited focus of UNCCD has been criticised since its inception (e.g., Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen 2001: 160) and efforts are now underway to expand its scope to other forms of land degradation (Conference of the Parties to UNCCD 2007). This expansion reflects a growing understanding of the causes and impacts of land degradation, some of which have emerged only in the past 15 years (Conference of the Parties to UNCCD 2007: 15). A 10-Year Strategic Plan, which covers the period 2008–2018, was unanimously adopted at the 8th Conference of the Parties in 2007 (Conference of the Parties to UNCCD 2007).

However, the 10-Year Strategic Plan does not refer specifically to soil contamination, nor does it expressly extend the scope of the Convention to all forms of land degradation, such as those occurring in developed countries. In general terms, it seeks to capitalise on the strengths of the Convention, and identifies the 'vision' for the future as being 'to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas' (Conference of the Parties to UNCCD 2007: 16), an objective which could be construed more broadly over time. At the 9th Conference of the Parties in 2009, it became clear that any efforts to extend the scope of the Convention will face significant difficulties (International Institute for Sustainable Development 2009).

Two early policy instruments, the World Soil Charter (Food and Agriculture Organization of the United Nations 1981) and the World Soils Policy (United Nations Environment Programme 1982) were intended to promote international cooperation in the rational use of soil resources. They are not binding, but are generally accepted as the global ‘soft law’ for soil and are credited with raising the international profile of soil conservation (Hannam and Boer 2002).

The World Soil Charter was designed to encourage the best possible use and conservation of soil, and contains governing principles and guidelines for future action. It broadly recognises the scarcity of soil as a resource and the threat presented by its mismanagement. The Charter refers briefly to pollution as one type of soil degradation, and the need to avoid permanent degradation of good quality soils (Food and Agriculture Organization of the United Nations 1981, principles 3 and 11). It calls on governments to develop institutional frameworks for monitoring soil management and assessing potential hazards of degradation. The World Soils Policy contains more technical guidelines for action (United Nations Environment Programme 1982).

Both the Charter and the Policy are over 30 years old and, as critics note, soil degradation is now much more serious and widespread than at the time of their creation. Hannam and Boer 2002: 61) comment that, although many of the principles contained in the instruments are still relevant, they ‘fall well short of the basic necessities of a modern day suitable non-binding “soft law” instrument’ and it is time for them to be superseded.

Amman Resolution on Legal Aspects of the Sustainable Use of Soils (2000)

The World Conservation Congress’ Amman Resolution on Soils requests the IUCN Environmental Law Programme to ‘investigate the need for and feasibility of further developing international environmental law [. . .], in particular through an international instrument for the sustainable use of soils’ (World Conservation Union 2000: para 3). The Amman Resolution has been supplemented by further WCC Resolutions in 2004 and 2008, which more specifically define the work to be done by the IUCN, ultimately through its Commission on Environmental Law’s Specialist Group on Sustainable Use of Soil and Degradation (SGSS&D) (World Conservation Union 2004, 2008).

In response to the WCC resolutions, the IUCN’s Environmental Law Programme continues to work on the development of an appropriate international legal framework, based primarily on the groundwork already laid by Hannam and Boer (2002; Boer and Hannam 2011). The international soil science and environmental law communities expressed a preference for this framework to be in the form of a protocol attached to an existing global treaty. Accordingly, the SGSS&D prepared two draft instruments, one as a draft protocol to the Convention to Combat Desertification, and the other as a draft protocol to the Convention on Biological Diversity (Boer and Hannam 2011: 6).

The Draft Protocol for the Security and Sustainable Use of Soil, which was prepared in 2009, is the option favoured by Boer and Hannam. They contend (2011: 7–8) that the Draft Protocol would help improve the operation and effectiveness of the Convention to Combat Desertification, which currently does not have a protocol. The Draft Protocol would be compatible with the integrated approach to soil contained in the Convention, and would provide a 'significant basis on which to develop national legal mechanisms to enable the Parties to meet their obligations' under both the Convention and the UNCCD 10-Year Strategy (Boer and Hannam 2011: 7).

Proposed provisions of the Draft Protocol include general measures regarding national legislation for the security and sustainable use of soils. There are provisions on the identification of existing or potentially threatening processes to soil security and ecological standards. Various implementation tools are also outlined, such as national policies and strategies, management plans, and ecological soil standards, as well as technical, monitoring and financial obligations. In addition, the Draft Protocol contains a provision on liability and redress (Boer and Hannam 2011: 15, app. 2).

Tutzing Proposal for an International Soil Convention (1998)

The Tutzing Proposal was put forward in 1998 by a group of academics and scientists from across the world (Held et al. 1998) and supported by the International Society of Soil Science (International Centre for Physical Land Resources 1999: 5–6). It recognises the main ecological functions of soil and defines 'soil degradation' as 'damage to and the destruction of soils and of soil functions', including by way of contamination (Held et al. 1998). Actions to be taken by governments to achieve sustainable use of soils are outlined, encompassing regulatory measures, reviews of national legislation, creating 'soil degradation syndrome' databases, soil monitoring, increasing public awareness, and assisting developing countries to address problems such as contamination (Held et al. 1998).

The Tutzing Proposal promotes a binding international soil instrument. It has not been pursued formally at the international level, although it has led to much discussion and recognition of the benefits of taking global action to protect soil (Hannam and Boer 2002: 71). In 1999, the 2nd International Conference on Land Degradation and Desertification passed a resolution 'seeking the introduction of an international soil conservation instrument' (International Union of Soil Sciences 1999; Hannam 2004: 1). The IUCN Environmental Law Centre was also approached by the supporters of the Tutzing Proposal to investigate more closely the feasibility of a global soil instrument (Hannam and Boer 2002: 72). However, the Tutzing Proposal has not at any stage been considered by States as a likely candidate for formal adoption, and it is now outdated by more recently proposed soil documents (Futrell 2007; Boer and Hannam 2011).

3.3.1.2 Regional Level

There is currently no comprehensive regional agreement on soil protection anywhere in the world. However, the European Union has been the most active region in the area of soil protection. European efforts to improve soil protection date back to the 1972 European Soil Charter (Council of Europe 1972), which *inter alia* aims to protect soils against damage from human causes, and to promote the rehabilitation of damaged soils (Hannam and Boer 2002: 60). The tenets of the European Soil Charter were reaffirmed 20 years later in the Council of Europe Recommendation on Soil Protection (Council of Europe 1992). The Recommendation on Soil Protection recognises that soil, as a finite natural resource, should be protected from pollution and practices which damage soil structure. It addresses issues such as the heavy metal contamination of soil.

The 1998 Soil Protocol to the 1991 Convention on Protection of the Alps, while expressly confined to the European alpine environment, is the only binding agreement on soil protection in the world apart from UNCCD. In addition, general environmental protection instruments, such as the 6th Community Environment Action Programme (European Parliament/Council of Europe 2002) and the Draft European Charter on the Environment and Sustainable Development (Council of Europe 2003), have prioritised the soil protection issue and identified specific soil threats. Most recently, the European Commission released its soil protection strategy, including the draft Soil Directive, in 2006 after lengthy preparations (European Commission 2006a, b).

European Union Protocol on the Implementation of the Alpine Convention of 1991 in the Field of Soil Conservation (1998)

The Soil Protocol (to the Convention on the Protection of the Alps) entered into force in 2005 for its nine signatories (the European Union, Austria, Switzerland, France, Germany, Italy, Liechtenstein, Monaco and Slovenia). The Protocol is limited to the alpine regions contained within the borders of its signatories, and is largely preventive in character. Parties have a general obligation to 'do everything in their power to minimize, through preventive action, inputs of harmful substances into the soils through water, air, waste and other substances harmful to the environment' (art. 15(1)).

More specifically, Parties must avoid soil contamination and implement environmentally compatible measures for waste management (art. 17(2)). Environmental liabilities and 'suspicious landfills' must also be surveyed and documented, together with an assessment of their condition and hazard potential (art. 17(1)). To avoid soil contamination occurring through the use of dangerous substances, Parties are to introduce technical regulations and other domestic measures to improve knowledge and expertise (art. 15(2)). Soil rehabilitation is required in some circumstances; for example, where tourism has caused significant soil or vegetation damage, the Parties must 'take the necessary remedial action' as soon as possible (art. 14(3)). Article 7(4) also states that, 'where natural conditions allow it, disused or impaired soils, especially landfills, slag heaps, infrastructures or ski runs, shall be restored to their original state or shall be recultivated' (art. 7(4)).

Draft EU Framework Directive for Soil Protection (2006)

In 2006, the European Commission presented a draft Framework Directive for the Protection of Soil (‘draft Soil Directive’), in an attempt to fill a perceived gap in existing European environmental legislation. The aim of the draft Soil Directive is to establish a common strategy for the sustainable use of soil by integrating soil concerns into other policies, preserving soil functions, preventing threats to soil and restoring degraded soil. Neither the high variability between soil types and functions across Europe, nor the fact that soil is mostly privately owned, were ultimately viewed by its proponents as obstacles to the draft Soil Directive (European Commission 2006a: preamble, paras 5 and 12).

In developments leading to the draft Soil Directive, soil contamination was identified as one of eight major threats to soils in the European Union (European Commission 2002). Contamination is referred to at length in the preamble to the original draft Directive, and specific measures to be taken by Member States are set out in Chapter III of the Directive. Member States would be obliged to take preventive measures to limit the introduction of contaminants, both intentional and unintentional, into the soil. They would also have to identify potentially contaminated sites (art. 10(1)) within their territory and establish a national, publicly accessible inventory of them, which would be reviewed every 5 years (art. 10(2)). An evaluation of the risk would have to take into account the current and approved future use of the land in question (art. 10(1)).

Under the original draft Directive, Member States would have to task a competent authority with identifying the location of all potentially contaminated sites within five years of the Directive being transposed into national law (art. 11(2)). Potentially contaminating activities are listed in Annex II of the draft Soil Directive and are considered ‘contaminating’ whether they took place in the past or are ongoing. The competent authority would be expected to measure the concentration levels of dangerous substances at all identified contaminated sites gradually, over a certain timeframe (art. 11(3)). An on-site risk assessment would be necessary for sites posing a significant risk to human health or the environment, following the same timetable.

Other requirements of the original draft Soil Directive relate to the provision of detailed soil status reports in transactions involving potentially contaminated land (art. 12), the remediation of all listed contaminated sites such that they no longer pose any significant health or environmental risk (art. 13(2)), funding for orphan site remediation where the polluter-pays principle cannot be invoked (art. 13(3)), and developing a National Remediation Strategy on the basis of identified contaminated sites (art. 14).

The remainder of the draft Soil Directive is predominantly preventive. It addresses, in fairly general terms, the issues of soil sealing (art. 5), erosion, organic matter decline, compaction, salinisation and landslides (art. 8). Soil sealing practices must be limited and its effects on soil mitigated (art. 5). In relation to the other issues (‘risk areas’), Member States would be required to draw up a programme of measures, including risk reduction targets, measures for reaching those targets, a timetable for implementation, and an estimate of the relevant funding (art. 8(1)). The precautionary approach would be applied to all soil degradation issues, to the effect that any land users whose actions will significantly affect soil functions must take action to prevent or minimise those adverse effects (art. 4).

Following its initial proposal by the European Commission in September 2006, the draft Directive was adopted at the first reading stage by the European Parliament in late 2007. The relevant resolution (European Parliament 2007b) states that

> an EU framework directive is fully justified in accordance with the principles of better lawmaking, given that the evaluation of existing EU legislation and of voluntary options based on the transfer of know-how still reveals gaps in soil protection. It considers that a framework directive is an adequate measure, having due regard for the subsidiarity principle and subject to proportionality[.]

However, the draft Directive requires adoption by both the Parliament and the Council of Ministers, and from its earliest stages the draft Directive has met with considerable opposition from a minority of countries in the Council of Ministers. Germany, the United Kingdom, Austria, France, the Netherlands and Malta have together blocked any further action on the draft Directive (Phillips 2010), opposing it primarily on the basis that it breaches the subsidiarity principle. The subsidiary principle, which is enshrined in the Treaty of Europe (2008, art. 5), states that any action taken by the European Union must either fall within its exclusive competence or be more effective than action taken at the national, regional or local levels. The minority countries argue that soil is a local or national issue and therefore should be dealt with exclusively at that level.

Other criticisms levelled at the draft Directive by its opponents are that its provisions are superfluous to existing national and regional measures (European Parliament 2007a); it would place a heavy cost burden on those countries which already have specific soil policies or legislation in place (Common Forum on Contaminated Land in the European Union 2007); the wording of the text is too inflexible (Council of the European Union 2007b); and it unfairly places the burden of liability on land-users rather than those responsible for soil damage. Conversely, proponents of the draft Directive—particularly environmental groups—have argued that the wording of the proposed draft should be clarified and strengthened (European Environmental Bureau 2006); and that it focuses too much on soil contamination issues to the detriment of other soil threats (e.g., Euromines 2007). Despite its perceived flaws, there were several endorsements of the original draft Soil Directive, including from industry networks, environmental groups and other commentators (e.g., European Environmental Bureau 2010; Network for Industrially Contaminated Land in Europe 2007b; Papanicolaou 2007).

Discussions of the proposal have been ongoing throughout the various European presidencies from 2007 to date, and all have been unsuccessful despite the sustained efforts of individual Presidents. A number of revised drafts of the Directive have been put forward over time. In September 2008, in response to the objections raised by the minority countries, the French Presidency of the EU issued a watered-down version of the draft Directive (Council of the European Union 2008a). This failed to gain sufficient support, and talks on the Directive stalled even after that proposal was itself revised in December 2008 (Council of the European Union 2008b; ENDS Europe 2008).

In March 2009, negotiations were revived under the Czech Presidency of the EU, which released another version of the draft Directive (ENDS Europe 2009a). The most divisive issue at that time was the procedure for dealing with contaminated sites, and in particular whether all sites should be addressed simultaneously (as proposed by the Commission) or prioritised through risk assessment (ENDS Europe 2009a). Shortly afterwards, the German Government proposed that a non-binding strategy on soil replace the draft Directive (ENDS Europe 2009b). According to observers (e.g., EurActiv 2010),

> Some delegations are already suggesting that after years of deadlock over the dossier, it is time for the EU to look at 'alternative ways' of promoting soil protection without overtly focusing on legislation.

In April 2009, the Czech Presidency revised its draft proposal once again in response to ongoing resistance from the blocking minority (Council of the European Union 2009b). However, by June 2009 it was evident that little progress was being made on the Directive (ENDS Europe 2009c; Rankin 2009).

A revised draft Protocol put forward by Spain in 2010 proposed that Member States be required to identify places where soil is at risk and take steps to protect it; draw up plans to remediate contaminated soil; and give authorities responsibility for soil at abandoned industrial sites (Council of the European Union 2010a; European Commission 2012: 14–15; Rankin 2010a, b). This draft was again rejected by the minority countries, on the ground that the same fundamental problems with the original draft remained unchanged (Rankin 2010a; Council of the European Union 2010b). In early 2012, the European Commission identified the main issues as subsidiarity, excessive cost and administrative burden.

For its part, the European Commission has continued to apply pressure to the minority Member States blocking the draft Directive. It has held conferences and workshops, released detailed reports, and issued statements on the important role played by soil in efforts to both combat climate change and protect biodiversity (European Commission 2008a, b, 2009; Turbé et al. 2010). However, the failure of the international community to reach a binding agreement on climate change in late 2009 may have somewhat reduced the impetus of the Commission's message. The controversial form and wording of the draft Soil Directive mean that it is unlikely to be finalised and agreed upon for several more years, if at all.

ASEAN Agreement on the Conservation of Nature and Natural Resources (1985)

The Association of South East Asian Nations' (ASEAN) Agreement on the Conservation of Nature and Natural Resources is the only regional instrument outside of Europe that promotes measures for soil protection generally, and the improvement and rehabilitation of damaged soils in particular. Article 7 of the Agreement requires the Parties to

> take measures, wherever possible towards soil conservation, improvement and rehabilitation; they shall, in particular, endeavour to take steps to prevent soil erosion and other forms of degradation, and promote measures which safeguard the processes of organic decomposition, and thereby its continuing fertility.

To this end, Parties are called upon to establish land use policies aimed at avoiding damage to the structure of the soil, and to take appropriate measures to rehabilitate degraded soils, including rehabilitation of soil affected by mineral exploitation (art. 7).

Avoiding and mitigating environmental degradation are key objectives of the Agreement. It obliges Parties, wherever possible, to prevent, reduce and control degradation of the natural environment. In particular, they are to promote pollution control and the development of environmentally sound industrial processes and products (art. 10(b)). An early version of the 'polluter pays' principle is incorporated into Article 10(d), which requires Parties

> as far as possible to consider the originator of the activity which may lead to environmental degradation responsible for its prevention, reduction and control as well as, wherever possible, for rehabilitation and remedial measures required.

Koh (2003: 5) comments that this enunciation of the polluter pays principle significantly pre-dated the Convention on Biological Diversity (1992) and subsequent international environmental treaties, which also invoked the principle.

The Agreement states that environmental impact assessment should also be undertaken for activities that may significantly affect the environment (art. 14). The adverse effects of any such activities that do proceed should be monitored with a view to taking any appropriate remedial action.

The ASEAN Agreement has been seen as a 'remarkable' and 'progressive' instrument that reflected a 'state of the art' holistic approach to environmental conservation and management when it was first made (Koh 2003: 3–4). However, more than 25 years after its creation, the Agreement is yet to enter into force. This may be due in part to perceptions by some ASEAN governments that the Convention on Biological Diversity and other global environmental treaties have usurped the role of the ASEAN Agreement. According to Koh (2003: 8), this belief is misplaced, because

> the ASEAN Agreement could in addition to [the] CDB and other biodiversity instruments provide a complementary overarching framework to deal with ASEAN's bioregion at the subregional level, as well as at the national level[.]

Another possible reason for the failure of some Parties to ratify the Agreement may be the preference by ASEAN Member States for a cooperative (i.e., in this context, 'soft law') approach to problem-solving. Koh and Robinson (2002: 642–643) refer to this consensus-building approach as the 'ASEAN Way', which is based on principles of non-interference and non-intervention in state sovereignty. Other possible reasons for non-ratification may include a lack of implementation 'readiness', lack of scientific data, and lack of capacity (Koh 2003: 10–11). However, Koh contends that none of these reasons are sufficient in themselves to justify a failure to ratify.

As Boer (2002: 538) notes, the ASEAN Agreement "has the potential to influence environmental planning and management at a regional level, and to promote legislative reform at a national level". It can provide both a comprehensive approach to environmental conservation in the region, and "a basis for detailed regional plans in every area of environmental management" (Boer 2002: 539). However, Boer contends that a stronger regional legal regime is needed, and that the first step towards achieving this would be the ratification of (and accession to) the Agreement by the remaining Parties and ASEAN Member States.

African Convention on the Conservation of Nature and Natural Resources (1968, Revised 2003)

The 2003 revised African Convention requires Parties to take all appropriate measures to prevent, mitigate and eliminate 'to the maximum extent possible' the adverse effects on the environment of radioactive, toxic and other hazardous substances and wastes (art. XIII). To this end, countries should use the 'best practicable means', and establish, strengthen and implement national standards (art. VI). The Parties should also use economic incentives and disincentives to mitigate environmental harm and restore environmental quality (art. XIII.2(b)). Efforts should be made to harmonise national policies with those of the other Parties (art. XIII.2(a)).

Until relatively recently, these provisions may have had little significance for contaminated sites, as other types of land degradation—such as desertification and soil erosion—have tended to be the primary focus of regional and international action in Africa. However, it is now recognised that site contamination is a growing problem in most African countries (United Nations Environment Programme 2003: 43). The causes of site contamination in this region vary widely, from chemical and industrial manufacturing activities, oil refineries, landfill sites and medical waste, to mining practices, stockpiles of obsolete toxic chemicals and electronic waste (United Nations Economic Commission for Africa 2008: 71).

3.3.1.3 Bilateral Level

There are no known bilateral agreements on soil protection at present, although there are numerous agreements on environmental protection in general, of which soil protection is one sub-issue.

Conclusions: Soil Protection Law

From a review of current international, regional and bilateral law, it is apparent that, with the exception of the Desertification Convention and the EU Soil Protocol to the Alpine Convention, international soil protection law as such is non-existent. The soil protection role of existing international and regional agreements is limited to certain types of soil damage, such as desertification (particularly in Africa) and soil erosion (e.g., as a result of forestry practices in Asia and elsewhere). Therefore both the geographical scope and the breadth of soil issues covered by these agreements are restricted. Although the EU Soil Protocol to the Alpine Convention is dedicated to the specific issue of soil conservation (art. 1), site contamination is addressed as only one minor aspect of that issue (arts. 15, 17).

Following their own detailed review of international law, Hannam and Boer (2002: 72) conclude that

> The existing binding instruments are insufficient as a framework for soil as they fall well short of including anywhere near a sufficient range of legal elements that are needed to protect and manage soil in a sustainable way.

While non-binding instruments on the subject exist at the international and regional level, these have not led to more formal measures to protect soil. The degree of controversy surrounding the release of the draft EU Soil Directive in 2006 suggests that formalisation of soil initiatives is likely to be lengthy, even in a relatively proactive region. The apparent shortcomings of the draft Soil Directive may also undermine its long-term effectiveness and subsequently its credibility as a leading example of soil protection law.

Hannam and Boer (2002) consider it a 'major concern' that the existing international environmental law regime does not provide any guidance to States in relation to the reform or development of national soil legislation. On the basis of their research into international and regional law on soil protection, they identify the elements of a possible 'international legal framework for soil' (Hannam and Boer 2002: 58). Other efforts have been made to discuss the possibility of an international soils convention, although they have either concluded that a convention would not be possible, or their proposals have received a lukewarm response (e.g., Wynen 2002). Despite the slow progress being made on the issue of international soil protection, efforts to promote an appropriate international instrument are nonetheless continuing (Wyatt 2008; Boer and Hannam 2011).

3.3.2 Pollution and Pollutants

Given the similarities between the concepts of 'contamination' and 'pollution', and 'contaminants' and 'pollutants', it is important to examine the existing body of anti-pollution laws to determine whether they have any bearing on domestic site contamination measures. Site contamination is indeed one form of pollution (the term ‘point-source pollution’ can also be used to describe site contamination) and, apart from naturally-occurring contamination, the presence of pollutants determines the status of a contaminated site. The approach taken to regulating some types of pollution and pollutants can involve similarly sensitive and complex legal, political and practical issues to site contamination.

The successes and failures of a binding international agreement on a specific group of pollutants or type of pollution can be insightful for the discussion of a possible international instrument on site contamination. Some anti-pollution instruments have been in existence for several years now, allowing lessons to be drawn from their experience. A more detailed analysis of the effectiveness (or otherwise) of global anti-pollution treaties is contained in Chap. 7 below.

With the links between pollution and site contamination in mind, the following section analyses the features and relevance of several key international treaties, including those on persistent organic pollutants, prior informed consent for international trade in hazardous chemicals and pesticides, major industrial accidents, and transboundary hazardous waste movements and disposal. A brief analysis of two key international law cases on transboundary pollution then follows, as these make an important contribution to the body of international law on the subject, and could have a significant impact on the small percentage of contaminated sites involving transboundary issues. Several regional instruments on pollution and pollutants, with a particular focus on European treaties, directives and regulations, are then discussed, reflecting the segregated regulatory approach of the European Union to different elements of the environment. Finally, the scarcity of bilateral anti-pollution instruments is noted.

3.3.2.1 International Level

There are several binding agreements at the international level that regulate the use, transport and disposal of particularly toxic or hazardous pollutants. Perhaps the most successful of these agreements, in terms of its relatively short negotiation process and effectiveness in attaining its goals to date, has been the 2004 Stockholm Convention on Persistent Organic Pollutants. Its subject matter is also clearly linked to site contamination, as the toxic chemicals covered by the Stockholm Convention are commonly found at contaminated sites. This Convention is discussed first, followed by international agreements that are more preventive in nature, or are only indirectly related to site contamination in the regulation of certain processes (e.g. transboundary transport or disposal of hazardous waste).

Stockholm Convention on Persistent Organic Pollutants (2001)

The Stockholm Convention on Persistent Organic Pollutants (‘Stockholm Convention’) entered into force in 2004. The Stockholm Convention aims to permanently phase out the use of a group of toxic chemicals, because of the serious threat they present to human health and the environment. It promotes the development of alternative processes and technology and exhorts the international community to take immediate action to eliminate or reduce POPs. It endorses the precautionary principle as a central objective (art. 1).

The relevance of the Convention to site contamination lies primarily in its regulation of the disposal of certain toxic chemicals. The Convention will impact on the management of industrial sites in that countries are obliged to identify where POPs are used, stockpiled or contained in waste. The POPs need not be causing contamination at a site to require action, although by their very nature they are likely to do so. Once POP sites are identified, they must be managed or cleaned up in a safe, efficient and environmentally sound manner, so as to minimise any leaks (arts. 3, 5, 6). The toxic content of any waste materials must also be destroyed.

Rotterdam Convention on Prior Informed Consent for Hazardous Chemicals and Pesticides in International Trade (1998)

A partner to the POPs Convention, the Rotterdam Convention on Prior Informed Consent ('Rotterdam Convention') also entered into force in 2004. As the title indicates, it promotes shared responsibility and cooperation between countries in the international trade of certain hazardous chemicals, by introducing a system of prior informed consent (art. 1). It also aims to 'contribute to the environmentally sound use of those hazardous chemicals' by way of information exchange and improving domestic import and export regulations (art. 1).

Each party to the Rotterdam Convention must implement 'appropriate' domestic measures for the import (art. 10) and export (art. 11) of the listed hazardous chemicals. If a party to the Convention decides not to import one of the listed hazardous chemicals from another country, it must at the same time prohibit any domestic production of that chemical (art. 10(9)(b)). All parties are obliged to exchange scientific, technical, economic and legal information on the listed chemicals and the domestic regulatory measures used to address them (art. 14). Apart from legislative or administrative measures, implementation should include the establishment of national registers and databases on listed chemicals; industry initiatives to promote chemical safety; and the promotion of voluntary agreements (art. 15).

The Rotterdam Convention only affects site contamination in that details of the nature and use of listed chemicals at certain sites may have to be kept on a national database. This may facilitate the earlier identification of potentially contaminated sites in countries which are parties to the Convention, and may result in a more informed management procedure for such sites.

Prevention of Major Industrial Accidents Convention (1993)

The Prevention of Major Industrial Accidents Convention ('PMIA Convention'), convened under the auspices of the International Labour Organization, entered into force in 1997. It has the primary purpose of preventing major accidents involving hazardous substances and limiting the consequences of such accidents (art. 1). While site contamination can clearly occur as a result of a major industrial accident, such accidents are relatively rare and would need to be particularly serious for the provisions of the Convention to apply.

The PMIA Convention covers sudden occurrences, including 'a major emission [. . .] involving one or more hazardous substances and leading to a serious danger to workers, the public or the environment, whether immediate or delayed' (art. 3(d)). According to Article 3(c), a 'major emission' must occur at a 'major hazard installation', i.e. one which

> produces, processes, handles, uses, disposes of or stores, either permanently or temporarily, one or more hazardous substances or categories of substances in quantities which exceed the threshold quantity.

A hazardous substance is 'a substance or mixture of substances which by virtue of chemical, physical or toxicological properties, either singly or in combination, constitutes a hazard' (art. 3(a)).

Parties to the Convention must develop, implement and review a 'coherent national policy' for the protection of workers, the public and the environment against the risk of major accidents (art. 4(1)). Preventive and protective measures are to be used for the management of major hazard installations and to promote the best available safety technology (art. 4(2)). In addition, countries must establish a system for identifying all of their major hazard installations, with employers carrying the obligation of such identification (art. 7). The Convention enables the competent national authority to inspect major hazard installations (art. 18) and to 'suspend any operation which poses an imminent threat of a major accident' (art. 19).

The PMIA Convention is largely preventive in purpose. Its limited relevance to site contamination lies in the identification and inspection of all facilities which may be 'major hazard installations'. If an incident of serious contamination at such an installation is imminent, the national authority could intervene to prevent it or mitigate its effects. However, most site contamination does not occur suddenly, but rather takes place over a lengthy period, perhaps remaining undetected until its effects become obvious.

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1989)

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal ('Basel Convention') entered into force in 1992 with the aim of minimising the generation and movement of hazardous wastes. It promotes 'environmentally sound management' (ESM), which means 'taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner which will protect human health and the environment against the adverse effects which may result from such wastes' (art. 2(8)). It uses mostly preventive language throughout its text.

While the Basel Convention largely targets the movement of hazardous wastes between countries, it also has some relevance for the domestic management of waste. Each Party to the Basel Convention must take 'appropriate measures' to ensure that their domestic generation of hazardous and other wastes is reduced to a minimum (art. 4(2)(a)). They must also ensure the availability of 'adequate disposal facilities' as near as possible to the source of the wastes.

Under the Basel Convention, persons involved in the management of hazardous wastes must take the necessary steps 'to prevent pollution [...] arising from such management and, if such pollution occurs, to minimise the consequences thereof for human health and the environment' (art. 4(2)(c)). This is perhaps more significant for the management of contaminated sites than other provisions in the Convention. It is conceivable that site contamination may arise from hazardous waste operations, such as waste disposal facilities, or chemical manufacturing plants which generate hazardous wastes. Where this occurs, operators have a positive duty to contain the contamination and minimise its detrimental effects.

Basel Protocol on Liability and Compensation (In Relation to Transboundary Wastes)

The Protocol to the Basel Convention was developed to provide a comprehensive regime for liability and adequate, prompt compensation for damage resulting from the transboundary movement of hazardous wastes, including illegal dumping and accidental spills. The scope of the Protocol and its definitions are similar to the provisions of the Basel Convention. However, Article 4 deals with the strict liability of the various persons involved in the movement and disposal of hazardous wastes. Article 5 provides for fault-based liability, Article 9 for contributory fault, and preventive measures are required to be taken under Article 6.

The Protocol is not yet in force, and even if it does become binding on the Parties, its significance for site contamination will be substantially limited to the discrete issue of hazardous wastes (only where, or indeed if, unexcavated site contamination can be defined as hazardous waste), and the domestic aspects of their movement and disposal.

International Jurisprudence

Finally, there are two international decisions that have some potential relevance to the subject of site contamination—one a classic and frequently cited case, the other arising from a recent transboundary dispute in South America.

Trail Smelter Arbitration (United States v Canada)

In this case, a lead and zinc smelter situated at Trail, in British Columbia, Canada, released sulphur dioxide fumes which were carried by air across the border to the United States, where it caused pollution. The output of the Canadian smelter, and the subsequent environmental damage to the United States, increased from 1925. Eventually, an Arbitral Tribunal was convened to settle several matters, including whether further cross-border pollution had occurred since 1932 (when some monetary compensation had been paid to the United States for damage caused), what the appropriate damages should be, whether the smelter operations should cease, and what measures should be taken to this end.

The Tribunal looked to international law and United States legal precedents to find against Canada, concluding (at 1965) that

> [. . .] no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence.

On this basis, the Tribunal found that Canada was responsible in international law for the operations of the Trail Smelter, and must refrain from causing further damage to the United States (Read 2006: 25).

The *Trail Smelter* decision has long been regarded as embodying the fundamental principle of state responsibility, and is often cited in relation to pollution cases (Read 2006; Ellis 2006a: 56). However, this status has been questioned in recent years. In particular, commentators argue that the scope of the decision is confined to situations where serious harm is caused by fumes and evidence of such harm is clear and convincing. These conditions may be difficult to satisfy in all but the most extreme cases of cross-border environmental harm, and perhaps only harm caused by air pollution. As Ellis (2006a: 61) notes, *Trail Smelter* may offer little assistance for the consequences of gradual emissions of pollutants over time, even though these may be 'potentially devastating'.

Therefore, while the decision offers some guidance on the resolution of disputes over cross-border pollution, it may be more influential for instances of severe airborne pollution damage than for cases of transboundary soil or water contamination. It is likely to affect the management of site contamination only where the contaminant is sufficiently mobile to cross an international border, the contamination causes serious harm, and that harm can be clearly proven. In such cases, the national government in whose territory the contamination originates has an obligation to ensure that the contaminating activity either ceases or subsequent cross-border environmental harm is prevented.

The Trail Smelter site has re-emerged in recent court action in the United States, in which US citizens asked the District Court to enforce a site investigation order made by the US Environmental Protection Agency against the Canadian company operating the smelter (*Pakootas v Teck Cominco* 2006). The order had been made under US federal legislation (Comprehensive Environmental Response, Compensation and Liability Act 1980) in relation to contaminants allegedly emanating from the smelter into the Columbia River, and being carried downstream across the Canadian/US border into Lake Roosevelt, Washington State. Teck Cominco, the Canadian company, was held responsible by the US Federal Court for the Lake Roosevelt contamination and effectively made subject to the extraterritorial application of the federal legislation. The Court did not rely on principles of international law in reaching its decision, but rather looked to domestic US law and the intention of Congress.

Pulp Mills on the River Uruguay (Argentina v Uruguay), International Court of Justice (2007)

In 2006, Argentina began proceedings against Uruguay in the International Court of Justice for an alleged breach of the 1975 Statute of the River Uruguay by authorising and commissioning two pulp mills on the River Uruguay without first notifying or consulting with Argentina. Argentina was concerned at the effects of the pulp mills on the quality of the river and surrounding areas, and alleged that Uruguay's actions could cause environmental harm within Argentina.

The ICJ was requested by each country to make 'provisional measures' according to their own respective desired outcomes. Argentina wished to have the pulp mill construction halted and Uruguay wanted to prevent Argentine civilians from blockading the Argentine/Uruguayan border. In its decision of 23 January 2007, the ICJ declined to make any provisional measures and instead called upon the two countries to comply with their obligations to consult with one another under the Statute of the River Uruguay.

In its judgment of 21 April 2010, the ICJ rejected Argentina's claim that Uruguay had breached the substantive provisions of the 1975 Statute. Regarding this matter, the Court held (para 265):

> there is no conclusive evidence in the record to show that Uruguay has not acted with the requisite degree of due diligence or that the discharges of effluent from the Orion (Botnia) mill have had deleterious effects or caused harm to living resources or to the quality of the water or the ecological balance of the river since it started its operations in November 2007.

Although the ICJ held that Uruguay had committed procedural breaches, those breaches were not considered sufficient to justify closing down the pulp mill or requiring compensation to be paid to Argentina (ICJ 2010: paras 269, 276). The pulp mill was therefore allowed to continue operating (ICJ 2010: paras 279–280).

The limited significance of the *Argentina v Uruguay* proceedings is that, where States are parties to a treaty concerning shared natural resources and that treaty contains provisions for minimisation of environmental harm and prior notification and consultation, the parties must fulfil their obligations. Therefore, where one State is contemplating an act which may cause cross-border contamination in an adjacent State, it must observe its particular treaty obligations to that State in addition to general principles of international law on state responsibility. However, as the judgment in *Argentina v Uruguay* shows, there will not always be penalties for parties who commit a breach of the relevant agreement, particularly if the breach is procedural rather than substantive. Court remedies may come too late to prevent or mitigate the harm already caused, and the existing law may not provide adequate compensation or practical remedies to affected parties.

3.3.2.2 Regional Level

There are several agreements on pollution at the regional level, mainly in Europe. These include two initiatives of the United Nations Economic Commission for Europe, the Protocol on a Pollutant Release and Transfer Register and the Convention on the Protection and Use of Transboundary Watercourses and International Lakes. The European Union also has a treaty and several directives and regulations relating to pollution and pollutants, particularly waste. An important decision of the European Court of Justice on the definition of 'waste' has led to changes in relevant EU regulations, and this is discussed below. Lastly, the Bamako Agreement regulates the transportation and disposal of hazardous waste in the African region.

UNECE Protocol (to the Aarhus Convention) on Pollutant Release and Transfer Registers (2003)

This Protocol was developed by the United Nations Economic Commission for Europe (UNECE) under the auspices of the Aarhus Convention. It aims to improve public access to information on pollutants by establishing a nationwide, integrated register in each member country. It is envisaged that such a register would both enhance the environmental decision-making process and help prevent and reduce environmental pollution (art. 1). The Protocol entered into force in 2009.

The Protocol defines 'pollutant' as a substance (or group of substances) that may be harmful to the environment or human health on account of its properties and of its introduction into the environment (art. 2(6)). A 'release' is broadly defined in Article 2(7), as

> any introduction of pollutants into the environment as a result of any human activity, whether deliberate or accidental, routine or non-routine, including spilling, emitting, discharging, injecting, disposing or dumping, or through sewer systems without final waste-water treatment.

The core elements of a publicly-accessible, nationwide pollutant release and transfer register system are set out in Article 4. This is a register of pollutant releases, not contaminated sites as such. The register must be computerised and searchable by specific categories, such as particular facilities (art. 2(4)), owners or operators of facilities, types of pollutants or activities, releases to land, water and air, and transfer destinations. The information is derived from annual, mandatory reporting by facility operators or owners (arts. 4(f), 7 and 8). Only those whose facility is involved in an activity listed in Annex I to the Protocol are required to submit reports (art. 7).

The Protocol may affect operators and owners of potential and actual contaminated sites by requiring regular reporting on any releases and transfers of pollutants that take place (art. 9). The release of a harmful pollutant into the environment as a result of human activity would normally be understood to equate to ‘contamination’, although the Protocol does not explicitly acknowledge this term. The wide definitions of ‘pollutant’ and ‘release’ would encompass many types of contaminants and contaminating activities. Public access to the pollutants register may result in increased public involvement in the decision-making process, for example the granting of a permit for emissions on a site, a transfer of contaminated soil for off-site treatment or disposal, or approval for remediation works which may involve the release of a contaminant.

UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992)

The Helsinki Convention was intended to strengthen national measures for the protection and ecologically sound management of transboundary surface waters and groundwater. It obliges Parties to prevent, control and reduce water pollution from point and non-point sources (arts. 3 and 9). It also includes provisions for monitoring, research and development, consultations, mutual assistance, institutional arrangements, the exchange of information, and public access to information (arts. 4–6, 9–13, 15–16). There are two protocols to the Convention, the 1999 London Protocol on Water and Health and the 2003 Kiev Protocol on Civil Liability.

Article 2(2) of the Convention states that the Parties ‘shall, in particular, take all appropriate measures to prevent, control and reduce pollution of waters causing or likely to cause transboundary impact’. Article 2(5) lists the polluter pays principle and the precautionary principle as among the guiding principles for measures taken by the Parties. Domestic measures must ensure that the emission of pollutants is dealt with at source by appropriate regulation and licensing of discharges (art. 3(1)). The provisions of the Convention are most likely to have a generalised, preventive effect on site contamination within domestic borders, by exerting pressure on Parties to take action against water pollution.

Convention on the Protection of the Rhine (1999)

The Bern Convention covers the Rhine River and connected groundwater, aquatic and terrestrial ecosystems, including the Rhine catchment areas. A major aim of the Convention is to maintain and improve the quality of the Rhine’s waters, by preventing, reducing and eliminating its pollution by noxious substances and point-source nutrients (art. 3(1)(a)). It specifically mentions the precautionary principle, polluter pays principle, and principles of preventive action and rectification at source, as among its guiding principles (art. 4).

Parties to the Convention (Germany, France, Luxembourg, Switzerland, Netherlands and the EU) undertake to analyse the causes of Rhine-related pollution in their territory and identify the parties responsible for such pollution (art. 5(3)). Discharges of waste water must be restricted and authorised, discharges of hazardous substances reduced and eventually eliminated, regulatory compliance monitored, and the risk of pollution from incidents reduced as far as possible by regulatory measures (art. 5(4)). The only contaminated sites to be regulated by this Convention would be those discharging into or otherwise affecting the waters or catchment areas of the Rhine.

Integrated Pollution Prevention and Control (IPPC) Directive (2008/1/EC) (European Union)

The IPPC Directive was first adopted in 1996 and revised in 2008, and contains a set of rules for permitting and controlling emissions from industrial plants. Permits must consider the whole environmental performance of a plant, including, among other factors, emissions to land and water and site remediation after closure (arts. 7 and 9). Contamination occurring at some industrial sites may therefore be regulated by such permits, which may state specific measures to be taken to mitigate the contamination, remediate the site and undertake further monitoring post-closure.

The European Commission updated the IPPC Directive in 2008 as a result of a detailed review of all of the relevant legislation. The revised Directive contains strengthened provisions on soil protection and contamination prevention. Measures include harmonising the obligation to avoid pollution risks, and obliging site operators to return IPPC sites to a 'satisfactory state' (art. 3).

Water Framework Directive (2000/60/EC) (European Union)

The Water Framework Directive ('WFD') was adopted in 2000 to protect rivers, lakes, coastal waters and groundwater in Europe from pollution. It sets a target for all waters to attain a 'good quality' status by 2015 (art. 4(1)(b)(ii)). Specifically, it requires Member States to take largely preventive steps regarding the discharge of pollutants into groundwater (art. 4(1)(b)). However, they must also actively restore all bodies of groundwater and reverse any identified trends of pollution. This seems to require Member States to proactively identify areas of polluted groundwater and take remedial measures. Where a contaminated site may pollute groundwater, onsite remediation may be necessary to curb the pollution.

A 'pollutant' is defined as 'any substance liable to cause pollution, in particular those listed in Annex VIII' (art. 2(31)). The WFD also distinguishes between 'priority substances' and 'hazardous substances', each of which require their own particular measures (arts. 2(30) and 2(29)). 'Pollution' is defined in Article 2(33) as

> the direct or indirect introduction, as a result of human activity, of substances or heat into the air, water or land which may be harmful to human health or the quality of aquatic ecosystems, which result in damage to material property, or which impair or interfere with amenities and other legitimate uses of the environment.

Groundwater Directive (2006/118/EC) (European Union)

The Groundwater Directive, adopted in 2006, requires Member States to take measures to prevent or limit discharges ('inputs') of pollutants into water (art. 6). It defines inputs as 'the direct or indirect introduction of pollutants into groundwater as a result of human activity' (art. 2(4)). Guidelines for establishing threshold values for groundwater pollutants and indicators of pollution are contained in Annex II to the Directive.

Landfill Directive (1999/31/EC) (European Union)

The Landfill Directive aims to prevent or minimise the negative impacts of landfill on the environment, by introducing strict technical requirements for waste and landfill facilities (art. 1). It covers landfills for hazardous wastes, non-hazardous wastes, and inert wastes, and includes onsite waste disposals (arts. 2 and 4). Landfill site operators must prepare and submit a site closure and aftercare plan to address any contamination left *in situ* (art. 13).

Restrictions introduced under the Directive mean that, in general, any soils removed from contaminated sites that are deemed 'hazardous waste' must be disposed of at a dedicated hazardous waste landfill. Due to the high costs of operating such landfills (and subsequently, high disposal fees), the traditional 'dig and dump' approach to contaminated soil is increasingly being replaced with alternative remedial methods, such as in situ soil treatment or containment measures (Gronow 2005: 3). The Directive represents a potentially major shift in the approach to site remediation across European Union Member States.

Waste Directive (2008/98/EC) (European Union)

The 2008 Waste Framework Directive defines 'waste' as 'any substance or object which the holder discards or intends or is required to discard' (art. 1(a)). It requires Member States to ensure that waste is recovered and disposed of without endangering human health, and without using processes or methods which could harm the environment, particularly elements such as soil and water (art. 13). Particular types of waste disposal operations must carry a permit (art. 23). Facilities carrying out their own onsite non-hazardous waste disposal or waste recovery processes may be exempted from the permit requirement (art. 24). 'Hazardous waste' is defined as waste which displays one or more of the hazardous properties listed in Annex III of the Directive (art. 3). Annex I lists several categories of substances which are 'contaminated', including 'contaminated materials, substances or products resulting from remedial action with respect to land'.

Traditionally, domestic waste management legislation was seen to encourage a 'dig and dump' approach to contaminated site remediation (Waite 2005: 38). In the United Kingdom, for example, waste management controls were criticised for leading to unjustified management costs for contaminated sites, discouraging redevelopment of brownfield land, and failing to provide incentives for the use of alternative remedial technologies (Waite 2005: 38).

In the 2004 decision of *Van de Walle*, the European Court of Justice gave a liberal interpretation of 'waste' as defined under the original 1991 version of the Waste Directive. The case involved the contamination of soil and groundwater as a result of an accidental leak of hydrocarbons from a petrol station in Belgium. The Court ruled (at para 62) that both the contaminant and the resulting contaminated soil, even where that soil had not been removed, were 'waste'. The Court also took a broader approach to the allocation of responsibility for the disposal and recovery of waste, particularly the definition of a 'holder' of waste (McIntyre 2005: 118).

The ECJ decision generated substantial debate and confusion over whether all contaminated soil could be considered 'waste' (McIntyre 2005: 118). According to one commentator at the time, *Van de Walle* brought contaminated soil within the scope of domestic and European waste law and had a potentially 'profound impact on the application of rules imposing liability for the remediation of contaminated sites' (McIntyre 2005: 118). The decision was considered to undermine fundamental established principles of 'suitability for use' and 'risk-based land management' by preventing usable materials from being reused (Network for Industrially Contaminated Land in Europe 2007a: 1). However, Waite (2007: 347) contends that the *Van de Walle* decision has been wrongly interpreted, and that its application is much narrower than is commonly understood.

Van de Walle prompted a review of the 1991 Waste Directive, along with several other pieces of European legislation relating to waste (Council of the European Union 2007a). As a result, and in an effort to clarify the legal definition of 'waste', the 2008 Waste Framework Directive now expressly excludes from the definition any 'land (in situ) including unexcavated contaminated soil and buildings permanently connected with land' (art. 2(1)(b)). Also excluded from the definition of 'waste' (art. 2(1)(c)) are

> uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated[.]

Therefore, contaminated soils that are remediated in situ are not covered by the Directive, and nor are excavated clean soil or other natural materials where they will be reused on site. However, contaminated soil that is excavated and remains onsite, or that is removed for offsite treatment and/or disposal, is still subject to the requirements of the Directive.

Regulation (EC) No 850/2004 on Persistent Organic Pollutants (POPs Regulation) (European Union)

The POPs Regulation was amended in 2006 to more fully incorporate Europe's obligations under the Stockholm Convention on Persistent Organic Pollutants. Its objective is to protect human health and the environment by prohibiting, phasing out, or restricting the production, trade and use of POPs (art. 1). Measures and timelines are set out for the reduction, minimisation and elimination of POPs releases (art. 6). Waste producers must ensure that waste is not contaminated with POPs or, where such contamination occurs, that the POPs element is permanently destroyed as soon as possible (art. 7).

Regulation (EC) No 166/2006 on the Establishment of a European Pollutant Release and Transfer Register (European Union)

The European Union adopted the EPRTR Regulation in 2006, in response to the 2003 United Nations Economic Commission for Europe (UNECE) Protocol on a Pollutant Release and Transfer Register, to which it is a signatory. The Regulation creates a publicly accessible database to assist in the prevention and reduction of environmental pollution (art. 1). Similarly to the Protocol, the Regulation defines 'pollutant' and 'release' broadly (arts. 2(9) and 2(10)).

The Register will include information on pollutant releases and off-site transfers of waste, both of which are to be reported by operators (arts. 3(a) and 3(b)). Reports need only be made annually and if threshold values are exceeded (art. 5). The Regulation envisages the development of guidelines for the monitoring and reporting of pollutants, in accordance with 'internationally approved methodologies, where appropriate' (art. 9(4)).

Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes Within Africa (1991)

Created by African countries with a similar purpose to the 1989 Basel Convention, but with stricter controls on hazardous wastes, the Bamako Convention entered into force in 1998. The Bamako Convention defines 'management' as the prevention and reduction, as well as the collection, transport, storage and treatment, of hazardous wastes (art. 1(3)). Parties have a broad obligation to adopt a preventive, precautionary approach to pollution issues, by preventing the release into the environment of substances which may cause environmental or human harm (arts. 3(f) and 3(g)).

3.3.2.3 Bilateral Level

There are only two agreements at the bilateral level on the specific issue of pollution, both of which do specifically refer to site contamination, but to a very limited number of contaminated sites.

United States-Germany Bilateral Agreement on Remediation of Hazardous Waste Sites (1990)

The United States Environmental Protection Agency (USEPA) and the German Federal Ministry of Education and Research entered into a Bilateral Agreement on Contaminated Waste in 1990. The objective of the Agreement is to improve each country's approach to the remediation of hazardous waste sites, through an evaluation of current practices and exchange of technologies (United States-Germany Bilateral Working Group 2000, 2001: 2).

The Bilateral Working Group, established to implement the Agreement, is currently in its fifth phase of operations (United States-Germany Bilateral Working Group 2012). Over the past decade the Bilateral Working Group has held several conferences and has developed publicly accessible tools to assist with redevelopment of contaminated land. The German partner organisation has since been changed to the German Federal Environment Agency (Umweltbundesamt).

Exchange of Notes Between Canada and United States on Environmental Issues (1996)

This agreement deals specifically with a 'lump sum' payment by the United States to Canada to meet the cost of remediating several former-US military sites in Canada. It has no relevance to contaminated sites beyond those military sites specified.

3.3.2.4 Conclusions: Pollution and Pollutants

There are several international and regional instruments on pollution and pollutants, focussing primarily on specific types of chemicals, hazardous substances and wastes, and pollution processes. None refer to site contamination, except in the broad sense of preventing or managing pollution, or in the very narrow sense of imposing cleanup obligations for particular substances (such as POPs) or sites (e.g. the US-Germany Bilateral Agreement). Nor can the existing international jurisprudence on state responsibility, provided by the *Trail Smelter* case, necessarily be applied generally to all environmental damage caused by one State to another. Moreover, the proportion of site contamination having a transboundary impact is small compared to the number of sites with domestic impacts only.

3.3.3 General Environmental Protection

This category encompasses instruments that have broad environmental objectives. There are many binding and non-binding instruments with the general purpose of environmental protection, at the international, regional and even bilateral levels. While most of these are only indirectly relevant to site contamination, they nonetheless play an important role in enhancing public awareness of environmental issues, which in turn may eventually lead to a greater knowledge of the environmental impacts of site contamination, among other factors. The national legislation, policies and plans of action that individual countries implement to comply with these instruments may be the foundation for more specific action on pressing domestic environmental issues. In some countries, site contamination is already considered a high priority for action. In others, that recognition is yet to emerge but may result from concerted efforts to collate relevant information at the domestic level.

3.3.3.1 International Level

At the forefront of binding international agreements on environmental protection is the Convention on Biological Diversity, although its ramifications for the domestic regulation of site contamination are indirect and minimal at best. However, its implementation has raised awareness of environmental issues more generally, as have several non-binding initiatives at the international level. These include declarations, action plans, programmes, draft covenants and standards created by the United Nations and other international organisations, all of which are referred to below because they have potential relevance (albeit indirect) to site contamination. Another important consideration at the international level is the precautionary principle, although its role is largely preventive in terms of site contamination.

Convention on Biological Diversity (1992)

The Convention on Biological Diversity (CBD) entered into force in 1995 and contains broad obligations for States to protect biodiversity and remedy damage caused to it (arts. 8(f), 10(a) and 10(d)). These obligations are underpinned by the central aim of the CBD, which is to promote ‘sustainable development’ (arts. 1 and 3). As with all other existing international treaties, site contamination is not mentioned in the text of the Convention. However, principles contained in the CBD may be broadly applicable to the management of site contamination, encompassing preventive, mitigating and remediation measures insofar as they affect the conservation of biological diversity.

For example, Article 7(3) of the Convention states that:

> Parties shall [. . .] identify processes and categories of activities which have or are likely to have significant adverse impacts on the conservation and sustainable use of biological diversity, and monitor their effects through sampling and other techniques.

It is conceivable that parties to the Convention would identify activities that cause site contamination as activities that are likely to have significant adverse impacts on biological diversity, and that they would be obliged to take appropriate actions to minimise and monitor those impacts. However, Article 7(3) appears to refer only to current activities, rather than past activities, so this would not cover historic contamination.

Some countries have already identified ways of measuring the impacts of contaminants on biological diversity. For example, Australia has developed 'Ecological Investigation Levels' (EILs), which measure the concentration of a contaminant, above which further appropriate investigation and evaluation of ecological impacts will be required (National Environment Protection Council (Australia) 1999: sched. B5). The EILs have been prepared 'specifically for the protection of terrestrial biota from the adverse effects of chemical contaminants in soil'. The ecological values to be protected vary, depending on several factors, and both existing and proposed site uses are taken into account when applying EILs.

The Conferences of the Parties to the CBD, together with the Subsidiary Body on Scientific, Technical and Technological Advice, have in recent years focused on reducing soil degradation, although mainly in the context of agricultural practices (Secretariat for the Convention on Biological Diversity 2008; United Nations Environment Programme 2002). There have been no initiatives on, or references to, site contamination by the Parties to the CBD at the international level, except in relation to the use of pesticides by farmers. Despite this, it is encouraging that some countries are integrating CBD principles into domestic decision-making processes on site contamination.

The Precautionary Principle

Principle 15 of the 1992 Rio Declaration on Environment and Development is often cited (see, e.g., Dickson and Cooney 2005: 5) as the classic articulation of the precautionary principle:

> Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

The precautionary principle has been applied and interpreted in many different ways in both international and national law and policy (Dickson and Cooney 2005: 5). It is also often referred to as a 'precautionary approach', and whether there is any real distinction between the two terms is debated (see, e.g., de Sadeleer 2007: 3). Regardless of the specific term used, the notion of precaution is broadly identifiable (de Sadeleer 2007: 4–5) as

> the premise that complete certainty regarding an environmental harm should not be a prerequisite for taking action to avert it….[It] supports action to anticipate and avert environmental harm in advance of, or without, a clear demonstration that such action is necessary.

The principle requires only that there be a threat of ‘serious and irreversible’ environmental damage, not actual damage, but there should be some persuasive scientific evidence to support the threat (Preston 2008: 168). If such a threat can be shown, the proponent of the environmental harm then has the burden of proving that the threat either does not exist or is negligible (Preston 2008: 168).

It is unlikely that the precautionary principle has yet attained the status of a norm of customary international law (Ellis 2006b: 445). Observers remain divided on this issue and some indicate that the absence of the application of the precautionary principle in decisions by international tribunals is one reason for its lack of legal status (Ellis 2006b: 448). Where the precautionary principle is incorporated into international soft law instruments, countries are encouraged, but not legally bound, to adopt the principle in their law- and policy-making. For its part, the Rio Declaration calls on States to apply the precautionary approach widely and in accordance with their capabilities (principle 15).

In relation to site contamination, a broad application of the precautionary approach could include the introduction of legal measures to require investigations into suspected contaminated sites and action even where contamination, or risks to the public or environment, are not yet confirmed. Justice Preston (2008: 169) states that

> In the context of contaminated land, the precautionary principle can operate in at least two ways: first, to prevent contamination of land in the first place and second, to remediate and manage contaminated land.

In relation to the remediation and management of contaminated land, the precautionary principle can require a site operator to take appropriate remedial measures to manage a contaminated site. This is evidenced by the European Directive on Environmental Liability, in which Articles 6 and 7 set out requirements for operators to take such action without delay.

The recent emergence of site-based risk assessment of contaminated land, and the in situ retention of contaminants, may present a challenge to efforts to comply with the precautionary principle. The fact that many sites will not be completely ‘cleaned up’ leaves open the possibility that ‘serious or irreversible damage’ may occur at some point in the future, and that further remediation could be required. While the precautionary principle obliges countries to avoid such damage wherever possible, it could be argued that emerging trends in site remediation represent a compromise in the operation of the principle. On the other hand, the reference within the precautionary principle to ‘cost-effective’ measures may serve to justify the adoption of the risk assessment approach to site contamination, rather than the expensive multifunctionality approach used in the 1980s (see Sect. 2.6.1 above).

Stockholm Declaration on the Human Environment (1972)

The Stockholm Declaration is broadly relevant to site contamination in that it emphasises the need for careful management of natural resources, including land and water, for present and future generations (principles 2 and 7). It also specifically links pollution to ecosystem damage, calling for a halt to 'the discharge of toxic substances or of other substances [. . .], in such quantities or concentrations as to exceed the capacity of the environment to render them harmless' (principle 6). However, there is no reference to the other impacts of pollution and the Stockholm Declaration provides no detailed guidelines for the 'careful management' of land or water.

Rio Declaration on Environment and Development (1992)

The Rio Declaration, adopted 20 years after the Stockholm Declaration, is more clearly focused than its predecessor. It recognises the need for 'effective environmental legislation' (principle 11). It specifically asks States to develop national laws on liability and compensation for pollution victims (principle 13), and refers to the 'polluter pays' principle (principle 16). The Declaration also espouses the 'precautionary principle' (principle 15) and calls for national environmental impact assessment procedures for proposed activities 'that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority' (principle 17).

Agenda 21: The United Nations Programme of Action from Rio (1992)

Agenda 21 is described by the United Nations (Department of Economic and Social Affairs 2012) as

> a comprehensive plan of action to be taken globally, nationally and locally by organizations of the United Nations System, Governments, and Major Groups in every area in which human impacts [sic] on the environment.

Chapter 10 of Agenda 21 refers to the need for an integrated and sustainable approach to the use of land resources, through the development of planning and management tools. Chapter 19 recognises that

> Gross chemical contamination, with grave damage to human health [. . .] and the environment, has in recent times been continuing within some of the world's most important industrial areas. Restoration will require major investment and development of new techniques.

Specific recommendations are made for the environmentally sound management of chemicals at the national, regional and global level (para 19.4). At the national level, these include establishing risk reduction programmes and strengthening national capacities for chemicals management. Governments are requested to identify, assess, reduce and minimise, or eliminate as far as feasible by environmentally sound disposal practices, risks from storage of outdated chemicals (para 19.49(i)).

Agenda 21 identifies the capacity for rehabilitation of contaminated sites as one of the basic elements for sound management of chemicals (para 19.56). However, apart from these two brief references in Chapter 19, site contamination receives no further mention in the text of Agenda 21. As the most comprehensive set of recommendations made so far at the international level on human-induced environmental impacts, this absence is significant. It suggests that, at the time, the international community did not perceive site contamination to be an appropriate issue for inclusion in Agenda 21.

IUCN Draft International Covenant on Environment and Development (2010)

Apart from espousing precaution and prevention of environmental harm, the Draft Covenant (art. 18) calls on countries to:

> Take all appropriate measures to ensure the conservation and where necessary the regeneration of soils for living systems by taking effective measures to [. . .] safeguard the processes of organic deposition and to promote the continuing fertility of soils.

Water quality should also be maintained and restored where appropriate (art. 19). Any particular substances, technologies, processes and types of activities having actual or likely significant adverse effects on the environment or public health should also be identified and evaluated by governments, with subsequent action being taken to regulate or manage them to prevent harm (art. 23). Environmental impact assessment procedures are to be followed for activities which pose a significant risk (art. 38).

With regard to pollution, countries should take steps to ‘prevent, reduce, control and eliminate, to the fullest extent possible, detrimental changes in the environment from all forms of pollution’ (art. 24). In doing so, they should employ the ‘best practicable means at their disposal’ and endeavour to harmonise their policies. However, they should avoid any attempt to transfer harm or hazards from one area to another, or one type of environmental harm to another (art. 14).

Although there is no specific reference to site contamination within the Draft Covenant, the explanatory materials accompanying the text refer to the need to devise effective remedies for environmental harm. It states (at 145), in relation to Article 52 on the Consequences of Failure to Prevent Harm, that

> A particular focus should be on restoring the environment, particularly protected areas or fragile ecosystems [. . .] after environmental harm has occurred. Remediation may include ‘any reasonable measures aiming to reinstate or restore damaged or destroyed components

> of the environment, or to introduce, where reasonable, the equivalent of these components into the environment.

The relevance of Article 52 for site contamination is limited, however, as it focuses primarily on sites or areas which have particularly sensitive ecosystems or high conservation value.

UNEP Montevideo Programme III (2001–2010) and IV (2011–2020)

The Programme for the Development and Periodic Review of Environmental Law for the First Decade of the Twenty-First Century (Montevideo Programme III) presented a 10-year strategy for the involvement of UNEP in environmental law developments worldwide. Improvement in the conservation, rehabilitation and sustainable use of soils was an objective identified in the Programme (area 12). To this end, domestic land use laws were to be reviewed and soil conservation measures were to be incorporated into all relevant domestic laws. Similar measures were required in relation to water conservation (area 10). No specific reference to site contamination was made.

The Third Programme also sought to prevent, reduce and control environmental pollution by strengthening and expanding existing laws and policies and developing new ones (area 15). It identified developing countries and those with economies in transition as being particularly in need of assistance, and outlined the types of assistance required. According to the United Nations Environment Programme (2009c: 3), 'developing countries are, to a large extent, lacking comprehensive national legislation and therefore do not have applicable legislation in environmental damages cases.'

Partly in response to this need, and in the specific context of environmental liability, UNEP is now finalising 'draft guidelines for the development of national legislation on liability, response action and compensation for damage caused by activities dangerous to the environment' as part of the Fourth Montevideo Programme (2010–2020). The new Programme was adopted at the 25th Session of the UNEP Governing Council/Global Ministerial Environment Forum in early 2009 (United Nations Environment Programme 2009c).

Montevideo Programme IV consists of 27 programme areas, of which the management and sustainable use of soils is one, and the prevention, mitigation and compensation of environmental damage is another (United Nations Environment Programme 2009c: paras 8(b)(iii) and 8(a)(iii)). In relation to soil, the Programme (Annex, 11) aims to promote

> the development, dissemination and implementation of laws and policies that aim to enhance the conservation, sustainable use, control and reduction of soil degradation and, where appropriate, restoration of soils[.]

In particular, efforts to review and implement domestic land-use laws are to be encouraged, existing domestic legal measures are to be strengthened to address the restoration of soils on an 'as needed' basis, and educational programs are to be provided to improve understanding of the legal aspects of sustainable soil use. In relation to environmental damage, the role of the polluter pays principle and the effectiveness of civil liability regimes are to be closely studied under the Programme. It also recognises the need to analyse the ‘adequacy and effectiveness of ways and means of providing compensation, remediation, replacement and restoration for environmental damage’ (United Nations Environment Programme 2009c: 4).

ISO 14000 Standards

The International Organization for Standardization (ISO) develops internationally applicable, but non-binding, standards which specify the requirements for products, services, processes, materials, systems and organisational management. These standards are essentially for preventive rather than remedial purposes. There are two broad categories of ISO standards which are relevant to site contamination: the ISO 14000 set of standards, and the numerous, very specific standards which apply to soil and water quality. The latter have been devised to achieve standardisation in particular aspects of soil quality, and deal with topics such as soil assessment, soils in situ and soil materials intended for reuse. Many of these standards are still under development by the relevant ISO technical committees.

ISO 14000 is an international standard for the development and implementation of an environmental management system (EMS) to deal with the environmental impacts of running an organisation. To achieve the standard, companies must adopt particular practices as prescribed in ISO 14001:2004, at which point they become certified and may adopt additional ISO 14000 standards. These include ISO 14004 (EMS development), 14011 (EMS monitoring), 14040 (environmental performance product lifecycle monitoring), 14030 (environmental performance target monitoring) and 14063 (environmental performance public communication). EMS is applied to many environmental aspects of business activities that are potentially relevant to site contamination, including hazardous materials management and emissions reductions.

There are several aspects of ISO 14001 which could be applicable to site contamination (see, e.g., Environment Agency (UK) 2005: 18). To obtain certification, companies must examine past, current and future activities and identify any possible environmental impacts. Any relevant environmental law requirements or industry standards must be complied with. Companies must take responsibility for activities of other entities over which they have influence, not only activities over which they have direct control. There are also many ISO standards (some of which are still under development) relating to sampling, testing and analytical methods for the monitoring of specific environmental aspects, such as soil and water quality (Elias 2000). For example, ISO 16712:2005 covers sediment, soil and water pollution, biological analysis and testing, toxic materials and toxicity. Among others, ISO 16703:2004 and ISO 16772:2004 provide standards for soil testing for particular substances.

3.3.3.2 Regional Level

There are some binding agreements on environmental protection at the regional level, including the UNECE Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Europe), North American Agreement on Environmental Cooperation, and the Convention for the Protection of the Natural Resources and Environment of the South Pacific Region. All of these have only broad, indirect relevance to site contamination.

United Nations Economic Commission for Europe (UNECE) Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (1998)

The Aarhus Convention entered into force in 2001 with 40 signatories. Its objective is to safeguard the right of present and future generations to live in an environment adequate to their health and well-being, by guaranteeing the rights of access to information, public participation in decision-making and access to justice in environmental matters (art. 1). Its relevance for domestic management of site contamination is limited and indirect, but the provisions of the Convention may result in information on contaminated (and potentially contaminated) sites becoming more readily accessible to the general public, particularly the residential population near such sites.

Under the Convention, local authorities must collate, update and disseminate ‘environmental information’, which includes information on soil (arts. 2 and 5(1)(c)). Part of this obligation is to maintain publicly accessible ‘lists, registers or files’ for environmental information (art. 5(2)(b)). Specifically, Convention signatories are required to establish a coherent, nationwide system of pollution inventories or registers in a publicly available format (art. 5(9)). This database is to be compiled using standardised reporting and taking into account ‘international processes where appropriate’. It can include inputs, releases and transfers of certain substances and products in relation to various activities and onsite and offsite treatment and disposal sites.

Other provisions include a requirement that operators, whose activities have a significant environmental impact, regularly inform the public of that impact (art. 5 (6)), that public participation be permitted in decision-making on significant activities, and that particular information be provided to the public by the proponent during that process (art. 6(6)). In relation to contaminated sites, public participation can play a significant role during the site investigation and assessment stages, and becomes even more important in the lead-up to the remediation decision. In addition, the Convention requires that access to justice be facilitated by allowing members of the public with a ‘sufficient interest’ to challenge the legality of ‘any decision, act or omission’ (art. 9). These measures could, for example, enable affected persons to object to a remediation decision on a contaminated site on the basis that procedures for public consultation had not been followed.

North American Agreement on Environmental Cooperation (1993)

NAAEC is a side agreement to the North American Free Trade Agreement (NAFTA), whose participants are Canada, the United States and Mexico. It contains broad environmental objectives, such as pollution prevention policies and practices (art. 1(j)). NAAEC obliges the member countries to apply sanctions and remedies to breaches of their environmental laws, such as compliance agreements, fines, imprisonment, injunctions, the closure of facilities, and the cost of containing or cleaning up pollution (art. 5(3)(b)). However, its relevance to site contamination extends no further.

Convention for the Protection of the Natural Resources and Environment of the South Pacific Region and Related Protocols (1986)

The SPREP Convention entered into force in 1990. Parties are required to prevent, reduce and control pollution 'caused by coastal disposal or by discharges emanating from rivers, estuaries, coastal establishments, outfall structures, or any other sources in their territory' (art. 7). Similar measures must be taken for pollution caused by the storage of toxic or hazardous wastes (art. 11). However, there are no specific provisions for the management or remediation of contaminated sites, either in the Convention itself or the two associated (1986) protocols to the Convention.

3.3.3.3 Bilateral Level

Examples of general bilateral environmental agreements are numerous, and include the following: La Paz Agreement on Cooperation for the Protection and Improvement of the Environment in the Border Area (US-Mexico); United States-Japan Agreement on Cooperation in Environmental Protection (1975); Canada-Chile Agreement on Environmental Cooperation (1997); and the Memorandum of Understanding between the United States Environmental Protection Agency and the State Environmental Protection Administration of China on Scientific and Technical Cooperation in the Field of Environment (2003). There are many more such general bilateral instruments, most of which contain little or no direct reference to any aspect of site contamination.

The Memorandum of Understanding (MOU) between USEPA and China's SEPA offers some broad provisions on matters relevant to site contamination. It sets out a work program for scientific and technical cooperation on a range of issues, including water pollution, persistent organic pollutants, and hazardous and solid wastes. Specifically, remediation of hazardous waste sites is one type of activity covered by the work program, and strengthening of regulations for waste management is another. A more recent addition to the US-China MOU deals with the development, implementation and enforcement of environmental law. The new Annex 5 to the MOU covers many types of project activities, such as improving the scope and substance of environmental laws and provisions for public participation in environmental law.

Conclusions: General Environmental Protection

If international or regional instruments on general environmental protection refer to site contamination at all, it is in a passing reference. They are more likely to only encourage prevention and mitigation of environmental harm and reinstatement of the environment, and in terms too general to extrapolate any specific duties or management procedures, such as a duty to remediate contaminated sites to a particular standard, or a method for identifying and assessing potentially contaminated sites.

3.4 Liability Measures

Two major notions of responsibility and liability are potentially relevant to the domestic regulation and management of site contamination. State responsibility involves a duty on the part of governments to prevent, mitigate and remedy any harm that may be caused, by activities within their control, to another country. The principle was applied in the high-profile case of *Trail Smelter* in North America in the late 1930s-early 1940s and has been the subject of lengthy discussions in international law circles since that time (see, e.g., Bratspies and Miller 2006). Its relevance to site contamination may be limited, but nonetheless should not be overlooked.

Civil liability is a tool with more scope for addressing site contamination, particularly the issue of devising a clear system for allocating the costs of site remediation to appropriate parties. The 'polluter pays' principle already plays an important role in the regulatory approach of many countries, although it is not always a straightforward matter to apply it, particularly in former Soviet countries. One binding regional agreement now exists on liability for environmental harm and non-binding international guidelines are being developed. Although none of these initiatives deal directly or comprehensively with site contamination, they are relevant to the issue and perhaps constitute a precursor to more specific action.

3.4.1 State Responsibility

States have a general responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or to areas beyond the limits of national jurisdiction (*Trail Smelter Arbitration* 1938, 1941). This principle is also known as the 'good neighbourliness' (or *sic utere*) principle, and has been reaffirmed in the Stockholm Declaration (principle 21) and the Rio Declaration (principle 2).

It is important to distinguish state responsibility from state liability. State responsibility involves an obligation to prevent (unlawful) activities which take place within its borders from causing harm to other States. The consequence of a breach is that the State must either 'make good' the damage done, or pay compensation. State liability arises when, perhaps through no actual fault of its own, a State has failed to prevent transboundary harm occurring from activities lawfully conducted within its borders.

Boyle (2005: 7) observes that:

> State responsibility will usually be based on breach of an obligation of due diligence in the regulation and control of [. . .] potentially harmful activities. This will not cover damage resulting from events that are either unforeseeable or unavoidable using reasonable diligence.

The principle of state responsibility for transboundary damage is enshrined in international law (Boyle 2005: 3–4). Harmful activities are viewed as 'internationally wrongful' where the State has violated an international obligation incumbent on it (Drumbl 2006: 98–99). In 2001, the International Law Commission adopted Draft Articles on the Responsibility of States for Internationally Wrongful Acts. The Draft Articles stipulate when an obligation has been breached and the legal consequences of the relevant breach, but do not include any substantive provisions. Drumbl (2006: 99) contends that the Draft Articles have already had a considerable impact in international law, and have been relied upon by the International Court of Justice (e.g., *Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory* 2004: para 140).

State responsibility also entails a duty to warn other States promptly about environmental emergencies and environmental damage to which those States may be exposed. As discussed above, this duty was a partial premise for the (unsuccessful) action taken by Argentina against Uruguay in the International Court of Justice to halt the construction of pulp mills by Uruguay along a river bordering both countries (*Pulp Mills on the River Uruguay* 2007). However, the ICJ did recognise that Uruguay had a breached a procedural obligation to notify and consult with Argentina prior to constructing the pulp mills.

In the context of site contamination, the principle of state responsibility is confined to the relatively small proportion of site contamination which occurs close to, or across, an international border. A high-profile example of transboundary site contamination is the Trail Smelter site, which caused air and water pollution across the Canadian-US border. However, it is unlikely that the principle of state responsibility could affect the day-to-day management of site contamination located solely within one country's borders, except where such site contamination coincidentally has (or could have) an international impact. If so, the originating State would have a duty to ensure that the owner or operator of the facility generating the contamination takes measures to prevent or minimise further contamination, in line with the *Trail Smelter* (1938, 1941) decision. The same State would also be obliged to notify and consult with the affected State in relation to the contamination.

3.4.1.1 Conclusions: State Responsibility

State responsibility has limited relevance to site contamination, being confined to transboundary cases which are likely to be few in number. According to some commentators, the *Trail Smelter* decision is not applicable to all types of transboundary site contamination in any event (see generally, Bratspies and Miller 2006).

3.4.2 Civil Liability for Environmental Harm

The decision as to whom should be made liable for environmental harm, and how to make appropriate restitution for such harm, has long been an issue of contention within the international community. Attempts to codify international law on the subject have been unsuccessful to date, resulting in draft principles and guidelines, non-binding resolutions and a defunct multilateral agreement instead. States have been unable to agree on a common regulatory approach to civil liability for environmental harm, and it is evident that they consider it a matter for domestic legislation rather than international law.

However, the polluter pays principle has emerged over the past few decades as a leading national approach to civil liability for environmental harm in many developed countries. Although it is not a binding principle of international law, it is nonetheless expressly included in some international instruments and has had a significant impact on domestic legislation. The polluter pays principle is implemented differently by individual countries, depending on how it is interpreted in national legislation and policy.

It is also significant that the general inaction on civil liability for environmental harm apparent at the international level is not necessarily reflected at the regional level. For example, the European Union enacted legislation on liability for environmental damage in 2004 (Environmental Liability Directive). The Directive required all EU Member States to have adequate implementing legislation in place by 2007, a deadline which was largely met (European Commission 2010).

It is possible that such regional measures to regulate civil liability for environmental harm will in turn influence international efforts. This is already suggested by references to the European environmental liability legislation by the Governing Council of the United Nations Environment Programme (2009a), in support of its Draft Guidelines for the Development of National Legislation on Liability, Response Action and Compensation for Damage Caused by Activities Dangerous to the Environment.

3.4.2.1 International Level

The Polluter Pays Principle

At the international level, the polluter pays principle first emerged in 1972. In its original form as a domestic policy tool, the polluter pays principle was neither intended nor designed to deal with transboundary or global pollution (Organisation for Economic Cooperation and Development 1972: 30). It has since evolved through its inclusion in many soft law instruments and national laws and policies (Organisation for Economic Cooperation and Development 2002: 9). A widely recognised description of the polluter pays principle is found in Principle 16 of the 1992 Rio Declaration on Environment and Development:

> National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.

Pollution-related costs to be borne by polluters may now extend to not only the costs of pollution prevention and control, but assessment and remediation costs, compensation payments, taxes, charges, and other forms of expenditure (Organisation for Economic Cooperation and Development 2002: 10). Where a competent authority steps in to prevent, assess or remedy the pollution damage, the costs of their actions are recoverable against the operator of the facility causing the pollution. As Preston (2008: 177) notes,

> The principle plays a role in prevention by justifying the imposition of responsibility for prevention and control of pollution arising from the development and use of land on the person carrying out that activity. This can be done by the imposition of conditions on any approval necessary to carry out the activity.

The principle has been incorporated into both global and regional environmental treaties and continues to be reinforced in international soft law instruments (e.g., Stockholm Convention on Persistent Organic Pollutants 2001; Convention on the Protection of the Alps 1991; Convention on the Transboundary Effects of Industrial Accidents 1992). Despite these developments, and claims that it has become ‘a general principle of international environmental law’, its exact status as a principle of customary international law remains contentious and uncertain (Organisation for Economic Cooperation and Development 2002: 10). In addition, the effectiveness of the polluter pays principle in both global treaties and soft law instruments may be undermined by the lack of a consistent, precise definition of the principle (Organisation for Economic Cooperation and Development 2002: 12–14).

Although the polluter pays principle originated as a domestic policy tool, its relevance for transboundary and global pollution is both evidenced by recent soft law developments and advocated by international actors, such as the OECD (Organisation for Economic Cooperation and Development 1989). The OECD (2002: 30) stated

> It could be argued that on the basis of the principle of non-discrimination formulated at the OECD for cases of transfrontier pollution, polluters should be subject to the PPP whatever the type of pollution: national, transfrontier or global. In other words, the fact that pollution affects territories outside national frontiers may be seen as insufficient justification for reducing the polluter's obligations with regard to pollution levels or costs.

At the domestic level, Preston (2008: 177) observes, 'the polluter pays principle operates in the remediation of contaminated sites by requiring the polluter to bear the primary liability for the remediation of sites they have contaminated.'

The polluter pays principle is fundamental to site contamination because it now underlies the legislative and policy approaches selected by many countries to address site contamination problems. Statements of the principle in global treaties oblige the treaty parties to take positive action to make polluters (such as site operators, owners and other relevant legal persons) cover the extensive costs of their polluting activities. Soft law instruments also call on governments to take this approach, but compliance remains voluntary.

UNEP Draft Guidelines for the Development of National Legislation on Liability, Response Action and Compensation for Damage Caused by Activities Dangerous to the Environment (2009)

The UNEP Draft Guidelines on liability set out key elements for possible inclusion in a domestic regime for environmental liability. According to UNEP (2009a), the Draft Guidelines are intended to

> be of assistance to, in particular, developing countries and countries with economies in transition, to create, as they deem appropriate, the necessary frameworks on which they might base national/domestic legislation or policy on liability and compensation for environmental damage.

The Draft Guidelines could therefore provide useful guidance for the drafting of liability principles in domestic legislation on soil contamination. UNEP foresees practical assistance being given to developing countries and economies in transition to ensure implementation of the guidelines at the national level, 'including through assisting them to develop or to update their national legislation in this field' (United Nations Environment Programme 2009a: 2–3).

The commentary to the Draft Guidelines provides further details on how domestic legislation should expand on these key definitions and take particular measures to ensure the effectiveness of the guidelines (United Nations Environment

Programme 2009a: 8). UNEP (2009a: 12) has noted that the Draft Guidelines are to be regarded as 'minimum guidelines on which national legislation could be based and which would require tailoring to specific national circumstances'.

Resolution on Responsibility and Liability Under International Law for Environmental Damage (Institute of International Law 1997)

The Resolution is non-binding and encourages States to reform their environmental regimes to reflect a particular set of common principles. It recommends (at art. 2) that

> environmental regimes should include specific rules on responsibility and liability in order to ensure their effectiveness in terms of both encouraging prevention and providing for restoration and compensation.

With regard to civil liability, environmental regimes 'should prefer the strict liability of operators as the normal standard applicable [. . .], thereby relying on the objective fact of harm and also allowing for the appropriate exceptions and limits to liability' (art. 5). Primary liability should be assigned to the operator of an activity, or to the State if acting in that capacity (art. 6). Liability should be apportioned to all entities that legitimately may be required to participate in the payment of compensation so as to ensure full reparation of damage (art. 11). Several and joint liability, in addition to primary and subsidiary liability, should be considered (art. 11).

For liability to be imposed, a causal link between the activity undertaken and the damage occurring should be required (art. 7). Where the operator has fully complied with relevant domestic rules or standards, they may be exempt from liability (art. 6). There are further recommendations on limits to civil liability, compulsory insurance and funding schemes (arts. 8–10). Operators (or States where necessary) should be required to respond promptly to damage already caused, and make restoration (art. 14). Failure to do so should invoke civil liability 'and possible international responsibility' (art. 15). The entity liable for the costs of taking action should reimburse those who undertook the response action or restoration in their stead (art. 16).

The scope of the recommended compensation and reparation of damage is broad. Damage to the environment should be provided for in addition to the traditional heads of damage, such as death, personal injury and loss of property/ economic value (art. 23). Reparation should include cessation of the relevant activity, restitution, compensation and, if necessary, satisfaction (art. 24). Compensation should encompass both economic loss and the costs of environmental reinstatement and rehabilitation. Where damage is irreparable or unquantifiable, other criteria should be used to establish the appropriate compensation to be made (art. 25).

The Resolution aims to promote both the preventive and the restorative purposes of an ideal liability regime for environmental damage. It is one of the few attempts that have been made at the international level to identify the most effective elements of a liability regime and encourage individual States to adopt them at the domestic level. It contains several recommendations relevant to the remediation of site contamination and the allocation of associated costs.

Draft Principles on the Allocation of Loss in the Case of Transboundary Harm Arising Out of Hazardous Activities (International Law Commission 2006)

The 2006 Draft Principles adopted by the International Law Commission are directed at hazardous activities which are not prohibited by international law, but which pose a risk of causing significant transboundary harm. Activities which are prohibited by international law are presumed to be covered by the law of state responsibility. 'Hazardous activities' are those which carry a risk of causing significant harm (principle 2(c)). The official commentaries to the draft principles indicate that 'significant harm' means either a high probability of causing significant transboundary harm or a low probability of causing disastrous transboundary harm (International Law Commission 2006: 116–117).

The Draft Principles focus on providing redress and compensation for victims of transboundary harm, where damage has occurred despite a State having fulfilled its duty of due diligence in accordance with its obligation to prevent harm (International Law Commission 2006: 120). 'Damage' includes significant damage caused to the public, property or the environment, and the costs of reasonable measures of response and reinstatement (principle 2).

States are required to take necessary measures to ensure that victims of transboundary harm obtain 'prompt and adequate compensation' (principle 4(1)). These measures should include imposing strict liability on the operator 'or, where appropriate, other person or entity' involved in the activity causing the transboundary harm (principle 4(2)). 'Operator' is defined as 'any person in command or control of the activity at the time the incident causing transboundary damage occurs (principle 2(g)). States should also require operators to have financial insurance or bonds to cover compensation, and establish national, industry-wide funds to contribute to compensation costs (principles 4(3) and 4(4)). Where the funds from these two sources are insufficient, the State should make additional funds available (principle 4(5)).

If an incident occurs which may present a significant risk of transboundary harm, the originating State is obliged to notify all potentially affected States of the incident and its possible effects (principle 5(a)). It should also ensure that 'appropriate response measures' are taken - which may involve the operator - based on the best available scientific data and technology (principle 5(b)). In attempting to mitigate or eliminate the harmful effects, the originating State should cooperate with the potentially affected State(s) (principle 5(c)). Potentially affected States should also take all feasible steps to mitigate or eliminate the harm (principle 5(d)).

Site contamination would only come within the ambit of the draft principles where there is a risk of it causing one of the three specified types of damage, where this damage would have a transboundary impact, and where it is either highly likely to cause 'significant' harm or potentially could be 'disastrous'. The instances of site contamination meeting all of these criteria are likely to be very few, particularly those falling into the 'disastrous' category. Moreover, the draft principles are not binding on States, although they may eventually evolve into customary law.

3.4.2.2 Regional Level

Council of Europe Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment (1993)

The Lugano Convention was concluded by the Council of Europe in 1993, and is primarily a preventive instrument which seeks to avoid environmental damage caused by dangerous activities. Where damage does occur, the Convention provides measures for compensation and reinstatement of the environment. A controversial aspect of the Lugano Convention is its broad definition of 'damage', to include loss of life or personal injury, loss of or damage to property, loss or damage by impairment of the environment, and the costs of preventive measures and any loss or damage caused by taking them (arts. 2(7) and 6).

Compensation for environmental damage under the Convention is limited to the costs of reinstatement measures actually undertaken or to be undertaken (art. 2(7)(c)). 'Measures of reinstatement' are any reasonable measures aiming to reinstate or restore damaged or destroyed components of the environment, or to introduce, where reasonable, the equivalent of these components into the environment (art. 2(8)). Contracting Parties may decide who is entitled to take such measures. A 'dangerous activity' is defined in the Convention as the production, handling, storage, use or discharge of one or more dangerous substances, or any operation of a similar nature dealing with such substances, provided that the activity is performed in a professional capacity (art. 2(1)). 'Dangerous substances', for the purpose of the Convention, include substances or preparations having properties which constitute 'a significant risk for man, the environment, or property' (art. 2(2)).

Due to the inherently dangerous nature of the activities covered by the Convention, its provisions are based on strict liability, taking into account the polluter pays principle (arts. 6 and 10). The person who controls the dangerous activity at the time of the incident, or at the time the damage becomes known, is held liable (art. 6). 'Incident' is defined as 'any sudden occurrence or continuous occurrence or any series of occurrences having the same origin, which causes damage or creates a grave and imminent threat of causing damage' (art. 2(11)).

However, the Convention also contains specific principles on the fault of the victim, causation, joint liability of the operators of installations or sites for damage, and a compulsory financial security scheme to cover liability (arts. 9–12). Various exemptions from liability are available, for example, where the activity in question was carried out in compliance with an order or compulsory measure, or in the interests of the person suffering the damage, or where the resulting damage was tolerable (art. 8). There are provisions for public access to technical information held by operators, and non-governmental organisations are able to take legal action to halt unlawful activities and to require preventive measures or reinstatement of the environment (art. 18).

The Lugano Convention is unusual in that it allocates liability for environmental damage occurring within national borders, whereas most global or regional environmental treaties focus on transboundary environmental harm. However, despite being adopted by the Council of Europe in 1993, it is not yet in force and seems unlikely to attract sufficient ratifications to enter into force in the near future (see generally, Boyle 2005: 15–16).

Directive 2004/35/CE on Environmental Liability with Regard to the Prevention and Remedying of Environmental Damage (European Union)

The Environmental Liability Directive ('ELD') entered into force in 2004 and its implementation by the Member States of the European Union was required by 30 April 2007. The objective of the ELD is to establish a framework of environmental liability within the EU region that is based on the 'polluter pays' principle, to prevent and remedy environmental damage (art. 1). It is not retrospective, so it applies only to damage caused after April 2007 (art. 17).

The definition of 'damage' in the ELD is a 'measurable adverse change in a natural resource or measurable impairment of a natural resource service which may occur directly or indirectly' (art. 2(2)). 'Damage' specifically includes land contamination, where it creates a significant risk of human health being adversely affected; the risk must arise from the 'direct or indirect introduction of substances, preparations, organisms or micro-organisms in, on, or under land' (art. 2(1)(c)). It also includes damage to protected species, natural habitats and water (arts. 2(1)(a) and 2(1)(b)). Activities which are recognised as causing damage are listed in Annex III to the ELD.

The ELD requires operators to take immediate steps to prevent damage where there is an imminent threat of it occurring, and to inform the competent authority if the preventive steps are unsuccessful (arts. 5(1) and 5(2)). Where damage has already occurred, the operator must take 'all practicable steps to immediately control, contain, remove or otherwise manage the relevant contaminants and/or any other damage factors' to mitigate the damage, and inform the competent authority without delay (art. 6(1)(a)). Appropriate remediation measures must then be approved by the competent authority and carried out by the operator (art. 7).

All costs of the preventive and remediation measures must be borne by the operator, unless they can prove that the damage was caused by a third party and despite appropriate safety precautions, or that it resulted from compliance with a compulsory order from a public authority (art. 8(3)). These are 'mandatory' financial defences, which all Member States must implement (Waite 2005: 51). In such cases the operators must still take the action required under the Directive, but do not have to bear the cost of doing so.

Member States themselves may also legislate to relieve operators of the financial burden (but not the functional requirement) of remediation in two additional situations: (a) where the operator was not at fault or negligent, and the damage was caused by an emission or event expressly authorised in a permit granted in accordance with national legislation (art. 8(4)(a)); and (b), where the emission or activity in question was not considered likely to cause environmental damage 'according to the state of scientific and technical knowledge at the time when the emission was released or the activity took place' (art. 8(4)(b)).

Where the operator is absent, or unwilling or unable to take preventive or remedial action, the competent authority may do so (arts. 5(3), 5(4) and 6(3)) and recover the costs from the operator (art. 8(2)). The ELD contains provisions on allocation of costs among multiple parties, limitation periods for costs and intervention by concerned individuals or non-governmental organisations (arts. 9, 10 and 12). It specifically indicates that Member States may adopt more stringent provisions than those contained in the ELD, including additions to the list of harmful activities and potentially responsible parties (art. 16(1)). However, it appears that many Member States are merely transposing the Directive into their national law as it stands, and choosing not to transpose politically sensitive 'opt in' provisions, such as compulsory insurance.

3.4.2.3 Conclusions: Civil Liability

There are no international treaty provisions on civil liability for site contamination, although non-binding resolutions, draft guidelines and principles on appropriate liability regimes have been put forward by international organisations. Europe is the only region to have adopted a liability regime for environmental damage which partly addresses site contamination, although it is not retrospective and it applies only to site contamination which poses a significant risk of human health being adversely affected, or which causes damage to protected species, natural habitats or water.

Civil liability for environmental damage remains a controversial issue at the international and regional level. The International Law Commission struggled to reach agreement on draft principles for allocating the costs of hazardous activities, after more than 20 years of deliberations. The Lugano Convention on liability for environmental damage is unlikely to enter into force. The unwillingness of States to adopt binding measures on civil liability perhaps stems from a desire to protect state sovereignty and to avoid undertaking what may be a complete revision of the relevant domestic law in compliance with those measures.

3.5 Summary

The overwhelming conclusion to be drawn from this survey is that there is almost no explicit reference to the subject of site contamination in any international or regional measures, binding or non-binding. Over 200 multilateral environmental treaties, agreements and protocols have been developed since the early twentieth century, but at present there is no international legal instrument which specifically addresses the issue of site contamination (see, e.g., Boer and Hannam 2003). Existing multilateral environmental agreements are either very broad in scope or deal primarily with the management of specific chemicals or wastes which are particularly hazardous or long-lasting. In most cases, these bear very little relevance to site contamination. The agreements are generally preventive in character and objectives, and may to some small extent assist in preventing behaviour which results in site contamination, although this is doubtful.

There are several international instruments and principles which could indirectly relate to a very few aspects of site contamination. However, when viewed together, they are still insufficient to provide a comprehensive approach to the various aspects of site contamination. They do not address in detail the sequential management of site contamination, from the preliminary investigation stage through to the closure and aftercare of sites. Nor do existing measures adequately cater for all physical and legal aspects of site contamination, as they commonly focus on single issues such as hazardous waste or state responsibility. It is not currently possible to draw upon the existing body of international law to manage domestic site contamination in a cohesive or comprehensive manner.

Similarly, there is currently no comprehensive regional agreement on site contamination. Every region has a general environmental agreement, containing broad objectives which are mostly preventive in character. There are also some more specialised agreements on pollution and hazardous waste. Even pollution prevention can be a politically sensitive regional issue (see, e.g., Pacific Regional Environment Programme 2005: 12), which states that it 'is something that needs to be addressed mainly at national and local levels', although it acknowledges that there are 'also regional and global aspects'. Criticism levelled at the draft EU Soil Directive also argues that soil degradation has local and regional (as distinct from Europe-wide) causes and effects (European Parliament 2007a). However, with the exceptions of the European Soil Protocol to the Alpine Convention and the European Environmental Liability Directive, there is no regional agreement which specifically addresses site contamination as an issue in its own right.

The European initiatives that do relate to site contamination have their limitations. The 1998 Soil Protocol to the Alpine Convention is confined to the European alpine region, and the Environmental Liability Directive applies only to liability for significant damage caused after April 2007. The draft EU Soil Framework Directive, which targets contamination only as a sub-issue, is also controversial and presently appears unlikely to be adopted. Yet European law, although it is piecemeal in its coverage of site contamination, is probably the most advanced of any regional legal system in dealing with certain aspects of the issue. European lawmakers acknowledge that extensive and consistent regulatory measures on site contamination are needed, and recent developments on environmental liability, water pollution, soil protection and chemical use are an attempt to at least partially fill the gap.

Again, at the bilateral level, there is no binding agreement on site contamination. With the exception of the United States-Germany Bilateral Agreement on Remediation of Hazardous Waste Sites, all existing bilateral agreements have a general environmental protection purpose rather than a specific focus on site contamination. The 1990 US-Germany Bilateral Agreement was made between governmental agencies, not heads of government. Moreover, it relates only to selected sites containing hazardous waste, and remedial methods for those sites. The 1996 Canada-US Exchange of Notes is even more limited in scope, applying to the remediation of a handful of former military sites. Both agreements are over a decade old and neither has led to any further developments in bilateral law on site contamination.

3.6 Conclusions and Analysis

Site contamination is a problem experienced worldwide, although to different extents. The absence of site contamination on the international law-making agenda is in clear contrast to the increasing regulation of site contamination at the domestic level, notably in Europe but also in North America. There are several possible reasons for the lack of profile for site contamination in international law.

One important explanation may be that site contamination is widely seen as a 'domestic' or 'local' issue, one which predominantly occurs within national borders and therefore is most appropriately regulated at the national or even local government level (see, e.g., Layard 2006: 130). Soil has already suffered from a similar public perception for some time (Wyatt 2008: 167; Hannam and Boer 2002: 9). Matters of biodiversity, climate change and persistent organic pollutants, in contrast, are viewed as being of global importance, and interconnected in such a way as to make national borders irrelevant.

Efforts are now being made to highlight the links between soil, climate change and biodiversity (Futrell 2007: 126; Harbottle et al. 2005; Al-Tabaa et al. 2007), particularly in support of the beleaguered draft European Directive on Soil Protection (Turbé et al. 2010; European Commission 2008b). It is possible that site contamination may eventually benefit from a changed perception of soil as a global issue instead of local issue.

The high variability between soil types may be another reason why site contamination is often viewed as an exclusively domestic issue. Once again, this was recognised as an initial problem for the draft European Directive on Soil Protection (European Commission 2002), but one which it has been sought to overcome by drafting the Directive in general terms and leaving the specifics, such as soil quality values, to be provided by the EU Member States to suit their own soil characteristics.

Another potential 'image problem' may lie in the fact that site contamination usually occurs gradually and almost invisibly, at least from the perspective of the public. This is similar for the issue of soil degradation (Wyatt 2008: 192 and 199). As Bouma and Batjes (2000: 38) point out,

> soils occur in “darkness” below the surface of the earth and, in contrast to weather and water, are not directly visible and cannot be experienced by the senses unless one digs a hole.

As a result, soil degradation (including contamination) may often be an unseen, unknown or poorly understood phenomenon. Given the lack of public awareness of soil functions generally, it should not be surprising that public pressure and subsequent political motivation to address contamination issues is lacklustre. Regulatory action may only be taken in response to a sudden and obvious case of contamination, such as an unsightly, toxic discharge of contaminants into a river.

A further obstacle to international action on this issue is its complex nature (with reference to soil degradation, see Wyatt 2008: 200). Site contamination encompasses many issues, ranging from the effects of contaminants on basic physical elements (e.g., soil and water) to broader issues such as spatial planning, property rights, manufacturing processes and costs, and liabilities of individuals and companies (Carlon et al. 2008: 113). The management of site contamination necessitates the use of detailed procedures and clear standards, including for the operation of facilities, the application of tests, monitoring procedures and risk assessment, the remediation and future use of contaminated sites, and the imposition of responsibility on government bodies, companies and individuals.

Without external pressure arising from international obligations, governments may be reluctant to carry out the fundamental legislative and policy changes required to address site contamination comprehensively (regarding soil protection measures, see Wyatt 2008: 192). Similarly, without guidance from an internationally-agreed approach to the issue, governments of developing countries may lack the knowledge required to introduce effective domestic measures. Chapter 4 below examines the various domestic approaches to site contamination that have emerged in some countries, and the lack of site contamination law or policy in others.

Whether therefore site contamination has been deliberately discounted as a subject of international environmental law or has simply failed to achieve sufficient recognition as an environmental issue to generate international measures is a moot question. In either event, the question remains whether it may be possible in the future to develop an international instrument concerning site contamination. It is evident that leadership on the issue is needed at the international level, given that no global agreement currently deals with site contamination, and few domestic regimes have specific or comprehensive laws on the issue. An international instrument could serve at least three important functions: provide a basic framework for regulating site contamination, raise public awareness of the issue (thereby generating political pressure to act), and provide developing countries with technical and financial assistance to address the problem.

The viability of an international instrument on site contamination will be considered further in Chap. 7, whilst Chap. 8 will examine the alternatives to an international instrument.

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Convention on the Protection and Use of Transboundary Watercourses and International Lakes, opened for signature 17 March 1992, 1936 UNTS 269 (entry into force 6 October 1996)

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Stockholm Declaration on the Human Environment, 11 ILM 1416 (1972)

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Chapter 4
National Site Contamination Law

4.1 Introduction

The concept of ‘national site contamination law’ tends to have different meanings in different countries. The term might be used to describe specific liability measures for contaminated sites in developed countries, for example, while in developing countries it could be applied to relatively broad environmental protection laws with only an indirect relevance to site contamination. While all relevant types of law are included in the analysis below, a distinction is made between countries with extensive legislation specifically directed at site contamination, and those with limited legislation of the same purpose. Legislative approaches in North America, Europe and Australasia tend to fall into one of these two categories. A third category covers countries with no specific legislation for site contamination, which generally describes those in Africa, Central and South America and the Asia Pacific region.

This categorisation of national (or ‘domestic’) legislative approaches is followed by an overview of key trends, issues and influences in the development of site contamination law over time. Observations are made on trends such as the concentration of site contamination legislation in particular parts of the world, the use of particular regulatory approaches, and the growth of brownfields measures in some countries. Key issues are noted, such as whether it is more appropriate to use policy or legislative tools in the regulation of some aspects of site contamination. Finally, the factors shaping site contamination law are discussed, including high-profile contamination incidents, urban pressures, the influence of foreign regulatory models, and site cleanup costs.

E. Brandon, *Global Approaches to Site Contamination Law*,
DOI 10.1007/978-94-007-5745-5_4,

4.2 Definition of 'National Site Contamination Law'

The term 'site contamination law' includes legislation containing elements necessary for the effective management of site contamination, from the first step of identification to the last step of aftercare. These elements have been identified as a result of a review of existing site contamination legislation in North America, Europe and Australia (Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) Australia). 'National' site contamination law can include both national and/or federal legislation, and state/provincial legislation displaying these characteristics. 'Legislation' is taken to encompass both primary and secondary statutory instruments.

Site contamination law should clearly define what constitutes 'site contamination' (or any other similar term that is used in the relevant legislation, e.g. 'contaminated land' or 'soil contamination'). It should contain detailed procedures for the management of site contamination, including site identification, investigation, assessment, remediation planning, remediation works, monitoring and aftercare. It should specify the role of public authorities, private professionals and responsible parties at each procedural stage. It should also stipulate whether a register or database of contaminated sites is to be kept, what information should be held and who should have access to it. The health and safety of site workers and neighbouring residents should be adequately provided for by the law.

In addition to the procedural aspects, site contamination law should contain at least a reference to the scientific basis for decision-making pursuant to the legislation. Apart from providing technical guidance, this would help ensure greater transparency and consistency in the decision-making process. The scientific basis may be described in detail (such as in German legislation) or referred to in brief, but with sufficient clarity to ensure that all decision-makers in relation to site contamination understand the method to be applied, and where to seek further guidance. At a minimum, there should be reference to the scientific method to be applied to site identification, investigation, assessment and remediation.

A further requirement of any specific site contamination law is that it clearly sets out a method for allocating responsibility and/or liability for the remediation of contaminated sites. Responsibility should be allocated for both historical and future contamination. The legislation should create or identify funding mechanisms where the polluter of a site cannot be found or made to pay for remediation costs ('orphan sites'). It should also encompass all stages of site contamination management, including who should bear the costs of identification, investigation, assessment, preparation of remediation plans, remediation works and aftercare measures.

Table 4.1 Countries with extensive, specific provisions on site contamination—examples

Country	National or state/ provincial legislation	Title of legislation	Year
United States	National and State	Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA) 1980 + similar State laws; Resource Conservation and Recovery Act 1976	1976+
Canada	Provincial	Provincial legislation	Various
Australia	State	State legislation	Various
United Kingdom	National	Environment Act 1995, Part 2A (2000); Contaminated Land Regulations (2006, 2012); Town & Country Planning Act 1991	1991–2012
Netherlands	National	Soil Protection Act 1987/2006; Soil Quality Decree 2007; Soil Quality Regulation	1987–2006
Germany	National and State	Soil Protection Act 1998; Soil Protection and Contaminated Sites Ordinance 1999; Environmental Liability Act 2007	1999–2007
Denmark	National	Soil Contamination Act 1999/2006; Loss of Value Act 1993	1999–2006
Belgium	State	(Flanders) Decree on Soil Remediation and Soil Protection (2006) and Regulations (2008); (Walloon) Decree on Soil Management (2008); (Brussels Capital) Decree on the Management and Remediation of Polluted Soil (2009)	2004–2009
Switzerland	National	Contaminated Sites Ordinance (1998/ 2000) + Ordinance on Charges for Remediation of Contaminated Sites (2000/ 2008)	1998–2008
Taiwan	National	Soil and Groundwater Pollution Remediation Act 1990 (revised 2003) + various regulations	1990–2003

4.3 Categories of Site Contamination Law

Where all or most of the features identified in Sect. 4.2 above are exhibited in the legislation, it is categorised herein as 'extensive' specific legislation. Countries with such legislation are listed in Table 4.1 above. Where only some of the necessary features are displayed—usually in amendments to general environmental protection law—the legislation is considered 'limited' specific legislation, and these countries are listed in Table 4.2 below. Where there are no specific provisions of either kind, a country is deemed to have no specific legislation on site contamination. Countries in this category are listed in Table 4.3 below.

Several countries, particularly in Southern Europe, Eastern Europe and Russia, have legislation which ostensibly deals with aspects of site contamination (e.g., Ministerial Decree No. 112 on Land Tenure of Radioactively and Chemically

Table 4.2 Countries with limited, specific provisions on site contamination—examples

Country	National or state/ provincial legislation	Title of legislation	Year
Austria	National + provincial	Contaminated Sites Remediation Act (mainly facilitates funding) + provincial soil protection legislation (various)	1989
New Zealand	National	Resource Management Act 1991; Hazardous Substances and New Organisms Act 1996 + 3 other laws	1991–1996
Finland	National	Decree on Assessment of Soil Contamination and Need for Remediation (2007); Environmental Protection Act (2000); Act on Compensation for Environmental Damage (1994)	1994–2007
Sweden	National	Environmental Code (1998) + Act on Environmental Liability(2007)	1998–2007
Poland[a]	National	Act on Environmental Liability (2007); Environment Protection Act (2001); Regulation on Soil Quality Standards (2002)	2001–2007
Spain[a]	National	Royal Decree 9/2005 on Contaminated Soils (2005); Soil Law (2007); Royal Decree on Environmental Liability (2008)	2005–2008
France	National	Law on Classified Installations (1976); Ministerial Circular on the General Policy concerning Contaminated Sites (1993); Law on the Funding of Orphan Sites (1995); Environmental Liability Act (2008)	1995–2008
Italy[a]	National	Legislative Decree 22/1997 on Waste; Soil Protection Act 1989; Ministerial Decree 471/1999; Decree 152/2006 on Norms in Environmental Matters (Part IV, Title V)	1997–2006
Malta[a]	National	Integrated Pollution Prevention and Control Regulations (2002, 2008); Prevention and Remedying of Environmental Damage Regulations (2008); Environment Protection Act (2001)	2001–2008
Portugal[a]	National	Criminal Code; Environmental Liability Act (2008); Waste Management Decree (2006); Groundwater Contamination Act (2005)	2005–2008
Turkey[a]	National	Soil Pollution Control Regulation (2001/2005); Environmental Law	2001–2007

(continued)

Table 4.2 (continued)

Country	National or state/ provincial legislation	Title of legislation	Year
		(2006); Groundwater Law (1960); Regulation on Remediation of Mine Sites (2007)	
Czech Republic[a]	National	Soil Protection Law (1992); Civil Code; National Act on Waste (2001); Act on Integrated Pollution Prevention and Control (2002)	1992–2002
Slovakia	National	Act on Certain Measures in Relation to Environmental Burdens (2011) + Act on Prevention and Remedying of Environmental Damages (2007)	2007–2011
Hungary[a]	National	National Remediation Programme (1997); Government Decree 219/ 2004 on Groundwater Quality (also provides for land pollution)	2004
Slovenia[a]	National	Decree on the Limit, Warning and Critical Concentration Values of Dangerous Substances in Soil (1996)	1996
Estonia[a]	National	Act on Preliminary Environmental Quality Objectives for Contaminants in Soil and Groundwater (1995); Environmental Liability Act; Waste Act; Water Act	1995
Romania[a]	National	Government Resolution No. 1403/2007 on the Rehabilitation of Affected Soils; Government Emergency Ordinance No. 195/2005 on Environmental Protection; GEO No. 68/2007 on Environmental Liability	2005–2007
Russia[a]	National	Ministerial Decree No. 112 on Land Tenure of Contaminated Land etc. (2004)	2004
Kazakhstan[a]	National	Ministerial Decree No. 976 on the Regulation on Expropriation, Protection and Management of Contaminated and Disturbed Land (1997) + Ministerial Decree No. 993 on the Regulation of Soil Conservation (2003)	1997–2003
Jordan[a]	National	Soil Protection Regulation No. 25	2005
Mexico[a]	National	General Law for Prevention and Integral Management of Wastes (2004) + Regulations; Regulation on Maximum Permissible Limits of	2002–2006

(continued)

Table 4.2 (continued)

Country	National or state/ provincial legislation	Title of legislation	Year
		Soil Pollution by Hydrocarbons (2002)	
Japan	National	Soil Contamination Countermeasures Law (2003, amended 2009) + Water Pollution Prevention Law (1996)	1996–2009
Vietnam	National	Regulation on Soil Monitoring Procedures (2011) + Environmental Protection Law (2005)	2005–2011
South Korea[a]	National	Soil Environment Conservation Act 1995 (revised 2007); Water Quality and Ecosystem Conservation Act; Act on Special Measures for Control of Environmental Offenses (1999); Presidential Decree + other guidelines	1995–2007
Singapore	National	Environmental Pollution Control Act 1999 (revised 2002), Part VI	1999–2002
Hong Kong	Regional	Guidance Note for Contaminated Land Assessment and Remediation (2007) + Guidance Manual for Use of Risk-Based Remediation Goals for Contaminated Land Management (2007)	2007

[a]The content of these laws cannot yet be verified as a translated version is currently not available in English

Contaminated Land 2004 (Russia); Ministerial Decree No. 976 on the Regulation on Expropriation, Protection and Management of Contaminated and Disturbed Land 1997 (Kazakhstan)). However, as English translations of such legislation are not currently available, an in-depth review of any relevant site contamination provisions is not possible. These countries are listed in Table 4.2 above, but are marked to show that their status remains to be confirmed.

4.3.1 Countries with Extensive, Specific Provisions on Site Contamination

This category covers countries having specific legislation which is comprehensive and encompasses most of the necessary features of site contamination law (e.g. the United States, United Kingdom and Germany). Importantly, although the label ‘extensive’ is used, the relevant legislation may still omit one or two significant aspects of site contamination management. Extensive specific provisions may comprise either ‘stand alone’ legislation or amendments to existing law, such as

Table 4.3 Countries with no specific legislative provisions on site contamination—examples

Country	National or state/ provincial level	Title of legislation
Norway		Pollution Control Act (1981); Environmental Information Act (2003); Planning and Building Act (1985)
Ireland		Waste Management (Miscellaneous Provisions) Regulations 1998; Local Government (Water Pollution) Act 1977; Derelict Site Act 1990
Luxembourg		Prevention and Management of Waste Act (1994) + Law on the Management of Waste from Extractive Industries (2008)
Greece		Civil Code + Joint Ministerial Decision on Hazardous Waste Management (2006)
Cyprus		Water Pollution Control Law (2002, as amended)
Iceland		Environmental Pollution Control Regulation (1989)
Latvia	National	Environmental Protection Act (1991, 2006) + Pollution Act (2001)
Croatia	National	Environment Protection Act (1994) + Criminal Code
Lithuania		Environmental Protection Act (1992) + Ministerial Rules on Remediation of Contaminated Land (2008)
Israel	National	Abatement of Nuisance Law; Tort Ordinance; Maintenance of Cleanliness Law (1984)
South Africa	National	National Environmental Management Act (1998); National Water Act (1998); Environment Conservation Act (1989); NEMA: Waste Act (2008)
Nigeria	National	Federal Environmental Protection Agency Act (1988) + Regulations; Harmful Wastes Act (1988)
Colombia	National	Law No. 99 of 1993 on the Environment
Brazil	National + State	National Environmental Policy (1981) + Environmental Crimes and Administrative Sanctions Act (1998)
Argentina	National + State	Constitution (s 41); General Environmental Act (2002); Resolution No. 185/99 (Annex II); Civil Code
Peru	National + State	Constitution + General Law on the Environment
Venezuela	National	Constitution; Organic Environmental Statute; Civil Code
India	National + State	Water (Prevention and Control of Pollution) Act (1974); Hazardous Wastes (Management and Handling) Rules (1989, amended 2003)
China (except Hong Kong)	National	Circular on Environmental Pollution Prevention Work in the Enterprise Relocation Process (2004); General Principles of Civil Law; Water Pollution Prevention and Control Law; Criminal Law (1997); Solid Waste Law (2005); Circular on Enhancing the Prevention and Control of Soil Contamination (2008)
Malaysia	National + State	Environmental Quality Act (1974, amended 2007)
Indonesia	National	Government Regulation on Groundwater (2008); Government Regulation on Land Use Management (2004); Environmental Management Act (1997) + Regulations; Government Regulation on Water Pollution Control (1990)

(continued)

Table 4.3 (continued)

Country	National or state/ provincial level	Title of legislation
Thailand		Land Development Act (1983) + Ministerial Notification on Disposal of Wastes or Unusable Materials (1997)
Cambodia		Law on Water Resources Management (2007); Circular on Land Use Planning (1996); Law on Environmental Protection and Natural Resource Management (1996)
Papua New Guinea		Environment Act (2000); Public Health Act (1973); Water Resources Regulation (1982); Environmental Contaminants Act (1978)
South Pacific Islands		Fiji - Environment Act 2005 + Land Development Act 1985; Solomon Islands - Environment Act 1998 + Environmental Health (Public Health Act) Regulations 2006; Kiribati—Environment Act 1999 + Neglected Lands Ordinance 1959/1977; Samoa—Planning and Urban Management Act 2004 + Water Resources Management Act 2008 + Lands, Surveys and Environment Act 1989; Tonga—Public Health Act 1992/2005 + Waste Management Act 2005; Tuvalu—Public Health Ordinance 1926/1978 + Regulations 1998; Cook Islands—Environment Act 2003; Vanuatu—Environmental Management and Conservation Act 2002 + Public Health Act 1994/2006; Pitcairn Islands—Local Government Regulations 1966/2001; Niue—Environment Act 2003 + Water Resources Act 1996

general environmental protection legislation, accompanied by a parliamentary intention to address site contamination. Parliamentary intent would normally be expressed in an explanatory memorandum to the legislation, reading speeches and other relevant parliamentary materials. In some federal systems, states or provinces have enacted extensive specific legislation in the absence of federal legislation (e.g. Australia, Canada and Belgium). Of the federal countries, generally the federal government will not have legislated specifically on site contamination unless there has been a major 'trigger' event (as in the United States), and the states or provinces have tended to do so instead.

Extensive specific legislation on site contamination may be enacted under a number of different titles, such as environmental liability, soil protection, soil contamination, soil quality, soil and groundwater pollution or contaminated land. However, the title of the legislation is not necessarily indicative of its purpose or effect, and one must look to its content to determine whether it meets the definition of site contamination law. For example, a law on liability for contaminated sites could not be said to be a site contamination law unless it contains a clear system for allocating liability for contaminated sites. Retrospectivity of the law is also an important factor, as it facilitates the remediation of historical contamination (e.g., the United States' Comprehensive Environmental Response, Compensation and Liability Act 1980).

4.3.2 Countries with Limited, Specific Provisions on Site Contamination

Some countries have enacted specific provisions on site contamination which fall short of 'extensive' provisions, because they address only some aspects of site contamination management. For example, legislation may introduce liability for site remediation but may not specify any site management procedures for identification or assessment. Limited specific provisions on contaminated sites are commonly added to a general environmental protection law.

The use of limited provisions within general environmental legislation may hamper the comprehensive, effective management of site contamination if the legislation is outdated. Many general environmental protection laws were prepared prior to the late 1990s, before the scale and impact of site contamination were widely known or different approaches to aspects such as risk assessment had been tried or compared. Approaches to site contamination, particularly remediation methods, are still evolving. Previously neglected aspects, such as aftercare and monitoring, are only now receiving wider attention. The older the general legislation is, the more likely it is to lack the necessary context to support site contamination measures. It may compare unfavourably with the scope, cohesion and detail of a stand-alone legal instrument dedicated to site contamination.

A reliance on limited provisions for site contamination may reflect an assumption by the relevant country that its existing laws are mostly adequate to address the issue, and that the new provisions are only needed to 'fill the gap'. This is particularly likely in countries which are not highly urbanised or industrialised, or where site contamination is not perceived to be a major problem. New Zealand, Sweden and Finland are examples of this category, as are Singapore and Hong Kong.

4.3.3 Countries with No Provisions on Site Contamination

This category includes countries which appear to have no provisions that specifically refer to site contamination. They may, or may not, rely on powers in general environment protection legislation—such as administrative orders and permit conditions under waste law or pollution law—to address contamination on an ad hoc basis. The absence of site contamination legislation may suggest that the issue is being ignored, particularly in countries with a highly urbanised population or a heavily industrialised history. In countries without those urban and industrial pressures, it may instead suggest a lack of awareness of the issue.

Most developing countries do not have any specific legislation for site contamination. No countries in Africa, Central America, South America or the South Pacific Islands appear to have specific site contamination law, although again, it is not possible to closely examine the content of their laws due to difficulties in obtaining more detailed information in English. Some of them have general environmental laws, such as Nigeria's Harmful Wastes Act, which prima facie do not address the necessary aspects of site contamination. While most of these countries are listed in Table 4.3 above, the status of their law is yet to be confirmed.

4.4 An Overview of National Site Contamination Law

As discussed in Chap. 1, it is possible to trace the origins of national site contamination law back to the 1970s, when the legacy of heavy industrialisation first became apparent in some Western countries. At the time, the negative impacts of site contamination on human health and the environment emerged as former industrial sites were redeveloped for residential housing and recreational use. The effects of contamination may have become known suddenly or over a lengthy period, with anecdotal evidence often long preceding official soil testing. The interval between increased public awareness and subsequent legislation on the issue may have been relatively short (e.g., 2 years, in the case of the United States) or over a decade (such as Germany).

4.4.1 Countries with Extensive, Specific Site Contamination Law

In countries which have extensive specific legislation on site contamination, the law may have developed in response to either one large 'trigger' contamination incident which took place in the 1970s or 1980s (e.g., United States and Netherlands), rising public concern over contamination generally (e.g., Denmark, Belgium and Germany), or a gradual increase in urban pressures (e.g., United Kingdom). It is particularly noteworthy that between all of the countries with extensive, specific legislation on the issue, there is no uniform definition of 'site contamination' or any of the other commonly used terms (e.g. 'contaminated land'). Each country has developed its own definition to suit its domestic circumstances, reflecting particular cultural, political, socioeconomic and geographical idiosyncrasies.

4.4.1.1 Legislation Resulting from a 'Trigger' Incident

In the United States, the introduction of the Comprehensive Environmental Response, Compensation, and Liability Act ('CERCLA', also known as 'Superfund') in 1980 is usually attributed mainly to the Love Canal disaster

(Fletcher 2003: 35; Percival et al. 1992: 288). Heavy chemical contamination was discovered in 1977 at a housing development and school known as Love Canal, near Niagara Falls. The site had been used since the 1920s by industries in the region, together with the local council, for the disposal of chemical and municipal wastes (Herdman 1978: 3; Fletcher 2003: 47). Contaminated waste disposal continued at the site until 1953, when it was covered with a clay cap and then sold by its owner, Hooker Chemical and Plastics Corporation, for development as a school and residences (Herdman 1978: 35). After discovery was made of the site contamination, 1,000 residents were relocated and the buildings on the site were demolished.

Following Love Canal, and other high profile contamination incidents in the late 1970s—Valley of the Drums in Kentucky, and Times Beach in Missouri—there was intense political controversy over the lack of regulation of abandoned hazardous waste sites. CERCLA was enacted in 1980 and is modelled on the liability provisions for oil spills contained in the federal Clean Water Act (1972) (Percival et al. 1992: 288). However, CERCLA is also said to be 'a direct extension of common law principles of strict liability for abnormally dangerous activities', which would probably have evolved even without Love Canal as a catalyst (Percival et al. 1992: 288).

The liability scheme in CERCLA provides strong disincentives for releasing hazardous substances. Another central purpose of the legislation is to ensure that any releases are cleaned up, and this is primarily achieved through the so-called 'Superfund', a multi-billion-dollar cleanup fund from which the legislation derives its popular name. The fund was originally financed by a levy on the chemical industry, but is now funded mostly from general revenue. Additional CERCLA provisions include notification requirements, authority to respond, a National Priorities List of sites, abatement actions, cleanup schedules and standards, and settlements between regulatory authorities and parties responsible for cleanup.

In 1980, shortly after the Love Canal incident, large-scale site contamination was discovered in the Dutch village of Lekkerkerk, near Rotterdam. It affected over 250 homes, which had been built in the late 1960s and early 1970s on top of ditches filled with domestic and industrial waste (Cino 2006). The Lekkerkerk contamination resulted in heightened public awareness of the broader pollution issue. In response, the Dutch Government committed to removing all contamination and eventually passing on the costs of doing so to the polluters (Cino 2006: 9). It also introduced the Soil Clean-up (Interim) Act in 1983. This was followed by the Soil Protection Act in 1987 and its successor, the 1999 Soil Protection Act.

The current Dutch legislation contains measures for addressing soil contamination, including the procedural approach to remediation and cost recovery (Mellenbergh 2006). It facilitates the imposition of liability on polluters, obligations on industrial site owners to remediate, specifies a 'suitable for use' standard of remediation, and contains financial mechanisms and aftercare provisions (Meijer 2005: 2). A tiered form of risk assessment is applied in determining the appropriate remediation for a site (see sects. 13 and 14, and Ch. IV generally, Soil Protection Act 1998; Meijer 2005: 3).

4.4.1.2 Legislation Resulting from Increasing Public Concern Over Time

In Denmark, an increasing awareness of potential contamination, particularly from landfill sites, led to the introduction of the Chemical Waste Deposit Act in 1983 (Ferguson 1999). It then became evident during the mid-to-late 1980s that other types of waste could cause contamination, and the legislation was amended in 1990 to include all types of land-based contaminants. The regime was further extended to diffuse and airborne contaminants in the Soil Contamination Act of 1999 (Contaminated Land Rehabilitation Network for Environmental Technologies in Europe 2000). The Danish Government also introduced the Environmental Damage Compensation Act in 1994, which imposed strict liability for damage caused by major and hazardous industrial plants (CMS Cameron McKenna 1995: 63).

A series of contamination incidents in Belgium during the 1980s raised the local profile of the issue (Vrijheid 2000). In Belgium, it is the competence of the three regions, rather than the Federal Government, to legislate on the environment (Schutyser and Deketelaere 2000: 23). Flanders was the first of the regions to legislate in 1995, enacting the Flemish Soil Remediation Decree, which has since been replaced by the 2006 Decree on Soil Remediation and Soil Protection. Walloon and Brussels adopted specific legislation only in 2004 (Vanheusden 2006). Belgium is also likely to have been influenced by the Dutch approach of the early 1980s, in developing its own legislation and particularly its remediation standards.

Several high-profile cases of former waste deposits in Germany in the mid 1980s are credited with leading to the adoption of specific site contamination law in that country, although this occurred several years later than in the Netherlands and Austria, and not as a result of one specific incident. The former landfill site at Georgswerder, near Hamburg, was said to be Europe's largest hazardous waste site (Vestbro 2007). Extensive contamination was also revealed after German reunification in 1989, when many military bases and industrial sites in the former East Germany were abandoned.

Initially, only the German states (Länder) introduced specific laws on soil remediation. The Länder enacted different laws, using various standards and funding mechanisms (Kohls 2006). This resulted in a fragmented regulatory approach to site contamination across Germany, and the need for a more uniform federal regime was reaffirmed in the years following reunification. The federal Soil Protection Act eventually entered into force in 1999, with the Contaminated Sites Ordinance following soon afterwards. The Act and Ordinance introduced detailed federal standards for remediation and primarily targeted historical site contamination (Kohls 2006: 251).

Some countries have legislated on site contamination because of their proximity to a country which has already done so, or which has experienced a high profile contamination incident. For example, the approach to site contamination in some provinces of Canada is said to have been influenced by the publicity generated by the Love Canal incident in the United States in the late 1970s, and the subsequent enactment of CERCLA (Fletcher 2003: 35; Griffiths and Board 1992: 723). In contrast to the US, however, Canada has no national or federal legislation on site contamination, although there are national guidelines and policy documents on remediation and principles of liability for contaminated sites (see Canadian Council of Ministers of the Environment 2006). While several of the provinces have their own specific legislation on site contamination, the content of these laws varies considerably. In general, however, Canada takes a ‘suitable for use’ approach to remediation (Canadian Council of Ministers of the Environment 1997: 10).

Similarly, the development of specific site contamination law in Australia has taken place at the state level. There is no national or federal legislation on the subject, although the states and territories are expected to comply with the National Environment Protection (Assessment of Site Contamination) Measure 1999. Specific legislation on site contamination at the state level is mostly a recent development, and not all states or territories have this. It has emerged in response to an increasing awareness of contaminated sites, particularly in the highly urbanised states. As in Canada, there are significant differences between the state laws on site contamination.

4.4.1.3 Legislation Resulting from Growing Urban Pressures

In the United Kingdom, site contamination legislation was not triggered by a major incident or a series of incidents (Griffiths and Board 1992: 720). Instead, lack of space for urban and residential development, combined with a heavily industrialised past, provided the impetus for a specific contaminated land regime in the late 1990s. The UK Government amended its existing environmental protection instrument, the Environmental Protection Act 1990 (Part 2A), to legislate comprehensively on site contamination in 2000. However, Part 2A tends to be invoked only in the most serious or extreme cases of site contamination, leaving the rest to be dealt with under planning law (see, e.g., Sheehan and Firth 2008: 71).

4.4.2 Countries with Limited, Specific Legislation

Where limited specific provisions are used to regulate site contamination, the legislation is more likely to have been introduced as a result of gradually increasing political or urban pressures rather than a more dramatic ‘trigger’ event. This may be because the political sensitivity of a large-scale contamination incident requires a more comprehensive approach to the issue, such as may only be possible in ‘stand alone’ legislation. Austria, however, is one exception to this observation. Once again, there is no consistent definition of ‘site contamination’ among the countries with limited specific legislation.

4.4.2.1 Legislation Resulting from a 'Trigger' Event

A large-scale contamination incident south of Vienna in the mid 1980s did lead to the development of some specific site contamination legislation in Austria (Federal Environment Agency (Austria) 2002: 139). Extensive groundwater contamination had been caused by the disposal of about 800,000 m^3 of waste at the Fischer landfill site. At the time of discovery of the contamination, there were insufficient regulations, technical expertise, and provision for remediation funding. The Law for Cleanup of Contaminated Sites was introduced in 1989 to meet these needs.

The Cleanup Law mainly provides for a remediation funding scheme, but does not appear to allocate liability for site contamination between responsible parties (Federal Environment Agency (Austria) 2004: 232–233). There are regulations on registration of suspected contaminated sites and appropriate risk assessment. Austria still officially applies the high standard of multifunctionality to remediation, resulting in an average remediation cost per site of between 50,000–500,000 Euro, considerably higher than in other European countries (European Environment Agency 2007: 6).

4.4.2.2 Legislation Resulting from Increasing Political and Urban Pressures Over Time

In Japan, soil contamination law took over two decades to emerge. A major contamination incident occurred in 1975, when a large amount of soil contaminated with hexavalent chromium was discovered in Tokyo, threatening the groundwater supply (Ministry of the Environment (Japan) 2012). Many more heavily contaminated sites, usually caused by the chemical and electroplating industries, were revealed in subsequent years and added to the growing political pressure to legislate on site contamination. Eventually, in 2002, the Soil Contamination Countermeasures Law was enacted.

The Countermeasures Law contains provisions on investigation duties and orders, risk assessment, cleanup orders, and the proportionate liability of polluters and/or landholders for cleanup actions and costs (Ozawa 2007: 221). The legislation does not contain a duty to notify authorities of suspected contamination (except where an investigation has already been carried out pursuant to an order), or detailed procedures for voluntary remediation works (Ozawa 2007: 222). In addition, its investigation orders and risk assessment provisions are limited in scope.

Sweden and Finland address site contamination through limited specific provisions in their existing general environmental legislation, with the addition of specific measures for site assessment in Finland (Decree on Assessment of Soil Contamination and Need for Remediation 2007). These countries were prompted to do so because of urban pressures and a fear of groundwater contamination. Sweden's Environmental Code (1999) is a broad legislative instrument containing provisions on environmentally hazardous activities and polluted areas (Part 3, chs. 9

and 10). The Environmental Code allocates liability for contamination caused after 1969, imposes a notification duty, and requires environmental remediation insurance for hazardous activities (Ministry of the Environment (Sweden) 2001: 27). It does not contain detailed provisions on contaminated site management or standards for intervention or remediation.

Finland's Environmental Protection Act contains provisions on the prohibition of soil and groundwater pollution, duties to notify, investigate and make restoration, and liability (sects. 4, 7, 8, and ch.12; Pajukallio 2005). It adopts the 'polluter pays' principle and requires the responsible party to restore the soil or groundwater to a condition that will not cause harm to health or the environment, or present a hazard to the environment (sects. 4 and 75). Apart from imposing the duties outlined above, the legislation does not contain procedural site management details, nor does it stipulate the scientific standards to be applied in any decision-making on contaminated sites.

In New Zealand, a new legislative framework for contaminated land has been deliberately avoided in favour of national guidelines and limited specific provisions on site contamination (Ministry for the Environment (New Zealand) 2012). It is difficult to clearly identify why New Zealand adopted this approach, as distinct from extensive specific legislation or no legislation at all. Extensive specific legislation is likely to have been seen as unnecessary because New Zealand is not a heavily industrialised country and it has had few major contamination incidents. Given the apparent lack of public concern over site contamination, it would also have been understandable if New Zealand had chosen not to introduce any provisions at all.

However, New Zealand's involvement in the Australian and New Zealand Environment and Conservation Council (ANZECC), and in particular the ANZECC Guidelines for Assessment and Management of Contaminated Sites, may have raised political awareness sufficiently to result in the existing limited provisions on site contamination. New Zealand's national resource management legislation was subsequently amended to include limited provisions for site contamination (Resource Management Act 1991). The Resource Management Act contains a definition of 'contaminated land', gives local governments the authority to investigate, identify and monitor contaminated land and manage its use, and refers to a (potential) national environmental standard for prescribing soil quality (sects. 2, 30, 31 and 43; see also, Ministry for the Environment (New Zealand) 2006: 4–5). However, the legislation is not retrospective, does not allocate liability for contamination, has no detailed procedural provisions, and is silent on the scientific standards to be applied to identification, investigation, monitoring and remediation of sites.

4.4.3 Countries with No Specific Site Contamination Law

Most countries in Africa, Central America, South America and the Asia Pacific region do not appear to have any specific site contamination law, although this is yet to be confirmed once translated copies of their legislation become available and the content of their existing general laws is more clearly known.

The Asia Pacific region, together with Central and South America, has been the subject of initial research into site contamination law (e.g., by the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (Australia); Marker et al. 2007). In developing countries in the Asia Pacific region, public awareness of site contamination problems is generally low, and governments may not yet have recognised a need to legislate on the issue (Fowler 2006: 8). This is particularly so in the least-developed countries, such as Papua New Guinea and the South Pacific islands, even though the problem is likely to exist, at least in some areas (Fowler 2006: 9–10). Landfill sites, for example, are already creating problems for small islands whose economies rely heavily on tourism, and whose populations are more directly affected by a polluted environment.

In South America, a general survey of domestic regulations relating to contaminated sites and brownfields revealed that 'a common characteristic of all countries is the lack of a [sic] specific legislation on the contaminated land and soil protection issue' (Marker et al. 2007: 2). Mexico and Brazil, as the most developed countries in their regions, have introduced regulations on liability for site contamination, as well as investigation, assessment and remediation procedures (Marker et al. 2007). However, these recent regulations are based on general waste or pollution control legislation. Most other countries in Central and South America have no legislation on site contamination at all, although some (such as Chile, Argentina and Uruguay) have 'programs' in place that may eventually lead to new regulations (Marker et al. 2007).

4.5 Key Trends and Issues in the Development of National Site Contamination Law

Four key trends are discernible in the development of site contamination law. First, specific legislation on site contamination is mainly confined to heavily industrialised, highly urbanised countries. Second, the 'command and control' regulatory approach to dealing with site contamination is giving way to supervised, voluntary remediation in some countries. Third, and related to the previous point, brownfields legislation is emerging as an alternative legislative vehicle for site remediation. Fourth, most countries use policy documents rather than legislation to specify the scientific basis for decision-making on site contamination. All four trends are explored further below.

4.5.1 Concentration of Site Contamination Legislation

A number of countries have deemed it appropriate to legislate specifically for site contamination, particularly in recent years. It is also evident that some countries which still regard environmental protection as being a high priority have viewed their existing environmental legislation as adequate to deal with contamination. The choice of legislative instrument generally reflects the degree of a country's industrialisation, the subsequent extent of its potential contamination (historical and future), whether there has been a 'trigger' event, and its proximity (physical or political) to a country which has specific site contamination law already in place.

In general, the more heavily industrialised or highly urbanised a country is, the more likely it is to have specific site contamination law (e.g., United States, United Kingdom, Netherlands, Germany, Australia and Japan). This is because a heavily industrialised or highly urbanised country will probably have one major 'trigger' event or a series of smaller incidents which provide sufficient political pressure to legislate on the issue. It is also more likely to feel pressure to redevelop urban areas due to land scarcity and a high population density. Conversely, a country with no heavy industry or few contamination incidents is unlikely to have specific legislation because public awareness of the issue is minimal.

This trend is clearly illustrated in the Asia Pacific region. The countries which do have extensive or limited specific site contamination law—such as Japan, South Korea and Taiwan—tend to have experienced rapid economic growth, increasing urbanisation of their population, and subsequently rising land scarcity. Other rapidly developing countries in the region, primarily China, Malaysia and Thailand, have acknowledged a site contamination problem and are considering how best to regulate it. Others, such as Indonesia, have no contaminated sites legislation but are likely to introduce some measures within the next 5–10 years, as urban pressures grow and the legacy of unchecked industrialisation is revealed.

4.5.2 Regulatory 'Model' or Approach

Among developed countries, the 'command and control' approach has, at least initially, been the preferred regulatory model for addressing site contamination (Sigman and Stafford 2010; Anderson 2002: 2). This has involved a staged process for managing contaminated sites, underpinned by a system for allocating liability for remediation to responsible parties. It is now apparent, however, that such measures are not frequently implemented, with supervised, voluntary remediation being the preferred approach in most developed countries. For example, there appears to be a widespread practice of allocation of liability by negotiation between the regulator and the potentially responsible parties (Fowler 2007: 5). In some states in Australia and the US, and some provinces in Canada, the regulatory oversight of contaminated sites management is also being outsourced to private professionals (see, e.g., Kizner 2009; Stolfa 2003: 179; Ministry of Environment (British Columbia) 2009c). This may present an issue of governmental accountability, in particular as to whether supervision is sufficient and whether remediation is being carried out to the required standard (Lyster et al. 2007: 530; *Charben Haulage v. Environmental and Earth Sciences* 2004).

Further evidence of the supervised, voluntary approach to the management of site contamination is provided by the reliance, in some countries, on planning laws to dictate the appropriate site remediation (see, e.g., Department of Urban Affairs and Planning (New South Wales) 1998; Office of the Deputy Prime Minister (UK) 2004). For example, in the United Kingdom, the planning approval process applies to any contaminated sites being redeveloped, with specific conditions for remediation being included in the approval. Use of planning law to remediate site contamination constitutes the rule rather than the exception in these jurisdictions (Luo et al. 2009: 1127; Sheehan and Firth 2008: 71), as regulatory authorities appear reluctant to use regulatory tools to achieve remediation.

4.5.3 Brownfields Legislation

Another significant development—both an issue and a trend—has been the emergence of specific brownfields legislation in some countries, such as the United States (e.g., the Small Business Liability Relief and Brownfields Revitalization Act 2002; Luo et al. 2009; International Economic Development Council 2005). This appears to confirm the growing preference for a voluntary approach to remediation, instead of the more costly, time-consuming regulatory enforcement approach, although its precise role is the subject of ongoing debate. Under brownfields measures, site owners or operators are given incentives to undertake the necessary remediation of a site, usually as a condition of development approval, and regulatory authorities monitor their compliance.

Brownfields measures may be financial, such as tax exemptions and grants, or legal, such as exemptions from liability if the site is remediated to an agreed standard (Environmental Law Institute 2001: 9, 39). Where brownfields measures are widely used, formal regulatory action is used as a last resort, generally being invoked only where the land will not be remediated unless such action is taken (Engineer 2005: 3). Consequently, specific site contamination legislation has been relegated to a largely ‘back-up’ role. How and whether brownfields law should interact with site contamination law remains an ongoing issue for countries considering new measures.

The United States initiated its first federal brownfields program in 1995 and enacted specific brownfields legislation, the Small Business Liability Relief and Brownfields Revitalization Act (the ‘Brownfields Law’), in 2002. The Brownfields Law was intended to increase funding for assessment and remediation and to enhance the role of State response programs. By 2012, the US brownfields scheme had resulted in the assessment of over 18,800 sites and the cleanup of almost 750 sites (United States Environmental Protection Agency 2012b). Brownfields redevelopment initiatives at the State level are also growing rapidly (Robinson 2006: 125). There are an estimated 450,000 brownfield sites in the United States (United States Environmental Protection Agency 2012a).

The approach to site remediation in the United Kingdom also emphasises voluntary mechanisms, which are specifically recognised within the framework of the command and control legislation by the Environmental Protection Act 1990 (e.g., sect. 78 H(5)(b)). Much contaminated land is now being remediated under brownfields measures, with a Government target for 60% of all new housing to be built on ‘previously developed land’ being exceeded well before the set deadline (Department of Communities and Local Government (UK) 2011: 15). The 60% target is now an ongoing objective of UK planning policy, and local councils are required to develop local strategies and targets to reflect it. Tax incentives and other forms of finance are available to companies undertaking remediation. Local councils can also access funding to restore contaminated land where a responsible person cannot be found or cannot be forced to remediate themselves.

It is not only developed countries that are considering brownfields measures. As a result of an increasing demand for building land, China and Malaysia are also investigating the potential for using brownfields measures alongside, or instead of, future site contamination measures (USEPA 2009a; Xie and Li 2010; Gong 2010: 1; Armstrong and Verma 2005). It is still too early to determine which options will be used, and what their features will be, but it is a significant development because most countries which are now using brownfields measures already have a legal framework in place for site contamination.

4.5.4 Policy Versus Law and Technical/Scientific Standards

A further issue in the development of site contamination law has been the way in which scientific standards for the management and remediation of contaminated sites have been specified. The general practice in most countries has been to set out such standards in policy or technical documents, with little or no reference to them in the relevant legislation (e.g., the United Kingdom, Canada and Australia). As a result, the criteria used to assess and remediate sites tend to be non-binding and lacking in transparency (Carlon 2007: 5). The legislative regime itself could also be said to be deficient because one of its essential elements is absent.

4.5.5 *Key Features of Site Contamination Regimes in Specific Jurisdictions*

The key features of site contamination regimes in several jurisdictions are briefly set out in Table 4.4 below. In addition, four jurisdictions—Germany, the United States, Massachusetts, and British Columbia—have been selected as case studies for a closer examination of particular elements of site contamination law and policy.[1] These case studies provide an insight into the key features of each jurisdiction, their relevant strengths and weaknesses, and any lessons to be learned. They are included at the end of this Chapter.

Germany (Case Study 4.1) provides a good example of specific federal legislation on contaminated sites that has been implemented at the State and local level. The case study demonstrates that, while Germany's federal structure has presented some challenges to implementation, these problems have in most cases been effectively addressed. The example of the United States (Case Study 4.2) shows how governments with different levels of jurisdictional responsibility for site contamination manage to coordinate those responsibilities.

The State of Massachusetts (Case Study 4.3) was selected for a case study on the basis that its government decided in 1993 to 'privatise' much of the site remediation process, so as to promote the more efficient reuse of contaminated sites. The legislation enacted to create this privatised scheme aims to minimise costly regulatory oversight at all but the most high-risk sites. It does so by requiring responsible parties to engage private professionals for the supervision of remedial works and preparation of key remediation documents. Other innovative features are discussed in the case study.

The contaminated sites regime in the Canadian province of British Columbia (Case Study 4.4) also displays a number of novel features. The British Columbian Government has enacted specific legislation that promotes voluntary remediation, a major role for private professionals in supervising site remediation, the use of regulatory 'sign-off' and a publicly accessible site registry, and the use of institutional controls for post-remediation.

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[1] The selection of Germany, the United States, Massachusetts and British Columbia is also based on project work undertaken by the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE), Australia. This project work involved researching specific jurisdictions in Europe and North America for the purpose of compiling a database on national and sub-national approaches to contaminated sites law and policy in these regions (the CRC CARE Contaminated Sites Law and Policy Database, http://www.cslawpolicy.com/). Due to financial and time constraints, it was not possible to visit the individual jurisdictions and interview government representatives in person for the purpose of confirming the research and preparing the case studies. For this reason, significant reliance has been placed on documents that are currently available for each jurisdiction, although every effort has been made to ensure that the document reviews are thorough.

Table 4.4 Key features of national legislation on site contamination in selected jurisdictions

	1. Specific law on site contamination	2. Definition of site contamination	3. Responsibility for remediation	4. Role of private professionals
Australia (National)	Policy only	In policy only	No specific measures	In policy only
New South Wales, Australia	Contaminated Land Management Act 1997 + policy	In legislation	Enforcement orders available; Liability is strict, retrospective, and joint and several; No orphan fund	In legislation
Western Australia	Contaminated Sites Act 2003	In legislation	Enforcement orders available; Liability is strict, joint and several, and retrospective; Orphan fund established	In legislation
Hong Kong	Policy only	In policy only	No regulatory orders (only in EIA process & leases); No retrospective liability; No fund/policy for orphan sites	Limited; no law or policy
Singapore	General legislation (Environmental Protection and Management Act 1999) + policy	No	Cleanup notices available; Liability is strict; not retrospective; No policy or fund for orphan sites; Govt pays	In policy only

	5. Regulatory process (identification, investigation, assessment, remediation + technical standards	6. Voluntary remediation/ brownfield measures	7. Post-remediation measures (institutional controls + responsibility for monitoring)	8. Public participation (site register + public consultation)
Australia (National)	In policy only	No specific measures	No specific measures	No national site register
New South Wales, Australia	Management process in legislation + policy; Technical standards in policy	Leg'n permits but does not regulate voluntary remediation; No brownfields policy	Ongoing maintenance orders in legislation; Restrictive covenant also possible	No site register—general record only; No provisions on public consultation
Western Australia	Management process in legislation.; Technical standards in policy	No specific measures	Land use restrictions in legislation; Notation on property title also required	Site register is publicly accessible; Public

(continued)

Table 4.4 (continued)

	5. Regulatory process (identification, investigation, assessment, remediation + technical standards	6. Voluntary remediation/ brownfield measures	7. Post-remediation measures (institutional controls + responsibility for monitoring)	8. Public participation (site register + public consultation)
				consultation required by legislation
Hong Kong	Management process and technical standards in policy only	No specific measures	No specific provisions	No national site register; Public consultation possible under other laws (e.g. EIA)
Singapore	Management process in legislation + policy; Technical standards in policy only	Limited voluntary remediation measures; No brownfields measures	No specific provisions	No national site register; No provisions on public consultation

	1. Specific law on site contamination	2. Definition of site contamination	3. Responsibility for remediation	4. Role of private professionals
United Kingdom	Part IIA, Environmental Protection Act 1990 + Contaminated Land Regulations 2006 (as amended in 2009 + 2012)	In legislation	Remediation notices available; Liability is strict; retrospective; joint and proportionate; Govt can remediate orphan sites	In policy only
Germany	Soil Protection Act 1998 and Contaminated Sites Ordinance 1999	In legislation	Several enforcement orders available + wide range of PRPs; Liability is strict, retrospective and joint and several; No specific orphan fund, but all government levels share costs	Limited role; reference in legislation
Switzerland	Contaminated Sites Ordinance 1998; Ordinance on Impacts on the Soil 1998;	In legislation	Remediation orders available; Liability is strict, retrospective and joint; Orphan fund est'd by law	Limited—no law or policy

(continued)

Table 4.4 (continued)

	1. Specific law on site contamination	2. Definition of site contamination	3. Responsibility for remediation	4. Role of private professionals
	Environmental Protection Act 1983 (amended 2006 + 2009)			

	5. Regulatory process (identification, investigation, assessment, remediation + technical standards	6. Voluntary remediation/ brownfield measures	7. Post-remediation measures (institutional controls + responsibility for monitoring)	8. Public participation(site register + public consultation)
United Kingdom	Management process in legislation + policy; Technical standards in policy only	Voluntary remediation measures in legislation; Brownfield measures in policy only	Provisions in policy only	Site register at local level only; Limited provisions on public consultation
Germany	Management process in legislation; Technical standards referred to in legislation (except remediation standards)	Voluntary remediation is preferred, and provided for in legislation; No brownfield measures	Protection and restriction measures for future site use in legislation; Financial security may be required; No proprietary controls; Self-monitoring reqt's in leg'n	No site register at federal level; States may compile own registers; Limited provisions on public consultation in legislation
Switzerland	Management process in legislation; Technical standards in legislation	No specific measures	Land use restrictions in legislation; No proprietary controls; No req't for financial assurance (except landfills)	Site register is publicly accessible; No provisions on public consultation

professionals	1. Specific law on site contamination	2. Definition of site contamination	3. Responsibility for remediation	4. Role of private
Canada (National)	Policy only	In policy only	Federal Govt is liable for federal sites	No law or policy
British Columbia, Canada	Contaminated Sites Regulation 1996 & Environmental Management Act 2003	In legislation	Enforcement orders available; Liability is absolute, retrospective, and joint & several; Orphan Site Reclamation Fund (oil & gas sites)	In legislation

(continued)

Table 4.4 (continued)

	1. Specific law on site contamination	2. Definition of site contamination	3. Responsibility for remediation	4. Role of private professionals
Alberta, Canada	Environmental Protection and Enhancement Act 2000 + Regulations	Yes, but other terms used (i.e. substance release)	Enforcement orders available; Liability for releases is strict/fault-based; retrospective; joint & several. Orphan oil/gas sites fund.	In legislation
Massachusetts, U.S.A.	Oil and Hazardous Material Release Prevention and Response Act 1983 + MCP	Yes, but other terms used (i.e., disposal site, release)	Enforcement orders available; Liability is strict; retrospective; joint & several; proportionate. Orphan fund.	In legislation
New Jersey, U.S.A.	Site Remediation and Reform Act 2009 + other legislation	Yes, but other terms used (i.e., area of concern, hazardous discharge)	Enforcement orders available; Liability is strict; retrospective; joint and several. Orphan funds.	In legislation; PPs have a major role
California, U.S.A.	Hazardous Substance Account Act 1983 + other legislation	Yes, but other terms used (i.e., hazardous substance, release)	Several enforcement orders available; Liability is strict; retrospective; joint and several; Fund for orphan USTs	In legislation

	5. Regulatory process (identification, investigation, assessment, remediation + technical standards	6. Voluntary remediation/ brownfield measures	7. Post-remediation measures (institutional controls + responsibility for monitoring)	8. Public participation (site register + public consultation)
Canada (National)	Management process and technical standards in policy only	Brownfield measures in policy	In policy only	Site register—federal sites only
British Columbia, Canada	Management process in legislation; Technical standards in legislation	Voluntary remediation preferred; provisions in legislation. Some brownfield provisions in legislation and policy	Land use restrictions and proprietary controls in legislation. Financial security/monitoring may be required	Site register is publicly accessible; Public consultation provisions in legislation
Alberta, Canada			Land use restrictions and proprietary controls in legislation; Financial	

(continued)

Table 4.4 (continued)

	5. Regulatory process (identification, investigation, assessment, remediation + technical standards	6. Voluntary remediation/ brownfield measures	7. Post-remediation measures (institutional controls + responsibility for monitoring)	8. Public participation (site register + public consultation)
	Management process in legislation; Technical standards in policy	Voluntary remediation permitted by legislation; Some brownfields measures	security/monitoring may be required	No site register; Public consultation required by legislation
Massachusetts, U.S.A.	Management process in legislation; Technical standards in legislation (MCP)	Voluntary remediation measures in legislation; Specific brownfield legislation + fund	Activity and use limitations (AULs) in legislation; Financial assurance/ monitoring may be required	Site register is publicly accessible; Public consultation required by legislation
New Jersey, U.S.A.	Management process in legislation; Technical standards in legislation	Voluntary remediation measures in legislation; Specific brownfield legislation	Land use restrictions, proprietary controls, financial assurance, and monitoring requirements all in legislation	Site register is publicly accessible; Public consultation required by legislation
California, U.S.A.	Management process in legislation; Technical standards in policy	Voluntary Cleanup Program; Specific brownfield legislation	Land use controls in legislation; Monitoring requirements in legislation	Site register is publicly accessible; Public consultation required

4.5.6 Factors Influencing Developments in Site Contamination Law

It is evident that there are some common, interconnected factors which lead a country to legislate on site contamination. These are a high degree of industrialisation, lack of housing, and an increasingly urban population. These factors may or may not be compounded by a series of high profile contamination incidents, such as threats to drinking water. Further impetus for site contamination law may come from a close proximity to countries which either experience a major contamination incident and/or have a strong site contamination law already in place.

4.5.7 Influence of 'Models' with Particular Countries

It is likely that 'leading' countries, such as the Netherlands and the United States, have influenced several others to select a particular model of site contamination legislation. For example, the liability regime introduced through CERCLA in the United States has been emulated in Taiwan, and to some degree in the provinces of Canada (Fletcher 2003). Both the United States Environmental Protection Agency and the Netherlands Soil Partnership are seeking to influence legislative reform in China regarding brownfields and contaminated sites (e.g., the USEPA China Environmental Law Initiative; see also the Netherlands Soil Partnership 2012). Likewise, the approach to remediation taken by the Netherlands was adopted, at least initially, by Austria, Denmark and Germany. It is also possible that countries which would not otherwise have legislated for site contamination have been prompted to do so by their neighbours' problems or initiatives.

4.5.8 Influence of Costs of Cleanup

The recent shift in emphasis from the 'command and control' regulatory approach to supervised, voluntary site remediation in some countries has taken place primarily due to the high costs and lengthy processes associated with regulatory measures. Prospective site owners had little incentive to take on contaminated sites and consequently, few were being remediated and urban pressures were growing. Negotiated site remediation, although it may also be expensive and time-consuming, tends to be preferred by stakeholders because it is more flexible and, at a minimum, it achieves regeneration of a contaminated site which would otherwise remain idle.

Similarly, brownfields measures have increased in popularity since the mid 1990s because they provide financial and legal incentives to take voluntary action. The outcome of this change in government policy has been the large-scale redevelopment of many formerly contaminated sites. Again, it is likely that the success of brownfields programs in some countries has led other countries to introduce brownfields measures of their own, although such measures are not necessarily consistent between countries or even between some states. The proportion of private sector versus public sector initiatives differs significantly from country to country (International Economic Development Council 2005).

The cost implications of remediation have led to a further important development for site contamination, although it relates to policy rather than legislation. The ‘multifunctionality’ approach to site remediation, originally used by the Netherlands and emulated in other Western European countries, has gradually been abandoned in favour of a ‘suitable for use’ approach. The ‘suitable for use’ approach is used in countries such as the UK and Germany, and generally correlates to the US approach. Only Denmark and Austria continue to follow the Dutch approach (Layard 2006:136–137). In the Netherlands, this reflected a realisation by the Dutch Government that it was not economically feasible to remediate every site to such a high standard, nor was it necessary to do so if the site was to be used for a similar (or less sensitive) purpose. The number of contaminated sites was too great, and the potential costs of remediation too high, to continue with the multifunctionality approach.

4.6 Conclusions

Despite some trends, national approaches to site contamination law do not appear to be converging. There are still very different approaches to the definition of site contamination, site management procedures, allocating liability and the underlying science of decision-making. Similarly, the method of legislating on site contamination—whether using extensive or limited specific legislation—is not consistent between countries. The most that can be said is that there are some broad patterns, and that two or three countries may have similar approaches. Liability for environmental harm is, to some extent, being harmonised in the European Union by the implementation of the Directive on Environmental Liability 2004, although the Directive is not retrospective.

An analysis of the development of national site contamination law reveals several key observations:

- Heavily industrialised, highly urbanised countries are most likely to have specific site contamination legislation
- The earliest countries to enact extensive specific site contamination law did so in response to one or more major contamination incidents
- Among the countries with extensive specific site contamination law, there is no uniform approach
- There is no consistency between countries in defining ‘site contamination’ or its equivalent term

- Developing countries are more likely to rely on their existing general legislation to address site contamination issues as and when they arise
- Some developing countries have recognised the need for extensive or limited specific measures on site contamination
- In developed countries, there has been a gradual change in emphasis from a strict regulatory approach to a supervised voluntary approach to site contamination
- among those countries with extensive specific site contamination law, there is a widespread tendency to negotiate with stakeholders outside the parameters of the legal framework, such as in supervised voluntary cleanups
- brownfields legislation is emerging as the preferred method of dealing with contaminated sites in some countries, with site contamination law likely to play more of a 'safety net' role in the future
- there is an absence of clear legislative provisions on the scientific basis of decision-making on site contamination.

Case Study 4.1 Germany

Background

Germany comprises an area of 357,022 km^2 and is the largest economy and second most populous country in Europe. Germany is a democratic federal republic, formed in 1990 by the unification of the former West Germany and East Germany. The Constitution (the Basic Law) establishes the Federal Government and the 16 States (the *Länder*). The constitutional basis for competency of the *Länder* in contaminated site management lies in Article 30 and Article 83 of the Basic Law. Each State has elected regional and municipal governments. Germany has a civil law system, comprised primarily of legal codes. As a member of the European Union, its legal system is also influenced by European laws.

Germany has experienced extensive problems with site contamination, particularly with respect to former industrial, landfill, mining and military sites. Many potentially contaminated sites were discovered in the former East Germany after reunification in 1990, following the decline and abandonment of industrial and military sites. Common types of activities causing site contamination in Germany include electro-engineering, electroplating, paint and varnish production, glass manufacturing, wood treating, leather manufacturing, scrap yards, petrol stations, gasworks, tar converting, and the mining of salt, coal, lignite, copper, ore, uranium and other minerals. There are currently more than 271,000 potentially contaminated sites in Germany (Federal Ministry for the Environment, Nature Protection and Nuclear Safety 2010).

Summary of Legislation

Germany adopted specific legislation concerning site contamination in the late 1990s: the federal Soil Protection Act 1998, which is complemented by the federal Soil Protection and Contaminated Sites Ordinance 1999 and Soil

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Case Study 4.1 (continued)

Protection Encumbrances Registration Ordinance 1999. The federal law enabled a uniform approach to be adopted with respect to the investigation, assessment and remediation of contaminated sites in Germany, both in terms of the procedures to be followed and the scientific values to be applied to each site (Kohls 2006).

A fundamental distinction exists with respect to the types of legal measures related to site contamination in Germany: the Soil Protection Act applies only to 'historic' sites that have been abandoned or are no longer in active use (referred to as *Altlasten*, or 'old burden'), whereas 'current' sites that are still the subject of active operations are managed, where they are found to be contaminated, under the federal Emissions Control Act 2002.

The Soil Protection Act contains provisions on soil protection principles, obligations to prevent hazards, values and requirements, risk assessment, investigation orders, site identification, consultation, further investigation, remediation planning, the role of authorities, self-monitoring, and supplementary orders. The Contaminated Sites Ordinance provides detailed, technical guidance with respect to the investigation, evaluation and remediation of sites suspected of being contaminated. It sets out requirements for sampling, analysis and quality assurance and also specifies trigger values, action values and precautionary values.

The Environmental Damage Prevention and Remediation Act 2007 was adopted to implement the European Directive on Environmental Liability, and imposes liability for activities causing environmental damage, including land damage that creates a threat to human health. The operation of the Act is limited to situations where existing federal or state laws do not adequately or specifically cover the prevention and remediation of the environmental damage; and the relevant damage was caused by emissions, events or incidents that took place after 30 April 2007 or derived from activities after that date. As federal soil protection laws specifically address site contamination, the Environmental Damage Act is unlikely to apply to many sites in practice.

Definition of 'Site Contamination'

A definition of 'contaminated sites' is contained in the Soil Protection Act (art. 2(5)). Contaminated sites are defined as 'former waste disposal and industrial sites that cause harmful soil changes or other hazards for individuals or the general public'.

Responsibility for Remediation

Government Responsibility for Remediation: Cleanup of Orphan Sites

The definition of 'contaminated sites' in the Soil Protection Act specifically includes 'closed down' waste disposal and industrial facilities. Such facilities may or may not be 'abandoned' in the sense of the party responsible for the

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Case Study 4.1 (continued)

contamination no longer existing or being insolvent. The *Länder* authorities are required to ensure the registration, investigation and assessment of all suspected contaminated sites, including those that have been abandoned ('orphan' sites), to determine whether they are in fact contaminated (art. 9 (1), Soil Protection Act). If feasible, the authorities are entitled to recover the costs of these actions from those who caused the site contamination.

There is no dedicated fund under the federal contaminated sites legislation to support the cleanup of 'orphan' contaminated sites; nor is there any specific statutory requirement for authorities to undertake remediation themselves. In practice, however, a considerable proportion of site remediation in Germany is carried out through the federal and *Länder* governments (including regional and local governments) and funded from their general revenues. An estimated 500 million Euro of public funds are spent each year on remediation of contaminated sites in Germany (Frauenstein 2007: 12). The *Länder* governments commonly raise funds through industry taxes and levies on waste disposal and groundwater use, and may be able to access the European Regional Development Fund for site remediation purposes.

Private Responsibility for Remediation: Liability Framework

Under the Soil Protection Act, a wide range of parties can be made responsible for investigation, assessment and remediation of contaminated sites, including polluters and their successors, current owners and occupiers, and former owners (art. 4(3); cf the narrow definition of 'responsible party' in art. 2(3) of the Environmental Damage Act). Liability under the Soil Protection Act is strict and retrospective (though qualified in the case of former owners). Obligated parties are deemed liable wherever 'a harmful soil change or a contaminated site' has been caused (arts. 4(3) and 24(1)). The Soil Protection Act imposes liability for site remediation jointly and severally on each obligated party. There is no hierarchy of liability among obligated parties. However, they may bring claims for compensation among themselves, depending on the extent to which the hazard or damage was caused primarily by one party or another.

There is no express provision in the Soil Protection Act allowing the owner of a contaminated site to transfer liability for its cleanup to another party. A party that has transferred ownership of a contaminated site to a new owner is still obligated to carry out remediation (art. 4(3), Soil Protection Act). However, liability is limited to circumstances where the transfer was made after 1 March 1999 and the transferor knew, or ought to have known, of the relevant harmful soil change or site contamination (art. 4(6)). Therefore, it appears that an 'innocent' transfer after 1 March 1999 will result in the responsibility for cleanup being passed on to the new owner.

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Where obligated parties under the Soil Protection Act are either unable or unavailable to undertake a site cleanup, an authority may, if the situation presents a threat of hazard to human health, undertake or arrange the remediation itself. It can then recover the costs incurred from obligated parties and may also seek 'value compensation' from the owner of the contaminated land (i.e. the difference between the pre- and post-remediation values of the land) (art. 25(1), Soil Protection Act). This effectively requires the owner to pay back any significant gain in value that is due to soil protection measures undertaken by the authority. An exemption from the requirement to make a value compensation payment can be granted by the competent authority on the grounds of public interest or unjust hardship (art. 25(5), Soil Protection Act).

Role of Private Professionals

Experts and investigating agencies may be permitted by authorities to undertake tasks related to site investigation, assessment, the preparation of remediation plans and monitoring under the Soil Protection Act (art. 18). Several of the *Länder* have adopted laws that provide for the certification of experts and accreditation of testing laboratories within their jurisdictions, although their regulatory approaches need to be evaluated to ensure that professional accreditation and auditing procedures are sufficiently rigorous and consistent. It ultimately remains the responsibility of the relevant authority to determine the nature and extent of the remediation to be undertaken at a contaminated site, based on their interpretation of any experts' reports (art. 9, Soil Protection Act).

Site Identification, Investigation and Assessment

Identification

The Soil Protection Act provides for a staged process of identification, investigation and assessment of potentially contaminated sites. However, the decision as to whether to proactively identify potentially contaminated sites is left to the individual *Länder*. Where proactive identification does occur, it is commonly a task undertaken by regional and local authorities. Federal legislation does not require site owners, occupiers or other parties to notify authorities of potentially contaminated sites.

Reactive identification of contaminated sites by authorities is required by the Soil Protection Act (art. 9(1)). Where an authority has any suspicion or information about a harmful soil change or a contaminated site, it must undertake further enquiries, in particular to determine whether trigger values have been exceeded. The *Länder* can establish their own procedures for site notifications, such as reporting requirements (art. 11, Soil Protection Act).

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Investigation

The investigation process provided by the Soil Protection Act involves an initial, 'exploratory' investigation which is followed, if necessary, by a detailed investigation to determine the extent to which remediation measures are required (a site-based risk assessment process). The Act states broadly that any investigations should consider the type and concentration of the relevant contaminants, the possibility of their spreading into the surrounding environment, the possibility of their being ingested or absorbed by people, animals and plants, and the use of the site (art. 9(1)). Specific criteria for each investigation stage are set out in Annex 1 of the Contaminated Sites Ordinance.

A detailed investigation is required if the exploratory investigation gives rise to a 'sufficient suspicion' of contamination at a site (art. 9(2), Soil Protection Act; art. 2(3), Contaminated Sites Ordinance). A 'sufficient suspicion' exists if the trigger values defined in the Contaminated Sites Ordinance have been exceeded (art. 3(4) and Annex 2, Contaminated Sites Ordinance). In this instance, the obligated party may required to carry out an assessment of the relevant hazards (art. 9(2), Soil Protection Act). However, if the risks identified at a site can be prevented or eliminated through 'simple means', a detailed investigation may not be needed (art. 2(5), Contaminated Sites Ordinance).

Technical Standards

Numerical standards (called 'threshold values') for the purposes of site identification, investigation and assessment are contained in the Contaminated Sites Ordinance (Annex 2). Federal policy sets out methods for developing threshold values to be used in assessing potentially contaminated or contaminated sites, for contaminants not currently covered by the Ordinance (Federal Ministry for the Environment, Nature Protection and Nuclear Safety 1999). The German numerical standards are divided into precautionary values, trigger values and action values and relate to several priority substances, such as heavy metals and persistent organic pollutants. If precautionary values are exceeded at a particular site, this indicates that a harmful soil change may exist, and precautionary measures must be taken to reduce, assess and monitor contamination (art. 8(2.1), Soil Protection Act; arts. 9(1) and 10(1), Contaminated Sites Ordinance). Efforts should be 'reasonable', based on the intended use of the site. If trigger values are exceeded, further investigation is required to determine whether a harmful soil change or site contamination exists, taking into account the relevant soil use (art. 8 (1.1), Soil Protection Act). If action values are exceeded, a harmful soil

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change or site contamination is normally assumed to have occurred (again, taking the relevant soil use into account), and measures are required (art. 8 (1.2), Soil Protection Act).

Risk Assessment

Site-based risk assessment is recognized in the Soil Protection Act as part of the detailed investigation stage (art. 9(2)). Under the Act, the detailed investigation must take into account the permissible use of the relevant land under planning law, or alternatively its expected development, in determining the requirements for protection (art. 4(4)).

The Remediation Process

Under the Soil Protection Act, obligated parties may be ordered to undertake remediation investigations and submit a remediation plan if a coordinated approach to remediation is required, or if the site presents particularly harmful soil changes or hazards for individuals or the general public due to the type, spread or amount of contaminants (art. 13(1)). The requirement for investigations and planning may be dispensed with if the relevant risks, disadvantages or nuisances can be prevented or eliminated by simple means (art. 7, Contaminated Sites Ordinance). If the obligated party is unable or unwilling to act, or their remediation plan is deficient, the authority may prepare the plan itself or require an expert to do so on its behalf (arts. 13(2) and 14, Soil Protection Act). In practice, remediation orders are rarely used in Germany; instead, the authorities issue informal directives with which the obligated parties generally comply. Obligated parties prefer to undertake remediation themselves in accordance with these directives, rather than have the authorities intervene to do the cleanup (at a potentially higher cost to the obligated parties).

The Contaminated Sites Ordinance requires that any remedial investigations and remediation plan for a site consider industrial safety requirements and measures (Annex 3(1) and 3(2)). Although the actual components of these health and safety measures are not identified in the Ordinance, it requires compliance with a policy document that sets out specific rules in relation to industrial safety at contaminated sites (Annex 1 (1); German Federation of Statutory Accident Insurance Institutions for the Industrial Sector 1997). The German legislation goes further than some other jurisdictions in requiring industrial safety to be considered (see, e.g., Table 4.4 above, regarding key features of national approaches to site contamination in selected jurisdictions).

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An obligated party who is ordered to submit a remediation plan must inform all affected parties (e.g., owners, occupiers and neighbours) of the planned remediation measures (arts. 12 and 13(3), Soil Protection Act). Once the remediation plan has been finalised, it can either be included as part of a remediation agreement between the obligated parties and the authority (art. 13(4)), or declared by the authority to be binding, meaning that the obligated parties must carry out the specified measures (art. 13(6)).

Remediation Standards

Uniform cleanup standards are not specified in the federal legislation, with a preference instead for remediation standards to be developed on a case-by-case basis, taking the intended or likely future use of the site into account. Technical and economic factors are also taken into consideration. The remediation standards for groundwater contamination are set out in the federal Water Management Act 2009.

Remediation Options

The Soil Protection Act identifies a range of acceptable remedial options, including decontamination, securing and containment, and measures that eliminate or reduce harmful soil changes (art. 2(7)). The situations in which each measure is deemed 'appropriate' are set out in Article 5 of the Contaminated Sites Ordinance. The Soil Protection Act also acknowledges the use of 'protection and restriction' measures, in particular restrictions on access to and the future use of a contaminated site (art. 2(8)). 'Protection and restriction measures' are defined as measures that prevent or reduce hazards, considerable disadvantages or considerable nuisances for individuals or the general public, especially usage restrictions. Where decontamination or securing measures are not possible or cannot be reasonably required at a site, protection and restriction measures should be used (art. 4(3), Soil Protection Act).

In general, where site contamination has occurred at a site after 1 March 1999, it must be eliminated if this may be reasonably required, unless the obligated party at the time of the contamination complied with the applicable legal requirements and acted in good faith (art. 4(5), Soil Protection Act). The Contaminated Sites Ordinance also provides that the site be restored so as to allow all uses that were previously possible (art. 5(2)). For sites contaminated prior to 1 March 1999, the permissible use of the land under planning law (or, if this is not evident, the nature of the land and its expected development) should guide the remediation decision. Cleanup standards are therefore targeted to specific site uses rather than aiming to achieve background levels.

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Voluntary Remediation/Brownfield Measures

Although authorities (usually at the *Länder* or local government levels) are empowered by the Soil Protection Act to issue orders to obligated parties to compel the investigation, assessment and remediation of contaminated sites (arts. 9(2) and 10(1)), in practice a negotiated approach to remediation is preferred. This is facilitated by the Section 13(4) of the Act and can be achieved through a remediation agreement between the authority and the obligated party.

There are an estimated 228,000 ha of brownfields (*Brachflächen*) in Germany (German Federal Statistical Office 2011). There are no specific provisions in federal legislation promoting brownfields redevelopment, although the National Strategy for Sustainable Development set a target of reducing the rate of nationwide land use expansion from an average of 120 to 30 ha per day by 2020, partially through brownfield reuse. By 2010, the rate of land use expansion had slowed to 87 ha per day (German Federal Statistical Office 2012: 14–15). Some federal funds for urban redevelopment and regeneration are available through *Länder*-based and municipal programs and may be used in some instances to facilitate brownfields projects.

Future Liability for Contamination

There is no formal mechanism in the Soil Protection Act for an authority to certify (or ‘sign off’) that a remediation has been satisfactorily completed. However, under the Contaminated Sites Ordinance, obligated parties must provide proof to the authority that the remediation objective of any completed decontamination measure has been achieved (art. 5(1)). They must also demonstrate to the competent authority the effectiveness of any completed securing measures, which must also be permanently monitored (art. 5(3)). Therefore, obligated parties remain liable for remediation until these steps have been completed.

Where a site has been cleaned up under a remediation agreement, the relevant authority cannot subsequently require additional remediation works by the obligated parties, except where the ‘inherent basis’ of the contract has changed (see, e.g., Spieth and Ramb 2010: 157). In this event, the obligated party may be made responsible for assessing, remediating and/or monitoring the relevant contamination. Aside from this possibility, however, the obligated parties can obtain some degree of finality if the required remediation work has been satisfactorily completed.

Post-Remediation Measures

The Soil Protection Act does not provide for an institutional control in the form of an encumbrance to be entered on land registers to secure post-remediation obligations. However, it does recognise that protection and

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restriction measures, especially to restrict usage of a site, are appropriate, particularly where decontamination and containment measures are not possible or cannot reasonably be required (arts. 2(8) and 4(3), Soil Protection Act). Under the Act, an authority may require obligated parties or an independent expert to carry out monitoring at a site following the completion of decontamination, containment and land-use restriction measures (art. 15(2)). The results of monitoring measures must be recorded and kept on file by the obligated party for at least 5 years, and must be provided to the authority upon request. An authority may also require an obligated party to provide financial security for the maintenance of any containment measures and the performance of any monitoring obligations (art. 10(1), Soil Protection Act).

Public Participation

Site Register

There is currently no federal register of all suspected or confirmed contaminated sites in Germany. Instead, the *Länder* have developed their own registers or databases under their own legislation (Federal Ministry for the Environment, Nature Protection and Nuclear Safety 2002: 3.1.7).

Public Consultation

The Soil Protection Act makes only limited provision for public participation in site cleanup processes. It imposes a general duty to inform owners, affected users and affected neighbourhood as to planned remediation (art. 12). The Act also imposes a specific obligation on a party who is required to submit a remediation plan to give affected persons early notice of the planned remediation (art. 13(3)). However, these provisions do not extend to allowing affected persons to be consulted or to make submissions to an authority regarding the suitability or otherwise of the proposed measures. It has been left largely to authorities at the *Länder*, regional and local levels to determine the level of public consultation required in relation to remediation projects.

Analysis

There are some distinctive features of the German regulatory framework for site contamination that merit particular attention, as well as some deficiencies that may require improvement. Features that work well include the coordination of regulatory responsibilities for site contamination between the federal and state governments, the remediation of orphan sites, the inclusion of technical standards for site investigation and assessment in the legislation, and the wide range of potentially responsible parties and enforcement orders to ensure site cleanup. However, some regulatory deficiencies do exist, and

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require further action if the regime as a whole can be viewed as sufficiently comprehensive.

Federal/Länder Coordination

The *Länder* are primarily responsible for the registration, investigation, assessment and remediation of contaminated sites in accordance with the German Basic Law, which divides powers between the federal and *Länder* governments (arts. 30 and 83). Therefore, the implementation of federal laws on site contamination is carried out largely by *Länder* authorities, and the regional/local authorities within each *Land*. The *Länder* governments generally delegate the task of administering the laws to specialist soil protection authorities within the regional and local (county and city) governments. Each *Land* has its own Ministry for the Environment, whose role is confined primarily to providing guidance to regional and local authorities on assessment and remediation, and coordinating the activities of these authorities.

The federal government is responsible primarily for the oversight of the system and the development of technical standards. Cooperation between the federal and *Länder* governments on soil protection matters is achieved through the Federal/*Länder* Working Group on Soil Protection (LABO), whose main task is to ensure uniform implementation of soil protection law across the nation and to develop proposals for further development of this law (Federal Ministry for the Environment, Nature Protection and Nuclear Safety 2002: 3.2).

The federal legislation must be applied fully and uniformly to contaminated sites nationwide (*Münster Higher Administrative Court* 2000; *Thuringia Higher Administrative Court* 2001) and takes precedence over *Länder* laws that go beyond it in extending liability to other parties. The *Länder* may adopt additional legislative measures regarding site contamination, provided these are consistent with the Soil Protection Act. They may also legislate on matters not already covered by the federal law. The Soil Protection Act specifically allows the *Länder* to legislate in the following areas: cooperation by obligated parties and notification of affected parties; identification of contaminated sites and those suspected of being contaminated; regulation of contaminated or suspected sites that are not covered by Part 3 of the Act; area-oriented soil protection measures (where widespread harmful soil changes exist or are expected; and the establishment and operation of soil-information systems. Supplementary legislation has been introduced in most *Länder* on matters such as the establishment of contaminated site registers, vendor disclosure and access to contaminated sites.

Remediation of Orphan Sites

Despite the absence of a dedicated fund for orphan site remediation in the federal legislation, the federal government takes a proactive approach to

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cleaning up orphan sites. This is particularly so in the former GDR *Länder*, where many state-owned industrial and military facilities were abandoned after reunification. A 'shared responsibility' approach has been taken to remediating these sites, with the federal government paying most of the remediation costs (60% for small and medium sites, or 75% for large-scale sites), and the *Länder* governments paying the remaining share. Good progress has been made in remediating these sites, which otherwise would have remained derelict and may have continued to cause contamination. By 2009, 21 'shared responsibility' projects had been initiated at a total cost of over 3 billion Euro (Federal Ministry for the Environment, Nature Protection and Nuclear Safety 2009 (Germany): 8).

Inclusion of Technical Standards in Legislation

Germany is one of only a few countries that have expressly incorporated technical standards for site investigation and assessment into their legislation, instead of referring to them in policy documents. The standards are not only referred to in the main statutory text, but are clearly set out in annexures to the statute. This ensures that the scientific basis of decision-making at the investigation and assessment stages is well defined and mandated by the law, thereby increasing legal certainty for all stakeholders.

Although remediation standards are not specified in the legislation, this apparent deficiency does not necessarily undermine the regulatory process. A flexible approach to developing cleanup standards is encouraged, rather than imposing a high standard regardless of site uses and site conditions. This allows for more cost effective and site-specific remediation solutions, making the prospect of cleaning up contaminated sites more attractive to landowners and developers.

Mechanisms for Imposing Responsibility

The wide range of potentially responsible parties identified by the legislation, together with its strict and retrospective liability framework, allows authorities to impose responsibility for site cleanup in most cases. This is supported by statutory powers to enforce remediation obligations, although in practice these powers are not widely exercised and a negotiated approach to cleanup is preferred.

Lack of a Federal Brownfields Program

Despite the high number of brownfields in Germany, and ongoing efforts to reduce greenfield consumption (Federal Statistical Office (Germany) 2012: 14–15), there is no federally coordinated brownfields program. The

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brownfield initiatives that do exist at the State level have in the past been undermined by tax incentives for greenfield development, liability concerns and the high costs associated with cleanup (Concerted Action on Brownfield and Economic Regeneration Network 2003: 1). The lack of any statutory provisions for brownfield redevelopment at the federal level is therefore a deficiency in the site contamination regime that requires concerted action.

Lack of a National Register

The lack of a centralised site register in Germany makes it difficult to accurately determine the total number of suspected and confirmed contaminated sites nationwide, or the progress being made in their investigation, assessment and remediation. To some extent, this undermines the effectiveness of the federal site contamination regime and makes it difficult for the public to gain ready access to information. However, detailed information on potential and confirmed contaminated sites is kept on publicly accessible registers at the *Länder* level, and efforts have been made to harmonise them so that federal statistics can be more easily collated and analysed. For these reasons, the lack of a federal register may not be deemed a major problem, although its inclusion is to be preferred.

Lack of Public Consultation Provisions

The lack of detailed provisions in federal legislation on public consultation during site remediation means that there are different approaches to the issue across the *Länder* (Thornton et al. 2005: 18). Although this is not a major deficiency in the regime, it does result in less certainty and consistency for stakeholders undertaking remediation across more than one *Land*. If a *Land* has good public participation provisions, backed up by effective risk communication processes, this can help to allay or even avoid a potentially acrimonious situation. Clear provisions on matters such as public notification, hearings, periods for comments, and review mechanisms, are therefore important.

In summary, Germany's regulatory framework for contaminated sites is particularly strong in some respects, but its overall scope is somewhat undermined by deficiencies in the areas of brownfield measures and public participation. While the level of federal leadership on the site contamination issue is commendable, it is almost inevitable that some disadvantages can arise from a regime that divides responsibilities between federal and *Länder* governments. A lack of consistency between various *Länder* measures is to be avoided or overcome wherever possible.

Case Study 4.2 United States

Background

The United States (US) is the world's third largest country in terms of both size and population, and comprises 50 States, one District, and several external territories (American Samoa, Guam, Northern Mariana Islands, Puerto Rico and the US Virgin Islands). There are many different types of contaminated sites in the US, including factories, mines, smelters, power plants, landfills, waste treatment facilities, military facilities, petroleum storage tanks (above and below ground) and pipelines.

Definition of 'Site Contamination'

The term 'site contamination' is not used in the main federal legislation relating to contaminated sites in the US, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, also known as 'the Superfund Law'). Instead, CERCLA refers to 'releases' of 'hazardous substances' (sects. 101(14) and 101(22)). The term 'hazardous substance' is not precisely defined, although it specifically includes any element, compound, mixture, solution, or substance designated under CERCLA; any hazardous waste listed under, or having the characteristics identified under, the federal Resource Conservation and Recovery Act of 1976 (RCRA); any substance designated, or toxic pollutant listed, under the Clean Water Act; any hazardous air pollutant listed under the Clean Air Act; and any imminently hazardous chemical substance or mixture for which the US Environmental Protection Agency (USEPA) has taken action under the Toxic Substances Control Act (sect. 101(14), CERCLA). The term does not include petroleum, which is regulated under the Oil Pollution Act of 1990. A 'release' is defined as "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment" (sect. 101(22), CERCLA).

Since the 1980s, over 40,000 contaminated sites across the US have been identified and assessed, and some prioritised for cleanup measures, under the federal Superfund Program (USEPA 2010c). The Superfund Program was created by CERCLA in 1980. A 'Superfund' site generally refers to a site at which the federal government is (or intends to be) involved in assessment or remediation activities (USEPA 2012i). Many States also have their own 'State Superfund' programs, which are not discussed in detail in this case study, except where they interact with the federal Superfund Program.

The National Priorities List (NPL) is a formal list of prioritised sites where releases of hazardous substances are known to have occurred or are threatening to occur. Sites listed on the NPL are those most in need of further investigation or remedial action, as determined by the relevant State

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Governor or the Environmental Protection Agency at the State or federal level. As at early 2012, approximately 1,300 sites across the US were listed on the NPL (USEPA 2012d).

Only a small number of contaminated sites in the US are currently being remediated under the Superfund Program, partly due to funding constraints (Scorecard 2012). By contrast, a significant number of contaminated sites are being remediated under the 'Corrective Action Program' for hazardous waste facilities, which is mandated by RCRA. There more than 3,700 corrective action sites across the United States, about half of which are being targeted by USEPA for prioritised cleanup (USEPA 2010b). By 2020, USEPA and its State counterparts aim to have completed construction of final remedies at 95% of all corrective action sites (USEPA 2010b). By 2010, final remedies had already been constructed at 33% of these sites.

The federal government is responsible for cleaning up any contaminated sites that it owns, leases or operates. Typically, federal sites include former military bases, ammunitions manufacturing facilities, fuel distribution stations and landfills (USEPA 2012c). As many as 57,000 federal sites are potentially contaminated with radioactive waste, unexploded ordnance or other hazardous substances. In early 2012, about 150 federal sites were identified on the NPL as most in need of action (USEPA 2012f). Non-federal contaminated sites that are neither listed on the NPL nor addressed through the RCRA Corrective Action Program are generally the responsibility of the States.

Summary of Legislation

CERCLA gives the federal government (through USEPA) broad authority to respond to actual or perceived threats to public health or the environment, and provides the framework for the federal site cleanup program. It authorises USEPA to identify parties responsible for contamination and require those parties to take remedial measures. Where they fail to do so, USEPA is authorised to undertake the action itself and recoup the costs from the responsible parties. The range of potentially responsible parties (PRPs) is wide, enabling the federal government to pursue several avenues, if necessary, to achieve site remediation. PRPs can seek contributions from other PRPs who are responsible for the contamination, but this process is conducted separately from federal enforcement action and thus should not significantly delay cleanup.

CERCLA authorises and regulates two main types of response action at sites that are known or suspected to be contaminated: short-term measures ('removal actions') and longer-term measures ('remedial actions'). Removal actions are those that promptly address imminent threats to human health and

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the environment, and are generally coordinated by the Emergency Response Program within USEPA or the relevant State EPA (sect. 104(a)(1), CERCLA). By contrast, remedial actions normally involve long-term investigation, assessment and cleanup measures to achieve a permanent remedy, and are particularly appropriate for the more complex, heavily contaminated sites (USEPA 2000c: 5). Such sites are the main focus of the Superfund Program.

Amendments were made to CERCLA in 1986 under the Superfund Amendments and Reauthorization Act (SARA), introducing new funding to support the continued work of the Superfund Program (US$8.5 billion for the period 1987–1991 and a further US$5.1 billion for the period 1991–1994: sect. 111(a), CERCLA). SARA expanded the federal government's enforcement authority, and clarified that federally-owned and operated facilities were subject to the provisions of CERCLA in the same way as private entities (e.g., sect. 120, CERCLA). In relation to the remediation process, significant changes included a greater emphasis on finding permanent remedies (e.g., sect. 121(b)(1), CERCLA) and innovative cleanup technologies for site remediation, an increased focus on risks to human health posed by contaminated sites, improved public participation in decision-making on site cleanups, and greater consideration of State regulations and standards.

RCRA authorises USEPA to control all aspects of hazardous waste, including its production, treatment, transport, storage and disposal (Subtitle C). In particular, RCRA establishes the Corrective Action Program, a framework for the identification, assessment and remediation of certain solid waste facilities and hazardous waste sites (sects. 3004 and 3005). Notably, RCRA addresses only active and future hazardous waste facilities, not abandoned or historical sites, which are instead covered by CERCLA. However, facilities that are still operating, and new facilities seeking a permit to operate, have retrospective liability to clean up any existing contamination (sect. 3004(u), RCRA). Subtitle I of RCRA deals specifically with the assessment and cleanup of underground storage tanks.

The National Oil and Hazardous Substances Pollution Contingency Plan ('National Contingency Plan', or 'NCP') is considered the 'blueprint' for federal action on hazardous substance releases and oil spills (USEPA 2012e). The first NCP was developed in 1968, and it has since been revised and extended in scope considerably, in particular after the enactment of CERCLA. The NCP sets out federal agency responsibilities, identifies national priorities for responding to substance releases, specifies how hazards are to be assessed in terms of risk to public health and the environment, and establishes the National Priorities List.

The Small Business Liability Relief and Brownfields Revitalization Act of 2002 (the 'Brownfields Law') provides federal funding to assist with the costs

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of remediating brownfield sites (sect. 211(b)), as well as legal incentives to promote the redevelopment and reuse of brownfields. In particular, it amends CERCLA to limit the liability of particular parties, such as small developers, contiguous landowners, and very minor contributors to contamination, and exclude certain parties (such as innocent purchasers) from liability altogether (sects. 102(a), 221, 222 and 223). However, these liability protections apply only in relation to brownfield sites, and where the eligible party has no connection with the potentially responsible parties. The term 'brownfield site' is defined as "real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant" (sect. 101(39), CERCLA). This definition expressly excludes sites that are listed on the NPL, subject to planned or current remedial action under CERCLA, subject to administrative orders, court orders or consent decrees under CERCLA, subject to corrective action under RCRA, owned or operated by the federal government, and certain other sites (sect. 101(39)(B), CERCLA).

Responsibility for Remediation

Government Responsibility for Remediation

The federal government is responsible for assessing and remediating, where necessary, any contaminated sites that are under its ownership or operation. CERCLA imposes liability on government bodies for any hazardous substance releases they cause or contribute to, unless they acquire the relevant site involuntarily and the release pre-dates that acquisition (sect. 101(20)(d), CERCLA). Almost 60,000 federal facility sites are believed to be potentially contaminated, possibly requiring remediation (USEPA 2011c). Many of these sites are former military bases or power generation plants.

The federal government also has the authority, but not the obligation, to clean up any contaminated sites where a responsible party cannot be located or is insolvent ('orphan sites') using Superfund monies (sect. 104(a)(1), CERCLA). The federal government can assume responsibility for cleanup of orphan sites under the Superfund Program. CERCLA gives broad statutory powers to USEPA to undertake cleanup and other measures at Superfund sites, although its ability to do so continues to be significantly curtailed by lack of funds. Where a PRP later becomes identifiable and/or solvent, the federal government retains the right to recover its cleanup costs from them.

Similarly to CERCLA, RCRA requires government bodies to comply with its provisions (and any other relevant State and local laws) in relation to any facilities over which they have jurisdiction (sect. 6001(a), RCRA). As a result, federal and State government bodies are responsible for taking

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corrective action at their own solid waste or hazardous waste facilities. In addition, administrative enforcement actions may be taken in respect of government-owned or government-operated facilities for violations of RCRA (sect. 6001(b)).

Private Responsibility for Remediation

A broad net of liability is cast by CERCLA for the cleanup of contaminated sites. PRPs can include current and previous site owners and occupiers, as well as anyone who has arranged for the disposal of hazardous wastes, or transported them. USEPA has a policy of pursuing 'enforcement first', that is, attempting to find responsible parties and requiring them to conduct and/or pay for site remediation wherever possible, before resorting to the use of federal funds (USEPA 2002). Accordingly, the federal government, together with its State counterparts, has paid for approximately 30% of all Superfund remediation actions to date, with the remaining 70% paid for by PRPs.

A key feature of the regulatory framework established by CERCLA is the type of liability imposed on PRPs. Liability for contamination is retrospective, strict, and joint and several. This allows PRPs to be pursued irrespective of when the contamination occurred, and regardless of the applicable laws and permits at the time of the contamination. Controversially, the effect of joint and several liability is that any one PRP can be held responsible for the entire cleanup cost of the contamination, even where other PRPs exist that may have contributed to the contamination. However, a PRP who undertakes a site cleanup is entitled to seek 'equitable' contributions from other PRPs through their own subsequent litigation. The contribution provision in CERCLA thus adds an element of fairness to the liability allocation process.

RCRA imposes liability on certain parties that are involved in the treatment, storage, and disposal of hazardous wastes and solid wastes. It also imposes liability for activities relating to underground storage tanks. Owners and operators of hazardous waste facilities, together with generators and transporters of hazardous waste, may be required to take corrective action measures at a facility and/or pay for the cost of others doing so. Facility owners or operators seeking a permit to treat, store or dispose of hazardous wastes must first remediate any existing contamination at the facility. RCRA is retrospective, so the parties may be held liable for site contamination regardless of when it occurred. However, RCRA does not extend to situations where hazardous wastes are found at abandoned or inactive facilities, which are normally addressed through CERCLA.

Different enforcement mechanisms are available under CERCLA and RCRA. Under CERCLA, the authorities may issue a Special Notice of Liability Letter, followed by a Unilateral Administrative Order (UAO) if

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the PRPs do not attempt to either accept or negotiate their liability for cleanup (sect. 106). A UAO can require parties to carry out short term and/or longer term response actions at the relevant site. In practice, USEPA tends to reserve this statutory power for sites involving an imminent and substantial threat to human health or the environment (sect. 106(a), CERCLA; USEPA 1990b: 9). Non-compliance with a UAO may result in substantial penalties, daily fines, and a cleanup order against the PRP.

Under RCRA, the authorities (i.e. USEPA, or its State counterparts) can take action if they discover breaches of statutory requirements during inspections of facilities, or at any other time. Enforcement tools include informal and formal administrative actions (e.g., compliance orders) (sects. 3008(a), 7003, 3013 and 9006, RCRA), civil prosecution of individuals and companies, and, in the most serious cases, criminal prosecution. As with CERCLA, substantial penalties may be imposed for ongoing and subsequent cases of non-compliance.

Role of Private Professionals

In general, USEPA does not delegate the regulatory supervision of Superfund site cleanups to private professionals. However, USEPA acknowledges that private professionals play a key role in the implementation of CERCLA, because much of the day-to-day remedial work is performed by private contractors (USEPA 2011g). Private professionals are commonly retained by government bodies (such as USEPA) and PRPs to conduct environmental site assessments, prepare remedial investigation and feasibility studies, design remedial options, oversee construction works, conduct laboratory sampling and analysis, acquire personnel and equipment during the actual remediation phase, and provide legal advice to support regulatory enforcement (Superfund Senior Regional Management Acquisition Council 2011: 1).

At Superfund sites being remediated by PRPs, it is common for USEPA to have a high degree of regulatory oversight in the initial and final stages, with less need for supervision in the intervening period if the PRP demonstrates competence and reliability (USEPA 1990a). Each Superfund site is assigned a Remedial Project Manager within USEPA, whose role it is to coordinate and supervise (and, if necessary, direct) the site remediation. The Remedial Project Manager is tasked with reviewing and approving remediation documents submitted by PRPs. They do so with the technical assistance of an Oversight Official, who has a contractual or inter-agency relationship with USEPA and monitors the PRP's compliance with their quality assurance plan.

At PRP-remediated sites, it is ultimately the responsibility of the PRP to ensure the site remediation is carried out to the required standard. USEPA can review the performance of contractors engaged by the PRP to undertake

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remediation. Federal policy states that Oversight Officials will conduct spot checks of the activities of professionals retained by PRPs or working on an 'in-house' basis within the PRP's company. Test results produced by such professionals will also be reviewed, and the findings reported to the Remedial Project Manager within USEPA (1990a: 2–8). In addition, five-yearly reviews are undertaken for all Superfund sites by USEPA, including those for which the Federal government takes responsibility. According to USEPA, these reviews "represent a required process for examining the cleanup remedies at Superfund sites to determine whether remedies adequately protect human health and the environment" (USEPA Office of Inspector General 2011: 2).

At RCRA sites, both the facility owner/operator and a qualified professional engineer (or, in some cases, an independent, qualified soil scientist) must certify key documents prior to their submission to USEPA (e.g., sect. 264.280(b), Code of Federal Regulations). These include the corrective measure completion report, final closure notice, and post-closure care documents. Documentation supporting the certification of the professional engineer must be provided to USEPA on request, and the facility owner/operator may not be released from their financial assurance requirements (e.g., for post-closure care) until they have done so (e.g., sects. 264.115 and 264.120, Code of Federal Regulations).

For the purposes of corrective action under RCRA, the term 'qualified professional engineer' refers to someone who is qualified to perform the relevant task and is licensed or registered as a professional engineer by the relevant State. The qualification requirements and licensing process are thus left to State licensing boards to administer (USEPA 2006: 16870). Qualified professionals may, for example, include a Certified Hazardous Materials Practitioner (CHMP) and, in some cases, a Certified Hazardous Materials Manager (CHMM). A CHMP is an individual with experience in various aspects of on-site handling of hazardous materials, which can include responding to spills and/or remediating contaminated sites. They have a more 'hands on' role than do CHMMs, who act in a managerial capacity and advise companies, organisations and government bodies on proper handling and management procedures for hazardous materials. The Institute of Hazardous Materials Management certifies both CHMPs and CHMMs, who are bound by a Code of Ethics. Individuals must have appropriate experience and academic qualifications, and pass an examination.

Site Identification, Investigation and Assessment

A potentially contaminated site may come to the attention of USEPA in a number of ways. For example, it may be notified of a hazardous substance release by a site owner or operator, or a concerned citizen. Alternatively,

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USEPA may discover a potentially contaminated site through routine inspections of site records or facility operations. Together, CERCLA and the NCP provide a federal framework for the investigation and assessment of potentially contaminated sites. The site identification, investigation and assessment process under CERCLA involves conducting a Preliminary Assessment and, if necessary, a Site Inspection (USEPA 1991a: 4). Federal facilities are subject to the same statutory investigation and assessment process as non-federal sites, although they may be identified through different methods (sect. 120(a)(2), CERCLA).

At solid waste facilities regulated under RCRA, potentially contaminated sites are commonly identified when a closure or change of use is proposed for a facility, or a hazardous waste release occurs during facility operations. USEPA can require the facility owner or operator to carry out a site investigation and assessment to determine the presence, if any, and extent of contamination (sect. 3019, RCRA). The initial stage of this process comprises a RCRA Facility Assessment, which involves a desktop review, site inspection, and preparation of an assessment report (USEPA 1986). If the assessment identifies the possibility or likelihood of a hazardous release, a RCRA Facility Investigation must be conducted (USEPA 1989a).

Identification

There is no statutory requirement for USEPA to proactively identify potentially contaminated sites, although it is authorised to take action on any site where contamination is believed or suspected to have occurred (sect. 300.130, NCP). PRPs have a duty under CERCLA (sect. 103(a)) to immediately notify the National Response Center regarding a hazardous substance release if it exceeds the specified reportable quantity. Regional EPA offices, State agencies and citizens can also notify USEPA of potentially contaminated sites. A special provision introduced through SARA (sect. 105(d)) allows citizens to file a petition regarding a suspected release of a hazardous substance at a site. Suspected contamination at federal facilities must be reported to USEPA by the relevant federal agency or department (sect. 120(c), CERCLA). Once a potentially contaminated site is identified, it is entered on the USEPA inventory, the Comprehensive Environmental Response, Compensation and Liability Information System ('CERCLIS').

RCRA contains requirements for owners and operators of hazardous waste facilities, as well as transporters and generators of hazardous waste, to notify USEPA of their activities (sect. 3010). A permitting system was also established under RCRA, whereby such facilities and parties must submit relevant site information to USEPA (sect. 3005). These provisions allow USEPA to respond to any instances of potential site contamination at RCRA sites.

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Investigation

Any site entered on CERCLIS must undergo a Preliminary Assessment ('PA'), which is the first step in the site investigation process (sect. 116(b), CERCLA). The PA is a screening tool that helps distinguish sites presenting little or no risk to human health or the environment, from those which may pose a threat and require further investigation or urgent remedial action (USEPA 1991a: 2).

Conducting a PA involves collecting information that is readily available regarding the site and its surrounding area (USEPA 1991a). This information is normally obtained by carrying out file searches, obtaining 'desktop' data from maps, databases and inquiries, and making on-site visits. All of the relevant site information is then evaluated, which involves characterising the site, the source and pathways of the release, the nature and quantity of the hazardous substance, and the likely targets (i.e., humans and/or the environment). Based on this evaluation, the site is given a score and a recommendation is made as to whether further investigation, in the form of a Site Inspection, is required.

A Site Inspection involves collecting waste and environmental samples from the site, so as to identify the substances that are present at the site, and whether a release has occurred or is likely to occur (USEPA 1992a). The Site Inspection may be conducted in either one or two stages, depending on whether sufficient information is at hand to make a decision. The first stage, a 'focused' Site Inspection, is essentially a screening process and involves testing the hypotheses developed at the PA stage. In some instances, this may provide enough information to allow the site to be scored using the 'Hazard Ranking System' ('HRS'), a numerically-based screening tool. If not, an 'expanded' Site Inspection is required, whereby all necessary data must be collected and analysed (USEPA 1992a: 11). All available information (including analytical data) is reviewed, and a work plan, sampling plan, health and safety plan, and waste plan are developed. Field work is undertaken to visually inspect the site and collect samples, and the Site Inspection report is prepared (USEPA 1992a: 5).

Once both a Preliminary Assessment and Site Inspection have been conducted, the relevant site is given an HRS score. The score is based on an evaluation of the risk posed by potential contamination at a site, through an assessment of the source, pathway and target of the relevant contaminant(s). If a site has an HRS score of 28.50 or above, it is eligible to be proposed for inclusion on the NPL (USEPA 1991a: 4). A site can also be proposed for NPL inclusion if USEPA believes that the site poses a significant threat to public health, even if it does not have an HRS score above the threshold (sect. 425(c)(3)(ii), NCP). The site ranking system enables USEPA to determine whether further investigation is needed, or that no further remedial action is required.

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If a finding is made for the latter, the site receives a “no further remedial action planned” recommendation, meaning that no action under the Superfund Program is envisaged. However, this recommendation does not prevent State agencies or other regulatory authorities from taking further action on a site.

Site-specific risk assessment is typically undertaken at the remedial decision-making stage for Superfund sites, rather than at the initial site investigation stage. The limited scope of the Preliminary Assessment process generally precludes USEPA from obtaining site-specific analytical data through environmental sampling, unless that data already exists and is readily available, reliable and sufficient (USEPA 1991a: 37). However, the process of assessing the hazards posed by a substance release is intended to take into account relevant site factors wherever possible. Although reference is to be made by USEPA officers to a checklist of considerations (or ‘criteria list’) when evaluating sources, pathways and targets during the Preliminary Assessment phase, government policy also urges site-specific factors to be taken into account (USEPA 1991a: 53).

Risk assessment at Superfund sites during the Remedial Investigation/Feasibility Study stage is guided by federal policy on health and environmental assessments. The Risk Assessment Guidance for Superfund (‘RAGS’) provides a comprehensive set of tools to assist decision-makers in finding a remedial solution that is protective of both human health and the environment, as required by CERCLA and the NCP. They contain detailed information on, and procedures for, conducting baseline risk assessments, refining preliminary remediation goals, and evaluating remedial alternatives. Volume I (the Human Health Evaluation Manual) sets out a process for assessing risks to health posed by contaminants and proposed remedial or removal measures at the relevant site (USEPA 2009b), while Volume II (the Environmental Evaluation Manual) sets out a framework for evaluating the associated environmental risks (USEPA 1989b).

Federal facilities are subject to the same Preliminary Assessment, Site Inspection, HRS ranking and NPL listing procedures under CERCLA as non-federal sites (sect. 120(a)(2), CERCLA; USEPA 2005a). USEPA is obliged under CERCLA to ensure that a PA and SI are conducted for each site identified on the Federal Facilities Docket. The party charged with conducting a PA and SI is usually the federal agency or department responsible for the facility (USEPA 2005a: Appendix A-2). Site-specific information can be used, where it is available and reliable, during the PA/SI process, and may be obtained from departmental reports and other sources (USEPA 2005a: Appendix B). Following the PA/SI for a federal facility, USEPA must consider whether it qualifies for inclusion on the NPL. Even if the facility is not listed on the NPL, some response actions may need to be taken by the relevant federal agency or USEPA (USEPA 2005a: 2).

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For RCRA sites, the first step in the corrective action process is the RCRA Facility Assessment ('RFA'). The RFA process allows USEPA to determine whether a hazardous release has occurred at a facility, and prioritise for further investigation any sites that may pose a threat to human health or the environment. An RFA must be conducted for facilities seeking a permit, facilities operating or closing under interim status, and some non-complying facilities that have neither a permit nor interim status (USEPA 1986). The RFA process comprises a Preliminary Review (in which existing information on the facility is examined); a Visual Site Inspection (an on-site visit to determine the existence or likelihood of a hazardous release); an optional Sampling Visit to confirm the existence of a hazardous release; and the RFA Report (which presents findings and makes recommendations regarding further investigations) (USEPA 1986).

If the RFA Report concludes that there is evidence of an actual or potential release at a facility, a schedule of corrective action will form part of the new or modified permit conditions for that facility (USEPA 1989a). A RCRA Facility Investigation ('RFI') must be conducted to determine the nature and extent of the contamination, and the rate of its migration to other areas (USEPA 1986: 4–17). The purpose of the RFI is to collect sufficient information to enable the nature, extent and rate of migration of hazardous releases to be characterised. The RFI provides the basis for making a decision as to whether interim corrective measures and/or a Corrective Measures Study may be needed (USEPA 1989a: i).

The Remediation Process

Once a site has been placed on the NPL, a Remedial Investigation/Feasibility Study ('RI/FS') is performed (sect. 116(d), CERCLA; USEPA 1988). These are undertaken concurrently, as the data collected in the Remedial Investigation influence the remedial options considered in the Feasibility Study (USEPA 1988: 1–6). A Remedial Investigation involves collecting information to help characterise site conditions, determine the nature of the contamination, and assess risks to human health and the environment. Testing is also conducted to evaluate possible treatment technologies. A Feasibility Study comprises the development, screening and detailed evaluation of alternative remedial actions.

Based on the findings of the RI/FS, a Record of Decision is issued by USEPA (sect. 117, CERCLA). This is a public document which explains the cleanup option(s) that will be used at the relevant site, and sets out the remedial action plan and timeline. It also certifies that the selected remedy complies with CERCLA and the NCP, and summarises the alternatives that were not chosen (USEPA 1999: 1–2). Following the Record of Decision, the

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Remedial Design is undertaken. This involves drawing up the technical specifications for the selected remedies and technologies (USEPA 1995). The Remedial Action can then be taken, involving the actual construction or implementation of the site remediation specified in the Record of Decision.

Federal facilities are subject to the same RI/FS requirements as non-federal sites (sect. 120(e)(1), CERCLA). Within 180 days of the completion of the RI/FS, the responsible federal department or agency is required to make an interagency agreement with USEPA for the "expeditious completion [. . .] of all necessary remedial action" (sect. 120(e)(2), CERCLA). The interagency agreement (also known as the Federal Facility Agreement) should contain a review of the alternative remedial options for the facility, a description of the selected remedy, a remediation schedule, and any long-term operation and maintenance arrangements (sect. 120(e)(4), CERCLA). Substantial remedial actions must be commenced at the facility within 15 months of the RI/FS (sect. 120(e)(2), CERCLA).

A site can be deleted from the NPL once USEPA is satisfied that no further action is needed to protect human health or the environment (sect. 300.425(e), NCP). A particular procedure is followed by USEPA for NPL deletion, including the preparation of a 'close-out report', which testifies that all necessary actions have been taken or that no action is required (USEPA 2011b). A site may be deleted from the NPL before a cleanup is complete, if the site is being (or will be) adequately addressed under the RCRA Corrective Action Program, provided certain criteria are met (USEPA 1997b). This policy also applies to the deletion of federal facility sites from the NPL (USEPA 2011b: 5–2 and 5–3).

Under RCRA, the remediation of a site may be triggered when the owner or operator of a waste treatment, storage or disposal facility applies to USEPA for an operating permit. It may also be triggered when a facility is to be closed, and the existence or possibility of a hazardous waste release at the site is identified by USEPA. Where there is, or has been, a discharge of hazardous waste at the facility, the owner or operator must undertake appropriate corrective action before the permit can be granted or facility closure allowed (sect. 260.101, Code of Federal Regulations). Corrective action measures may be required either through permit conditions or enforcement orders under RCRA. Interim corrective action measures may be required if USEPA believes that expedited action is needed to protect human health or the environment (USEPA 1989a: 1–6).

Regardless of whether interim measures are needed at a RCRA site, the owner or operator must prepare and submit to USEPA an evaluation of different remedial alternatives to clean up the site, in a Corrective Measures Study. The Study involves identifying and recommending appropriate measures to correct the release, based on the information contained in the RCRA Facility Investigation (USEPA 1989a: 1–7). Information collected

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through the RFI process assists with the assessment of various remedial options in the context of the site conditions. After reviewing the Study, USEPA selects a remedy that will allow for appropriate cleanup of the site. The next step in the corrective action process is the Corrective Measures Implementation, which involves the design, construction, operation, maintenance and monitoring of the selected remedy by the facility owner or operator.

Remediation Standards

The selected remedy for a Superfund site must be protective of both human health and the environment (sect. 121, CERCLA). This also applies to federal facilities. CERCLA indicates that preference should be given to remedies that are reliable and provide long-term protection (sect. 121). In addition to these core objectives, there is a preference for remedies that result in a permanent and significant reduction in the volume, toxicity or mobility of the contaminants; and remedies that maximise the use of alternative treatment technologies or resource recovery technologies to reach a permanent solution (sect. 121(b), CERCLA). Off-site treatment and disposal (also known as the 'dig and dump' approach) is to be avoided wherever possible.

Neither CERCLA nor any other federal legislation contains specific remediation standards. Instead, the regulatory authority dealing with a Superfund site must develop a remediation standard on the basis of "applicable or relevant and appropriate" federal cleanup standards, requirements, criteria and limitations ('ARARs') (sect. 121(d)(2)(a), CERCLA). State cleanup standards must be met if they are more stringent than the federal standards (USEPA 1988: 1–4). Identifying the ARARs for a site is the main prerequisite for setting remediation goals, selecting the remedy, and determining how the remedy should be implemented (USEPA 1992b: sect. XII).

ARARs are generally considered adequate to protect human health and the environment at sites that do not involve multiple pathways of exposure or contaminants (USEPA 1997a: 2). However, in rare instances where ARARs are not deemed adequate, USEPA can establish preliminary remediation goals ('PRGs') at levels that are more protective than required by ARARs. The decision as to whether a PRG should be established for a site is based on a review of the level of risk associated with applying the ARAR; the soundness of the technical basis for the ARAR; and other relevant factors regarding the ARAR or its application to the specific site (USEPA 1997a: 2). Where there are no ARARs to address a particular situation, or the existing ARARs do not ensure enough protection, other policy materials can be used to develop a cleanup standard (USEPA 1992a, b: sect. XII-3). These are called 'To Be Considered' materials ('TBCs') and may comprise non-statutory criteria,

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advisories, guidance and proposed standards developed by federal and State public health and environmental agencies.

There are limited situations in which remedial actions may be exempt from complying with the federal (or State) cleanup standards (sect. 121(d)(4), CERCLA). These are where: the selected remedy is an interim one only, and the final remedy will comply with cleanup standards when it is completed; compliance will result in a greater risk to human health and the environment than alternative options; compliance with the cleanup standard is technically impracticable; an alternative remedy will attain the same standard using a different method; the cleanup standard is a State requirement that the State has not applied consistently in similar circumstances; or compliance will not provide a balance between protecting human health/the environment, and the availability of Superfund money for other sites.

The applicable cleanup standard for a particular site is usually specified in the Record of Decision that is issued by USEPA at the end of the Remedial Investigation/Feasibility Study stage. Remedial actions must be reviewed every 5 years following commencement of remediation, for as long as the hazardous substances or contaminants remain at the site (sect. 121(c), CERCLA). If the review process finds that the remedy no longer protects human health and the environment, consideration must be given to further remedial action. Federal facilities are subject to the same requirement for five-yearly reviews (sect. 121(c), CERCLA; USEPA 2011d).

At RCRA facilities, corrective action must be conducted 'as necessary to protect human health and the environment' (sect. 260.101, Code of Federal Regulations). The remediation standard is therefore a broad one. It is applicable to any RCRA facility, regardless of whether corrective action is achieved through the permitting process or through enforcement action taken by USEPA (sect. 3008(h), RCRA). Similarly to sites addressed under CERCLA, risk assessment is used at RCRA facilities to determine the need for remediation and to identify cleanup goals in relation to human health and the environment. However, there are some differences between the risk assessment approaches to Superfund and RCRA sites (see, e.g., Benjamin and Belluck 2001: 525). An ecological risk assessment and a human health risk assessment form the basis of the RCRA risk assessment process.

Voluntary Remediation/Brownfields Measures

Federal supervision of voluntary cleanups is conducted in a 'focused' manner, to conserve limited USEPA resources. Supervision takes place at the beginning of key stages in the site assessment and cleanup process, and focuses on the most important tasks and documents. Close supervision is reserved for the most complex sites, or those involving recalcitrant or unreliable PRPs.

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At the federal level, the 2002 Brownfields Law provides various financial and legal incentives to promote the redevelopment of brownfield sites. USEPA is responsible for administering the federal Brownfields Program, although many States also have their own brownfields legislation and voluntary cleanup programs. In the 10 years since the federal Brownfields Program began, almost 20,000 brownfield sites have been assessed and over 700 site cleanups have been completed (USEPA 2012b).

Voluntary Remediation

In general, CERCLA prevents federal enforcement action being taken against parties that are already remediating certain low-risk brownfield sites (called 'eligible response sites') under a dedicated State Voluntary Cleanup Program ('VCP') (sect. 101(41)(C)(i), CERCLA). The term 'eligible response sites' does not include sites that may qualify for NPL listing. For voluntary cleanups not already covered by State-based VCPs, the main objective of federal oversight policy is to use the limited resources available to achieve timely and protective site cleanups. This is to be attained by tailoring oversight to each particular site, on the basis of the complexity of the cleanup, the level of experience of the PRPs, and the interests of the community (USEPA 2000a: 2).

The preferred approach for Superfund sites is that USEPA negotiates a settlement agreement with PRPs regarding site cleanup, before resorting to enforcement (USEPA 2002: 1). This can be done wherever USEPA determines that the cleanup will be properly carried out by the PRP, and a settlement would be both practicable and in the public interest (sect. 122(a), CERCLA). The settlement agreement may be in the form of either an Administrative Order on Consent (AOC) or a Judicial Consent Decree (JCD), and must comply with the National Contingency Plan. The negotiations for a settlement agreement normally begin with the USEPA sending a Special Notice Letter to the PRP(s), inviting the PRP to make a 'good faith offer' within 60 days to carry out the required work or to pay for remediation costs (sect. 122(e)(1), CERCLA).

USEPA offers PRPs the opportunity to discuss oversight expectations and possible options once settlement has been agreed. This can be done early in the site management process and at subsequent annual meetings (USEPA 2000a: 3–4). Throughout the cleanup process, USEPA takes a 'focused approach' to overseeing PRP actions. A high level of oversight is necessary at the onset of both the RI/FS and the RD/RA stages, but at most other times a lower degree of supervision is appropriate if the site remediation is straightforward. For cost reasons, continuous oversight is usually reserved for sites

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which are particularly complex, or where PRPs have proved unreliable and/or technically incapable (USEPA 2000a).

Throughout the remediation process, USEPA communicates with PRPs regarding performance and supervision of the cleanup tasks specified in the settlement agreement (AOC or JCD), in accordance with the agreed timeline. USEPA has wide powers to monitor the PRP's progress in carrying out the agreed cleanup, so as to ensure protection of human health and the environment. These powers include making sporadic and unannounced site inspections, issuing 'stop work' notices, and taking over the remedial action if necessary (USEPA 2000a: 4, 1991b: 1–20).

A RCRA brownfield site is generally defined as a RCRA facility that is not in full use, has redevelopment potential, and the reuse or redevelopment of the site is delayed due to concerns about actual or potential contamination and liability under RCRA (USEPA 2012g). It may be possible at such facilities for part of the site to be remediated and redeveloped for another use within a relatively short timeframe, whilst the main facility is undergoing a longer-term cleanup under the Corrective Action Program (USEPA 2003a: 8762). This flexibility is an incentive for the revitalisation of RCRA brownfield sites, and applies to parcels of land within a RCRA facility site that are either lightly contaminated or uncontaminated.

Brownfields Measures

Brownfields revitalisation funding provisions in the Brownfields Law authorise funding of up to US$200 million per year for brownfields assessment and remediation (sect. 211). Individual sites can be funded up to US$200,000 for site assessments and planning, and up to US$1 million for remediation (the latter through Revolving Loan Fund grants). In the 2011–2012 financial year there was a federal budget of US$65 million for the assessment, remediation and revolving loan fund grant programs, to be divided among an estimated 210 grants (USEPA 2011e: 2). Further federal funding of US$100 million was made available to USEPA for brownfields redevelopment through the American Recovery and Reinvestment Act of 2009 (the 'Recovery Act'). A further 700 sites have been assessed and 47 cleanups have been performed under the provisions of the Recovery Act (USEPA 2012b).

There are also some federal tax incentives that relate indirectly to brownfield regeneration. These include the New Markets Tax Credits, which are intended to stimulate the economy and create jobs in distressed urban and rural communities by expanding the availability of credit, investment capital and financial services; Low Income Housing Tax Credits, which are an incentive for using private equity in the development of affordable housing for low-income residents; and Historic Rehabilitation Tax Credits, which aim

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to encourage private investment in the cleanup and rehabilitation of historic sites (USEPA 2011a).

In addition to creating financial incentives to brownfield redevelopment, the Brownfields Law amended CERCLA to provide liability protection for certain parties involved in brownfields remediation. It contains liability exemptions for small businesses that contribute only a miniscule amount of the overall site contamination, and municipal solid waste facilities (sect. 102). In addition, liability exemptions are provided for contiguous property owners and operators, bona fide prospective purchasers and innocent landowners who have made ‘all appropriate inquiries’. The legislation also provides for expedited settlements on the basis of a party’s limited ability to pay for response costs.

The RCRA Brownfields Prevention Initiative was established by USEPA in 1998 to promote the redevelopment of potential RCRA brownfield sites. It has involved using pilot projects to demonstrate the regulatory flexibility of the RCRA regime for expediting brownfield redevelopment, in particular by facilitating dialogue and integrating reuse considerations into cleanup decisions (USEPA 2001b: 1). The program has also entailed the launch of several small-scale projects (‘RCRA Targeted Site Efforts’) aimed at showcasing brownfield tools and RCRA cleanup reforms (USEPA 2003b: 1). These projects were intended to demonstrate how specific barriers to the successful remediation and reuse of RCRA sites could be overcome.

Future Liability for Contamination

A mechanism known as the ‘Covenant Not to Sue’ may provide PRPs with some protection against liability for future contamination under CERCLA. Generally, a Covenant Not to Sue is justified if it would be in the public interest, it would expedite the relevant response action, the PRP is in full compliance with the terms of the settlement agreement, and USEPA has approved the response action (sect. 122(f)(1), CERCLA; USEPA 1987). The Covenant Not to Sue does not become effective until the site remediation is certified as complete by USEPA (sect. 122(f)(3), CERCLA). A provision can also be included in the covenant that reserves the right of the USEPA to require further remedial action by the PRP, should the need arise (sect. 122(f)(6)(c), CERCLA). This may be necessary where, for example, new contamination is discovered at the site, there are changes in scientific knowledge of particular contaminants, or new information reveals that the remedy used for a site no longer protects human health or the environment (USEPA 1987).

It may also be possible for a PRP to obtain a ‘comfort letter’ (also known as a ‘status letter’) from USEPA regarding the status of a remediated Superfund site or RCRA facility (USEPA 1996a, 2001a: 1). Comfort letters provide an interested party with pertinent information held by USEPA

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regarding a particular site, details as to what the information means, and the likelihood (if any) of USEPA taking Superfund or RCRA enforcement action in relation to the site (USEPA 1996a). In relation to RCRA facilities, site-specific factors determine whether a comfort letter is appropriate, and if so, the type of letter issued (USEPA 2001a: 2). Comfort letters may be appropriate at RCRA brownfield sites, 'generator-only' sites, and other sites where hazardous waste is discovered during remediation or redevelopment activities

Federal policy states that comfort letters are only appropriate in situations where they may facilitate the cleanup and redevelopment of brownfields; where there is a realistic perception or probability of Superfund liability being incurred or RCRA corrective action being taken; and no other mechanism is available to adequately address the interested parties' concerns (USEPA 1996a). Comfort letters are intended as an informational tool only, providing informal reassurance to parties regarding the status of a site. They do not affect USEPA's statutory powers to take action at the relevant site should the need arise in the future; nor do they exempt any party from liability under CERCLA or RCRA (USEPA 1996a: 2).

Post-remediation Measures

Institutional controls ('ICs') are legal and administrative instruments that are used to minimise risks to human health posed by contamination remaining at a site following remediation, or as part of the remedial solution. CERCLA specifically authorises the use of enforceable mechanisms such as ICs, and they are commonly used to manage contaminated sites (sect. 121(d)(2)(B)(ii)(II)). The purpose of an IC is to provide a safeguard for the selected site remedy, by imposing limits on resource and site uses, and guiding human activities at the site. It may be used at any stage of the site remediation process, if residual contamination means that unrestricted site use is not possible (sect. 300.430, NCP). ICs are particularly useful where the complete removal of contaminants from a site would be too costly or difficult (USEPA 2005b: 2).

The NCP states that ICs should generally be used in addition to engineering controls, and only rarely as the sole remedy for a site where other response actions would be impracticable (sect. 300.430(a)(1)(iii), NCP). However, ICs are often an important part of the overall cleanup efforts at a site. They can be used for Superfund sites, federal facilities, RCRA corrective action sites, brownfields and underground storage tanks (USEPA 2010a: 1). The decision as to whether ICs are appropriate at a site is one that must be made on a site-by-site basis, taking into account the relevant site conditions and uses. In particular, the decision-maker needs to assess whether the site has achieved a level of cleanup such that all exposure pathways present an acceptable level

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of risk for all relevant land uses (the 'unlimited use and unrestricted exposure' standard) (USEPA 2010a: 2).

While the IC mechanisms authorised by RCRA are similar to those under CERCLA, they are applied differently. Generally, ICs are part of the corrective action and/or post-closure care requirements at a RCRA facility, so they can be incorporated into the conditions of a permit or terms of an enforcement order (USEPA 2010a: 5). RCRA permits and orders can restrict the use of a property by the current owner or operator, or require them to implement, maintain and enforce certain proprietary controls to ensure long-term protectiveness (e.g., orders issued under Section 3008(h) or Section 7003 of RCRA: USEPA 2010a: 5). When a RCRA facility is given a determination of 'Corrective Action Complete With Controls', this may indicate that ICs need to be maintained, or complied with, by the owner or operator on an ongoing basis, as part of the selected remedy.

Examples of ICs include zoning restrictions, building permits, easements and covenants (USEPA 2010a: 2). Around half of the States have now introduced legislation based on the model Uniform Environmental Covenants Act (UECA) to regulate the use of easements and covenants. UECA provides long-term protection for ICs through voluntary agreements, or 'environmental covenants'. Covenants can place prohibitions on activities that may compromise the effectiveness of the site remedy. Alternatively, they may restrict activities or resource uses that could result in an unacceptable risk to human health or the environment (USEPA 2010a: 3). These covenants are binding on subsequent purchasers and tenants, and are identified on the local land register (e.g., sects. 5 and 8, UECA). A wide range of interested parties can enforce the ICs contained in a covenant, to help ensure the controls remain effective over time (e.g., sect. 11, UECA).

Other enforceable legal tools, such as administrative orders, permits, consent decrees and Federal Facility Agreements, may be used to impose site use restrictions on landowners (USEPA 2010a: 3). These mechanisms can be either negotiated between USEPA and the site owner/operator, or imposed unilaterally on the latter. Disadvantages of using these tools are that they are normally only enforceable against the current site owner/operator, and they are not transferable.

Where some contamination remains at a federal facility as part of the remediation strategy, the relevant Federal Facility Agreement must set out a schedule of operation and maintenance activities, including five-yearly reviews, to ensure long-term protectiveness of the selected remedy. Whilst the federal agency or department responsible for the site typically conducts the five-yearly review, USEPA ultimately determines whether or not the selected remedy is sufficiently protective (USEPA 2011d: 2). Recent recommendations have been made that USEPA oversight of the review

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process be improved, and that long-term measures at federal facilities be tracked and monitored against their agreed schedule (USEPA 2011d: 2).

Financial assurance may have to be provided to regulatory authorities to ensure compliance with, and enforcement of, ICs at a site (Environmental Law Institute 2005: 16). In general, financial assurance obligations are negotiated between USEPA and PRPs as part of the Superfund settlement process. Alternatively, they can be included in the terms of an enforcement order. Financial assurance mechanisms include surety bonds, corporate guarantees, trust funds, insurance policies, corporate financial tests and letters of credit. Occasionally, other mechanisms may be used to suit specific circumstances, such as liens over real property, deposit accounts, escrow accounts, and certificates of deposit.

CERCLA authorises USEPA to require that certain industries provide financial assurance for site remediation activities that is "consistent with the degree and duration of risk associated with the production, transportation, treatment, storage or disposal of hazardous substances" (sect. 108(b)). These industries include the chemical manufacturing, petroleum and coal processing, hardrock mining and electricity industries (USEPA 2012h). Operators of such activities must set aside sufficient funds to be used in the event of a future inability or unwillingness to pay for site cleanup.

RCRA contains its own financial responsibility provisions for site closure and post-closure measures (sects. 3004(t), 3004(u), 3005(e)(2)(B), 3005(g)(1)(C), and 9003(d); see also, Subpart H, Code of Federal Regulations). For example, it is a requirement that owners and operators applying for a permit under RCRA demonstrate financial assurance for any necessary corrective action at their facility (sect. 3004(u), RCRA). Generally, owners and operators need to provide an estimate of the costs associated with facility closure, including any cleanup and longer-term monitoring and maintenance costs (sects. 264.142 and 264.144, Code of Federal Regulations). They also need to prove that they have adequate funds to cover all of these costs (sects. 264.143 and 264.145, Code of Federal Regulations).

Public Participation

USEPA promotes the 'early and meaningful' involvement of the community in the Superfund process (USEPA 2005c: 1). CERCLA, together with the NCP, contains specific requirements for community involvement throughout the site cleanup process (see, e.g., sect. 300.430(c)(2)(ii), NCP). USEPA policy complements the legislation by recommending additional measures to involve the public (USEPA 2005c: 3).

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Site Register

A list of contaminated sites, known as the Comprehensive Environmental Response, Compensation and Liability Information System ('CERCLIS') Public Access Database, is publicly available on the USEPA website. CERCLIS contains both NPL sites and non-NPL sites. It provides essential site information, including details of the relevant contamination, the stakeholders, the steps taken in the cleanup process, and any enforcement actions taken.

Information regarding sites on the NPL, and sites proposed for NPL listing, is also publicly accessible on the USEPA website. Details of all federal facilities listed on the NPL are available from the Federal Facilities Restoration and Reuse Office website (USEPA/FFRRO 2012). In addition, USEPA must record relevant site information and key decisions for each contaminated federal facility (regardless of whether it is listed on the NPL) on the publicly accessible Federal Agency Hazardous Waste Compliance Docket (sect. 120(c), CERCLA).

The Emergency Planning and Community Right to Know Act ('EPCRA') aims to help local communities protect public health, safety and the environment from chemical hazards. Under EPCRA, commercial and industrial operators are required to disclose to the public certain information about any toxic chemicals that they store, use and/or release. Relevant site information is kept on the publicly accessible Toxics Release Inventory, which is maintained by USEPA.

Site-specific information on RCRA facilities is provided by USEPA in the publicly accessible online database, 'RCRAInfo'. The RCRAInfo database contains details on corrective action status, regulated activities, and compliance history for each facility. It also provides information on the generation of hazardous waste by large quantity generators, and the waste management practices of treatment, storage, and disposal facilities.

Public Consultation

Both CERCLA and the NCP require that the public be given appropriate opportunities for involvement "in a wide variety of site-related decisions, including site analysis and characterization, alternatives analysis, and selection of remedy" (USEPA 2005c: 3; sect. 117, CERCLA; sect. 300.155, NCP). Accordingly, USEPA consults with the public at each key stage of a site cleanup, including Preliminary Assessment, Site Inspection, NPL listing (if applicable), Remedial Investigation/Feasibility Study, Remedial Design and Remedial Action, Record of Decision, Construction Completion, Post-Construction and NPL deletion (if applicable). Federal facilities are subject to the same

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requirements for public participation, although the lack of consultation by federal departments and agencies with affected communities has attracted criticism in the past (sect. 117(a), CERCLA; see, e.g., National Environmental Justice Advisory Council 2004: 1).

Public consultation activities may include issuing a public notice with details of the relevant site and proposed decisions, distributing fact sheets and regular newsletters to inform and update the community on the site's status, making presentations, and conducting workshops (USEPA 2005c). At the beginning of the remediation stage, USEPA normally prepares a Community Involvement Plan. This specifies how the concerns and expectations of the community regarding the site cleanup will be addressed (USEPA 2005c: 27). A Regional Public Liaison person, who is appointed by USEPA, also provides information to the public and assist with resolving issues and concerns on an impartial basis (USEPA 2004).

At RCRA facilities, owners and operators are required to engage in public consultation at various stages of the corrective action and facility permitting processes. USEPA introduced the Expanded Public Participation Rule in 1995 to improve public participation measures under RCRA, and involve the public at an earlier stage of the decision-making process (USEPA 1996b: 1–2). Mandatory activities during the RCRA permitting process (for both operating and post-closure permits) include a public meeting prior to submitting the permit application, public notices, and public notification and review of permit applications upon receipt by USEPA. The facility owner or operator may also be required to establish an information repository to enable public access to facility information (USEPA 1996b: 3–2).

Citizen Enforcement

CERCLA contains a specific provision on bringing citizen suits in relation to Superfund sites. Section 159 allows "any person" to commence a civil action on their own behalf against anyone, including the government, who is alleged to be in violation of any "standard, regulation, condition, requirement or order". They may also bring an action against the government (including USEPA) for an alleged failure to perform a non-discretionary act or duty under CERCLA. However, challenges to a removal or remedial action or order are specifically prohibited (sect. 113(h), CERCLA).

RCRA also allows citizens to bring enforcement actions against potential or actual RCRA violators, as well as USEPA, in the federal District Court (sect. 7002). Enforcement actions may also be brought against federal departments and agencies that are responsible for remediating federal facilities under RCRA. In general, citizens are required to provide notice to USEPA, to the State in which the violation occurred, and to the alleged

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violator. EPCRA contains similar citizen enforcement provisions to RCRA (sects. 325 and 326). However, according to Purifoy (2012), the US Supreme Court case of *Steel Co. v Citizens for a Better Environment* (1998) has had a 'chilling effect' on the citizen suit provisions of EPCRA.

Federal/State Coordination—Superfund Cleanups

Where the federal government is conducting the remediation of a federally-owned Superfund site, and it selects a remedial action that will not achieve the applicable or relevant cleanup standards, it must give the State an opportunity to agree or disagree with the proposed measures and standards (sect. 121(3)(A), CERCLA). If the State does not concur, it may bring an action in the federal District Court. The proposed cleanup standard may be modified if the State can successfully contend that the federal government's decision was not supported by substantial evidence.

Generally, USEPA or the appropriate State-based EPA should enter into a Cooperative Agreement or State Contract with the relevant State or Indian Tribe before it undertakes remedial measures at a Superfund site (Subpart O, CERCLA). A Cooperative Agreement is a tool used to transfer funds to a State, municipality or Indian Tribe that takes on responsibility as the lead or support agency for a Superfund site cleanup (i.e., 'State-lead Superfund cleanups') (USEPA 2007). A Superfund State Contract is a legally-binding agreement between a State or Indian Tribe and USEPA, which ensures that cleanup costs will be shared, and in particular to obtain financial assurances from the State.

An agreement or contract can cover one or more Superfund sites, and can also be instigated by States that intend to remediate a site themselves. In the latter case, USEPA must be satisfied that the State has the capability to carry out the required remedial actions in accordance with applicable criteria and priorities, and to carry out enforcement actions if necessary (sect. 104(d)(1)(A), CERCLA). State remediation criteria and standards may be used at a State-led Superfund cleanup if they are at least as stringent as their federal equivalent, provided the State has given adequate notice to USEPA (sect. 121(d)(2)(A)(ii), CERCLA). Many States have by now enacted their own 'Superfund' laws, many of which are even more rigorous than the federal Superfund Law (Environmental Law Institute 2001: 13). At a minimum, these State Superfund laws contain provisions on strict, retrospective, joint and several liability, and identify the same range of PRPs as does CERCLA (Abrams 1997: 267–268). Some of the more rigorous State laws cover issues such as liability for underground storage tanks and other types of petroleum contamination, liability transfer, and property liens.

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Under the Cooperative Agreement or Superfund State Contract, the State provides assurances that it will: (a) ensure all future maintenance of the remedial measures for as long as they are expected to continue; (b) ensure the availability of a hazardous waste disposal facility for any necessary offsite storage, treatment or disposal of remediation waste; and (c) either pay a 10% share of the remediation costs, or a minimum 50% share of such costs, depending on the degree of responsibility of the State for the contamination (sect. 104(c)(3), CERCLA).

CERCLA allows the federal government to grant a credit to the relevant State against the share of the costs for which it is responsible at a Superfund site (sect. 104(c)(5)). The credit is limited to State expenses that are 'reasonable, documented, direct out-of-pocket expenditures of non-Federal funds' for remedial actions. If a State breaches the terms of a Cooperative Agreement or Superfund State Contract, the federal government can apply to the federal District Court to enforce the contractual provisions against the State, and/or recover any funds advanced or costs incurred as a result of the breach.

Federal/State Coordination—RCRA Corrective Action

In relation to RCRA facilities, a State must be authorised by the federal government to implement and enforce the provisions of RCRA before it can assume the regulatory lead for a site (sect. 3006(b), RCRA). State authorisation effectively delegates the primary responsibility of USEPA in implementing RCRA to the individual State. According to USEPA, the authorisation process ensures national consistency and minimum standards while providing flexibility to States in implementing rules (USEPA 2011f: III-133). States can develop hazardous waste regulations of their own, provided the regulations are at least as stringent as the RCRA provisions (sect. 3009, RCRA). The State regulations then operate in lieu of the federal RCRA provisions. By early 2012, all States except Alaska and Iowa had obtained final authorisation.

Federal/State Coordination—Voluntary Cleanups

State-based Voluntary Cleanup Programs (VCPs) play a key role in brownfields redevelopment across the United States, encouraging voluntary remediation and ensuring that cleanups are performed to the appropriate standard. States have gradually shifted their original focus on regulatory enforcement against PRPs (under State Superfund legislation) to secure site remediation, to an emphasis on achieving voluntary cooperation by PRPs, thus reducing costs and delays (see, e.g., Environmental Law Institute 2001).

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Since the mid 1990s, USEPA has entered into non-binding agreements with individual states to promote and facilitate State VCPs. These agreements take the form of memoranda of agreement (MOAs) for cleanups under CERCLA (authorised by sect. 128(a)(1)(A)(ii)), and memoranda of understanding (MOUs) for corrective action under RCRA (authorised by sect. 271.8 of the Hazardous Waste Regulations). Whereas 24 States have concluded MOAs with USEPA, only five States have MOUs in place (Illinois, Indiana, Michigan, Missouri and Wyoming). In 2002, CERCLA was amended through the Brownfields Law to provide dedicated funding for remediation costs to States that had MOAs (sect. 128(a)(1)).

Broadly, MOAs and MOUs specify the roles and responsibilities of USEPA and the State Government in ensuring effective remediation of brownfield sites. Before an agreement is entered into, an evaluation of the relevant VCP is undertaken, and the terms of the agreement are tailored to the capabilities of the VCP. Such agreements can provide an endorsement of the State VCP by USEPA. In return, the State gives an assurance that cleanups undertaken through its VCP will comply with the requirements of CERCLA, RCRA or other relevant federal legislation. Neither MOAs nor MOUs can contain any provisions that restrict the oversight authority of USEPA.

Analysis

Federal/State Coordination—Superfund Cleanups

The US federal government took the initiative to enact CERCLA not only in response to high-profile contamination incidents, but also because it recognised that the growing issue of site contamination demanded strong federal leadership. An early proponent of CERCLA stated that hazardous waste cleanup was "a problem that is nationwide in scope and is deserving of a comprehensive legal framework" (LaFalce 1980, cited by Young 1990). Unsurprisingly, this was a controversial viewpoint. As noted by Abrams, "Superfund reaches deeply into the states, affecting specific parcels of land that traditionally had been regulated exclusively by state law" (Abrams 1997: 266). Opponents of CERCLA argued that the states should be left to regulate the issue; however, the states had so far failed to implement such legislation and urgent action was needed (e.g., Stockman 1980, cited by Young 1990).

When enacting CERCLA, the US Federal Government believed that federal rather than State resources were best used to address the few contaminated sites that were thought to exist at the time, given their vast magnitude and complexity. Also, States may not have been able to replicate the expertise that would have been gained over time by the federal government in addressing the issue on a site-by-site basis (Abrams 1997: 267).

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Others suggest that a federal approach to contaminated site cleanup was justified because individual States may have been economically disadvantaged by taking regulatory action against PRPs, who might then be prompted to shift business to a more lenient State (in the context of State Voluntary Cleanup Programs, see Rose-Ackerman 1994: 1612).

A comparison is drawn by Rose-Ackerman (1994) between CERCLA, and the federal approach to contaminated sites in Germany in the 1980s and 1990s, prior to the enactment of federal legislation on the issue (i.e., the Soil Protection Act 1998). Rose-Ackerman notes (at 1613) that Germany, at the time, lacked an equivalent to the US Superfund Law. This is perhaps attributable to fact that the German constitution (the Basic Law) contains stronger protections for the powers of the *Länder* than the US Constitution provides for its own States (see generally, Faure and Johnston 2007: 20).

Efficient coordination between the federal and State governments is essential for the sound management and timely cleanup of contaminated sites across the United States. Under CERCLA, the federal government (primarily through USEPA) has broad authority to undertake abatement measures to address an imminent and substantial endangerment to public health or the environment, in addition to any measures taken by the relevant State (sect. 106(a)). However, the federal government is required by CERCLA to consult on certain matters with States in which Superfund sites are located, such as proposed remedial measures (sects. 104(c)(2) and 106(a)).

CERCLA stipulates that the States should be given 'substantial and meaningful involvement' in the initiation, development and selection of Superfund cleanups (sect. 121(f)(1)). USEPA was slow to determine the form that such involvement should take. According to Morissette and Hourcle (1989), the States became frustrated at their limited role in setting cleanup standards and selecting remedial options, as well as the lengthy enforcement process used by USEPA. By the late 1980s, the States had "seized the initiative to develop an aggressive state role in environmental protection and enforcement" (Morissette and Hourcle 1989). Many States took measures to strengthen their own hazardous waste laws and regulatory enforcement powers, partly in a bid to assert some independence in the Superfund cleanup process.

In 1990, the role of the States was clarified in the National Contingency Plan, which set out the minimum requirements for 'substantial and meaningful involvement' (sect. 300.500, Subpart F). Generally, States could be involved in decision-making on Superfund sites on a 'reciprocal concurrence' basis, with USEPA retaining ultimate decision-making authority (USEPA 2000b: 2). Reciprocal concurrence is a process whereby a State could prepare a Record of Decision and then obtain USEPA concurrence, or USEPA could prepare the Record of Decision and then seek State concurrence (sect. 300.515(e)(2), NCP). States did not need to seek concurrence from USEPA

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Case Study 4.2 (continued)

on decisions regarding State-lead cleanups of non-Superfund-financed sites (USEPA 2000b: 2). The combined effect of the CERCLA and NCP provisions is to restrict State participation primarily to sites involving State funds and enforcement of State laws, whilst ensuring that sites financed through federal funds (i.e. Superfund) stayed under federal control wherever possible.

Case Study 4.3 Massachusetts (United States)

Background

Massachusetts covers an area of over 8,000 square miles and has a population of approximately 6.3 million. The State has a long history of industrial activities. From the 1800s, common industries included textile production, leather tanning, iron and steel manufacturing, and timber processing (Citizen Information Service 2012). After the Second World War, a nationwide economic downturn resulted in the closure of many of these industries. Since 1984, over 41,500 releases of hazardous substances have been reported to the Massachusetts Department of Environmental Protection (MassDEP). Eighty-three per cent of these notifications were made after the privatised program took effect in 1993 (MassDEP 2012a). On average, 1,500 new releases are reported each year, although this number is declining over time.

Almost 30,000 sites have been remediated in Massachusetts since 1993 (MassDEP 2012a). Of these, a third have been cleaned up to background levels, rendering them suitable for any use. Since 2002, the annual number of remediated sites has been greater than the number of new releases being reported. This trend is attributed to upgrades of underground petroleum storage tanks, improved environmental management practices and the diminishing number of historically contaminated sites. Petroleum contaminants are a major source of site contamination in Massachusetts.

In a nationwide first, Massachusetts introduced a privatised site cleanup program in 1993. This meant that direct regulatory oversight for most cleanups was delegated by MassDEP to private professionals (MassDEP 2006a: 1). As a result, there was an increase in the number and pace of contaminated sites being remediated, and many cleanups are now completed in a year or less. There is little or no direct involvement by MassDEP in these cleanups, and for most sites regulatory approval is not required prior to the commencement of remedial works. Dedicated State brownfields legislation was also introduced in 1998, creating financial and legal incentives to promote the more rapid redevelopment of brownfield sites (MassDEP 2006a: 1).

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In addition, federal programs have played a significant role in brownfield reuse in Massachusetts, providing funding to assist with site identification, assessment and remediation.

Summary of Legislation

The Massachusetts Oil and Hazardous Material Release Prevention and Response Act (or 'State Superfund Act') contains provisions on voluntary remediation, brownfield redevelopment, liability protection for remediated sites, apportionment of liability between potentially responsible parties, cost recovery, natural resources damages, public participation, and enforcement. The Massachusetts Contingency Plan ('MCP') contains regulations implementing the State Superfund Act. It provides the structure and procedures for identifying, assessing and remediating sites contaminated with oil and/or hazardous materials.

The Regulations of the Board of Registration of Hazardous Waste Site Cleanup Professionals creates a Board to license and regulate all site professionals involved in cleanups in Massachusetts. The Board consists of an independent panel of 11 members. It is responsible for establishing qualifications for licensing, administering the licensing exam, requiring professionals to obtain continuing education, and investigating complaints against professionals (Massachusetts Board of Registration of Hazardous Waste Site Cleanup Professionals 2012).

The Massachusetts Brownfields Act ('Brownfields Act') provides financial incentives and liability relief to encourage parties to clean up and redevelop contaminated properties. Among the financial incentives created by the Act are the Brownfields Tax Credit scheme and the Brownfield Redevelopment Fund. The Act also creates liability exemptions and defences for tenants, adjacent property owners, community development agencies and lenders. It establishes the Brownfields Covenant Not to Sue Program, which provides liability protection for projects not already covered directly by the Act (e.g., projects undertaken by a causally responsible party, and projects involving only temporary remedial solutions). In 2006, changes were made to the Act as part of an economic stimulus package. These included an extension of the Brownfields Tax Credit scheme, tax credits being made transferable, and a recapitalization of the Brownfield Redevelopment Fund with an additional US$30 million.

Definition of 'Site Contamination'

Massachusetts does not have a legal definition of 'site contamination', as State legislation uses the term 'disposal site' instead. 'Disposal site' is defined

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Case Study 4.3 (continued)

as “a place or area where an uncontrolled release of oil and/or hazardous material from or at a site or vessel has come to be located” (sect. 40.0006(1)(b), Massachusetts Contingency Plan). The term ‘hazardous material’ is defined as “any material (excluding oil), in whatever form, which [...] constitutes a present or potential threat to human health, safety, welfare, or to the environment, when improperly stored, treated, transported, disposed of, used, or otherwise managed” (sect. 2, State Superfund Act). A ‘release’ is defined as “any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment” (sect. 2, State Superfund Act).

Responsibility for Remediation

Most contaminated sites in Massachusetts are remediated by potentially responsible parties, either voluntarily, or through enforcement action by MassDEP if necessary. However, the State Government takes responsibility for cleaning up sites where a response action is urgently needed, and/or a potentially responsible party (‘PRP’) cannot be found or made to act.

Government Responsibility for Remediation: Cleanup of Orphan Sites

Under the State Superfund Act, MassDEP has authority to take or arrange for any necessary response actions wherever it believes that oil or hazardous material has been released, or there is a threatened release (sect. 4). The situations where MassDEP will exercise this authority are determined by the Massachusetts Contingency Plan. However, in practice, direct cleanup action by MassDEP is limited to the minority of contaminated sites where there are serious conditions or time-critical factors, and the responsible parties are unwilling or unable to carry out response actions (MassDEP 2008a: 3). The State Government is required to ensure remedial action is taken for at least 100 top-priority sites each year (sect. 3A(p)(2), State Superfund Act). Top-priority sites are those posing the greatest risk to public health and/or the environment.

Appropriate short term measures taken by MassDEP may include limiting site access, evacuating the area, relocating nearby residents, blocking the movement of oil or hazardous materials, or taking other similar temporary action that will remain effective until other, longer-term remedial measures can be implemented (sect. 3A(e), State Superfund Act).

Private Responsibility for Remediation: Liability Framework

Mechanisms for imposing liability for site assessment and remediation are contained in the State Superfund Act, and must be implemented in

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Case Study 4.3 (continued)

accordance with the MCP. MassDEP has broad powers to issue enforcement orders to impose responsibility for cleanup costs on potentially responsible parties. These include assessment orders, response action orders and production orders. If enforcement mechanisms fail, MassDEP can issue a notice of responsibility to potentially responsible parties and proceed to conduct the cleanup itself, or engage contractors. PRPs are then held liable for the costs incurred.

Several categories of potentially responsible parties are identified in the State Superfund Act, including site owners and operators (current and past), persons involved in the transport, handling, storage and disposal of hazardous materials, and others who cause a release. These parties are deemed liable to the State Government for all costs of assessment, containment and removal incurred under the Act in response to a release, or threatened release, at a site (sect. 5(a), State Superfund Act). They are also liable for natural resource damages and related assessment costs, and to other persons for property damage caused by the release. Liability is strict, joint and several, and in some cases, proportionate.

The State Superfund Act provides several exemptions from, and defences to, liability, such as releases caused by third party acts or omissions, and releases occurring on residential sites. The Act rules out the possibility of transferring liability for a contaminated site between parties.

Role of Private Professionals

Licensed site professionals ('LSPs') must be used by PRPs to manage the assessment and remediation of contaminated sites in Massachusetts (Massachusetts Board of Registration of Hazardous Waste Site Cleanup Professionals 2007: 2). The primary role of LSPs is to carry out site assessments and provide formal opinions on the regulatory compliance of actions taken throughout the remediation process.

The licensing process for LSPs is overseen by the Board of Registration of Hazardous Waste Site Cleanup Professionals. LSPs are required to have minimum tertiary qualifications and professional experience, good moral character, and pass an examination. They must also comply with the Rules of Professional Conduct when providing professional services, and their work is audited by MassDEP (sect. 3A(o), State Superfund Act; sect. 40.1101(2), MCP). At least 20% of all site cleanup activities are audited by MassDEP each year. During an audit, MassDEP has broad powers to examine relevant documents, request evidence of compliance from the PRP, enter and inspect the site, take samples, investigate relevant records, conditions, equipment and practices, and take any other necessary action to determine regulatory compliance (sect. 40.1120(1), MCP). The Board can impose penalties on LSPs who do not comply with the Rules of Professional Conduct.

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Case Study 4.3 (continued)

Site Identification, Investigation and Assessment

MassDEP has some statutory obligations to carry out proactive identification of potentially contaminated sites. However, it is primarily the responsible parties and LSPs who must notify MassDEP of any reportable release or threatened release. They must do so within certain timeframes, which are determined by the degree of risk involved. Some small-scale releases are not reportable, although they must still be managed so as to minimise any risks.

Once a release has occurred, responsible persons have 1 year in which to remediate the site and submit a 'response action outcome' to MassDEP. If cleanup is not completed within the first year, the site must be classified into the appropriate 'tier' according to its complexity and other factors. Remediation should then be achieved within a further 5 years. By contrast, if sufficient action is taken at a site within the 1-year deadline, the responsible party may be exempt from the obligation to 'tier classify' the site and from normal cleanup timelines (MassDEP 2008a: 2).

Identification

MassDEP is required under the State Superfund Act to carry out an ongoing, comprehensive program to identify contaminated sites in Massachusetts, particularly those that pose a substantial hazard (sect. 3A(c)). MassDEP is also required to maintain a list of locations to be investigated for possible contamination, as well as confirmed contaminated sites (sect. 40.0168(2), MCP).

The MCP imposes an obligation on responsible persons to notify MassDEP within specific timeframes whenever a sudden spill, historical release, imminent hazard or threat of a release is identified (sects. 40.0311-40.0315 and 40.0317, MCP). A wide range of persons are required to notify MassDEP in these circumstances, including site owners and operators, persons involved in the transport, disposal, storage or treatment of hazardous material, any person who otherwise caused or is legally responsible for the release, a fiduciary or secured lender who holds title to or possession of the site, a government agency or public utility company that owns a right of way that comprises the release site, and any person otherwise required to notify MassDEP (e.g., an LSP) (sect. 40.0331(1), MCP). The duty to notify MassDEP only applies to sites where the concentration of hazardous materials exceeds the 'reportable quantities' for soil and groundwater contamination that are set out in the MCP (sects. 40.0350 and 40.0351). Therefore, reportable quantities (RQs) and reportable concentrations (RCs) are used to determine notification requirements.

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Case Study 4.3 (continued)

The Brownfields Act also requires notification to MassDEP by certain parties involved in brownfield redevelopment, once they become aware of a release or threatened release at their site (sect. 27). Apart from site owners and operators, fiduciaries and secured lenders, these include municipalities, redevelopment authorities and agencies, community development corporations, and economic development and industrial corporations.

Investigation

Once a site has been reported to MassDEP, regulatory procedures are triggered for submitting site information and conducting the cleanup, to ensure that the site no longer poses an unacceptable health or environmental risk within 6 years (MassDEP 2008a: 1). Under the MCP, responsible parties have a general obligation to take the necessary response action to assess the release or threatened release (sect. 40.0403(1)).

Within 1 year of reporting the release to MassDEP, a responsible party must undertake preliminary response actions (sect. 40.0403(3), MCP). These comprise initial site investigation activities (up to and including preparation of a Phase I Report, if needed) and, where required, immediate response actions or release abatement measures (sect. 40.0403(3), MCP). Initial site investigations consist of limited investigative and assessment actions that are sufficient to guide determinations as to appropriate response actions at a site (sect. 40.0405(1), MCP). They may include an evaluation of records relating to the release or the site, underground storage tank testing results, monitoring data, limited sampling and analysis of soil, sediment, groundwater and surface water, and other similar activities.

Assessment

'Assessment' is defined in the MCP (sect. 40.0006(12)) as including investigations, monitoring, surveys, testing and other information-gathering activities to identify the existence, source, nature and extent of a release or threatened release; the extent of risk or danger to public health and the environment; and the persons liable under the State Superfund Act. In Massachusetts, risk characterisation is used at the site assessment stage to determine whether a significant risk of harm exists and the need for remediation. One of two possible approaches to risk characterisation may be used: either a contaminant-specific approach with numerical standards, or a cumulative risk-based approach based on site-specific information (MassDEP 2006b: 2; sect. 40.0902(2), MCP).

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Case Study 4.3 (continued)

The Remediation Process

The remediation process is triggered whenever contaminants at a site pose a significant risk of harm to human health or the environment. As noted above, early response actions must be taken within 1 year of MassDEP being notified of the release of hazardous materials. If this deadline is not met, the site must be categorised according to its level of risk and be remediated within the appropriate timeframe.

Once remediation has been completed at a site, or a determination has been made that 'no significant risk' exists, a response action outcome ('RAO') statement is submitted to MassDEP. It contains a formal opinion by an LSP as to whether the response actions were carried out in compliance with the response action plan. Further remediation may be required after an RAO statement has been submitted, but under certain conditions they may be exempt from the usual regulatory requirements.

Remediation Standards

The Massachusetts site cleanup program allows for varying levels of remediation based on the current and/or intended site use. The MCP requires sites to be cleaned up to a level of 'no significant risk' to people and the environment, or a permanent solution to be implemented (MassDEP 2008a: 2). If a permanent solution is not feasible, either a condition of 'no substantial hazard' or a temporary solution must be achieved (Stolfa 2003: 181).

In Massachusetts, risk characterisation is used to determine whether a level of 'no significant risk' has been achieved at a site (sect. 40.0902(2), MCP). The results form the basis for selecting the appropriate remedial action outcome for the site (sect. 40.0902(4), MCP). The MCP (Subpart I) sets out soil and groundwater standards for Method 1 risk characterisations. They are also used as generic cleanup standards, which can either be applied without modification (Method 1) or modified using site-specific information (Method 2). Method 3 allows for cleanup standards to be developed based on site-based risk assessment, where the use of generic or modified standards is not appropriate or feasible.

Voluntary Remediation/Brownfield Measures

The Brownfields Act is the primary legislation in Massachusetts regarding the voluntary remediation of brownfield sites. The Act introduced new incentives to promote the cleanup and redevelopment of brownfields. Key features of the Brownfields Act are the provision of liability relief to certain parties who carry out site remediation, and financial incentives to assist with cleanup

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costs. These incentives are available mainly to purchasers, but in some instances also vendors, who are committed to the cleanup and redevelopment of the relevant site.

The privatised remediation process facilitated by the State Superfund Act also allows site owners and developers to redevelop brownfield sites over a relatively short timeframe and with minimal regulatory oversight. The risk-based approach to site remediation under the Act also allows for more flexible cleanup standards, meaning that some contamination can be left in place if appropriate physical and legal controls are implemented to minimise risk. MassDEP must undertake both random and targeted audits on at least 20% of all response actions that it has not directly overseen or conducted (sect. 40.1101(2), MCP). This is to ensure that such response actions properly comply with the State Superfund Act, the MCP and the Response Action Performance Standard (sect. 40.0191 of the MCP).

Voluntary Remediation

Voluntary remediation must be undertaken in compliance with the State Superfund Act and the MCP, and the normal statutory processes for site investigation and remediation apply. Those undertaking the voluntary cleanup must also engage LSPs to oversee and, where necessary, carry out on-site activities and prepare the relevant documentation. The advantage of undertaking voluntary remediation lies in the flexibility of the cleanup standard, which allows planned future site uses to be taken into account. This means that remediation can be less costly and time consuming, at sites where it is still protective of human health and the environment to leave some contamination on site (MassDEP 2008b: 1).

Statutory liability relief is available for several classes of eligible parties under the Brownfields Act and the State Superfund Act. These include site owners and operators, owners and operators of 'downgradient properties', tenants, redevelopment authorities and other similar entities, secured lenders, governmental bodies, charitable trusts, parties involved in site cleanup settlements, and parties using AULs as part of the remedial solution (sect. 5C, State Superfund Act).

Redevelopment authorities, community development corporations and economic development and industrial corporations are exempt from liability if they acquired the site after 5 August 1998 and did not cause or contribute to the contamination (sect. 5C, State Superfund Act; sect. 15, Brownfields Act). To be eligible, they must notify MassDEP of the release, provide site access for cleanup purposes, prevent exposure to contamination, and take immediate response actions where necessary. Agencies must also act diligently to divest themselves of the property.

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Case Study 4.3 (continued)

The Brownfields 'Covenant Not to Sue' Program provides liability relief to current or prospective owners and operators who are redeveloping contaminated sites and do not qualify for statutory liability relief provisions. The Program offers greater flexibility to those involved in the remediation and reuse of particularly complex or challenging sites where redevelopment would otherwise not be possible. Although there are no geographical restrictions on eligible sites, those located in the 15 cities with the highest poverty rates have first priority (MassDEP 2012c: 2). More than 30 agreements were signed in the 10-year period up to 2008 (MassDEP 2008b: 2).

Brownfield Measures

Three major programs offering financial incentives to parties engaged in site cleanups have been established under the Brownfields Act. These include the Brownfields Redevelopment Access to Capital Program, the Brownfields Redevelopment Fund and the Brownfields Tax Credit. There are additional programs available through other State Government departments, which assist municipalities in particular with brownfield redevelopment projects. Municipalities can also enter into agreements with new purchasers to reduce or waive accumulated tax burdens, interest and penalties for contaminated sites (sect. 33, Brownfields Act). A combination of targeted liability relief and financial assistance is also available to projects located in 'economically distressed areas' (defined in sect. 9, Brownfields Act).

Future Liability for Contamination

Site owners and operators are eligible for liability relief once they have met cleanup standards as required by MassDEP and documented in a waste site cleanup activity opinion, provided that a permanent solution or remedy operation status has been achieved and is being maintained in accordance with the opinion (sect. 5C, State Superfund Act). The liability protection covers subsequent property owners who maintain the site's 'clean' status or the ongoing cleanup remedy.

Activity and use limitations (AULs), where they are used as part of a permanent remedial solution or remedial operation at a site that is then transferred to a new owner, can protect the former site owner or operator from liability for any future contamination (MassDEP 2012c: 2; sect. 40.1012, MCP). They are then protected from liability to the Massachusetts Government for cleanup costs or to third parties for contribution, as well as from liability for response action costs for property damage, and common law property damage claims.

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Post-remediation Measures

The MCP requires site owners and operators to achieve and maintain a level of 'no significant risk' at their sites (sect. 40.0190(1), MCP). In some cases, where residual contamination remains after remediation has been carried out, this requires the implementation of AULs. The use of AULs is regulated primarily by the State Superfund Act and the MCP. They are intended to be used as part of a temporary or permanent solution for a contaminated site (MassDEP 1999: 2).

AULs establish limits and conditions on the future use of contaminated sites, allowing cleanups to be tailored accordingly rather than requiring cleanup to unrestricted use (MassDEP 1999; Stolfa 2003). They also provide essential information to future site users, to ensure that residual contamination on the site will not present a significant risk to human health or the environment in the future. An AUL is deemed to be 'implemented' and effective once it has been recorded and/or registered with either the deed registry or the land registration office (sect. 40.1070(3), MCP).

An AUL is mandatory for all sites where: the response action outcome (RAO) and the supporting risk characterisation are based on the restriction of site activities and uses to achieve or maintain a level of 'no significant risk'; where the RAO relies on exposure pathway elimination measures to prevent exposure to levels of contamination that would otherwise pose a significant risk of harm; and where an existing private water supply well is to be used for purposes other than drinking water (sect. 40.1012(2), MCP). At all other sites, an AUL is optional.

MassDEP is required to perform a targeted audit on all sites where long-term restrictions are part of the selected remedy (sect. 43, Brownfields Act). There are specific procedures to follow if further remedial actions are taken on a site for which an RAO has previously been submitted and an AUL is in place (sect. 40.1067, MCP). The stringency of the regulatory requirements depends on the category of RAO that applies to the site, and the purpose of the proposed remedial actions.

Where a comprehensive remedial action for a site involves long-term operation, maintenance and/or monitoring (OMM) measures, an OMM plan needs to be included in the remedy implementation plan for the site (sect. 40.0874(d), MCP). The OMM plan sets out the measures necessary to ensure effective operations of the response action in both normal and emergency situations (sect. 40.0874(d), MCP). It provides details of the person(s) responsible for undertaking the OMM measures; general operating procedures; the type, frequency and duration of monitoring; and testing and inspection requirements. The plan should be updated in response to any change in site conditions (sect. 40.0891(3), MCP).

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Financial assurance can be required by MassDEP from a responsible person at any stage during the remediation process, including for long-term operation and maintenance at a site, i.e. where an engineered barrier has been installed (sects. 40.0996(5)(a) and 40.0170(6), MCP). Acceptable forms of financial assurance may include trust funds, letters of credit, surety bonds and escrow deposits.

Public Participation

There are extensive provisions for public involvement in the site remediation process under the MCP (in particular, sects. 40.1400 and 40.0002(a)(6)). A database of known contaminated sites is maintained by MassDEP, allowing the public to access key information on particular sites, their relevant response actions and the ‘cleaned up’ status. There are no provisions under State legislation for either third party merit appeals or third party civil enforcement.

Site Register

MassDEP maintains a publicly accessible database, the Waste Site Cleanup Database, which contains information on each stage of the remediation process for known contaminated sites (MassDEP 2008a, b: 1). These are sites at which contamination exceeds the relevant reportable quantities, resulting in notification to MassDEP. All sites with AULs in place are also listed on the MassDEP database. Details kept on the database include the site name and location, reporting category, notification date, compliance status, remedial phase, RAO class, type of contamination, and relevant documents.

Public Consultation

‘Public involvement’ is defined in the MCP as activities which the responsible person (or MassDEP, if undertaking site cleanup itself) is required to perform, to inform the public of, and involve the public in, decisions regarding site remediation (sect. 40.0006, MCP). The minimum requirements for public involvement activities at all sites are set out in Section 40.1403(2) of the MCP. Public involvement activities at all contaminated sites are intended to inform the public of the risks posed by a contaminated site, the status of response actions, the availability of financial assistance, and the opportunities for involvement in the site cleanup process (sect. 40.1401(1), MCP). All public comments should be taken into consideration in remediation decision-making (sect. 40.1401(2), MCP). Public involvement activities can be ceased, modified, expanded or reduced in certain circumstances, and

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provided that appropriate measures are taken by the responsible person, MassDEP and/or the public (sect. 40.1405(7), MCP).

Certain sites requiring additional public involvement due to a high level of public interest can be designated as 'public involvement plan' sites (PIP sites). Apart from the minimum requirements for public involvement that apply to all contaminated sites, PIP sites require the preparation of a draft, site-specific public involvement plan, and a public meeting to present the draft plan. Once public comments have been taken into account, the finalised public involvement plan must be implemented throughout the remediation process (sect. 40.1405(5)(f), MCP). Specific requirements for the plan are set out in Section 40.1405(6) of the MCP.

Analysis

A feature of the regulatory approach to contaminated sites in Massachusetts that particularly stands out is the privatised cleanup program, utilising private professionals. Another interesting aspect of the regulatory approach is the need for authorities to coordinate some cleanup activities in the broader context of federal laws and standards.

Privatised cleanup program

Massachusetts has been a pioneer in the use of private professionals (licensed site professionals, or LSPs) for conducting and overseeing site cleanups, and giving formal recognition to this role. Most significant is the mandatory requirement for responsible persons to retain LSPs at the outset of the site remediation process, when they take on the primary supervising role and ensure regulatory compliance through to the final stages of cleanup.

The fact that MassDEP approval is not needed for site assessment and remediation activities in most cases, provided that an LSP has been engaged, means that the cleanup process can be streamlined and delays can be avoided. This allows many site cleanups to be completed within a relatively short timeframe, compared with those in other jurisdictions. Audits carried out by MassDEP, combined with its direct regulatory oversight role at the most high-risk sites, are intended to provide a 'safety net' for compliance purposes. The Massachusetts LSP program has been seen as so successful that it was emulated by New Jersey in 2009, with the introduction of specific legislation (the Site Remediation Reform Act).

Federal/State Coordination

The Federal Site Program within MassDEP provides technical guidance and regulatory oversight at Superfund sites, defence sites or brownfield sites

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located in Massachusetts (MassDEP 2012b). As at mid 2012, there were 31 federal Superfund sites (listed on the National Priorities List) located in Massachusetts. MassDEP responsibilities include managing, overseeing and coordinating cleanup activities, all of which involve liaising with USEPA, other federal authorities, PRPs, contractors and other stakeholders. Both State and federal cleanup requirements must be met at these sites, and the State assessment and remediation standards may be even more stringent than those at the federal level.

Case Study 4.4 British Columbia (Canada)

Background

British Columbia has a Provincial Government which operates within the federal constitutional system of Canada. It is the westernmost province in Canada and has a population of over 4.4 million (Government of British Columbia 2012b). At least 9,000 sites are currently recorded by the British Columbia Ministry of Environment (the 'MOE') as either contaminated or potentially contaminated (Ministry of Environment (BC) 2009a). A considerable portion of these sites (i.e. 2,000 out of the total of 9,000) are owned by the Crown (Ministry of Sustainable Resource Management (BC) 2008: 1). The Government of British Columbia is responsible for remediating these sites. Typically contaminating activities in BC include underground storage of petroleum, oil and gas exploration, forestry, mining, and transportation. Common contaminants include heavy metals (e.g. lead, arsenic, cadmium and mercury) and organic chemicals (e.g. benzene and toluene).

Summary of Legislation

British Columbia has both general environmental protection legislation (the Environmental Management Act 2003) and specific legislation on site contamination (the Contaminated Sites Regulation 1996). Part 4 of the Environmental Management Act (the 'EMA') establishes processes for identifying and designating contaminated sites, provides for public access to contaminated sites information and sets out liability provisions and remediation requirements. Part 5 deals with remediation of mineral exploration sites and mines. The provisions of the EMA are supported by the comprehensive Contaminated Sites Regulation ('CSR'), which covers all aspects of site contamination management, including identification, registration, investigation, assessment, remediation, liability allocation and the use of scientific standards.

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Definition of 'Site Contamination'

The EMA contains a clear definition of 'contaminated site' and 'contamination' (sect. 39(1)). The 'contaminated site' definition expressly includes soil, groundwater, surface water and sediment, and refers to both risk-based and numerical standards for prescribed substances.

Responsibility for Remediation

Government Responsibility for Remediation: Cleanup of Orphan Sites

In cases involving high-risk sites where no responsible parties are identifiable or able to pay, the EMA authorises the MOE to undertake the appropriate remediation using public funds (sect. 58(2)(b)). It may subsequently recover its remediation costs from purchasers of remediated sites, or from liable parties who are identified or become solvent at a later date (sects. 59(2) and 59(4), EMA).

Private Responsibility for Remediation

BC legislation provides that the range of parties who can potentially be held liable for site remediation costs is wide (sect. 45, EMA; sect. 31, CSR). They include current and former site owners and operators, anyone who produced or transported the contaminating substance, anyone who caused the contamination to migrate offsite, and, in limited circumstances, secured creditors and municipalities. Liability in respect of responsible parties is absolute, meaning that intention or fault is irrelevant, and a party is liable based solely on the fact that they are identified as a 'responsible party' under the legislation (sect. 47 (1), EMA). Liability is also retrospective, allowing both historical contamination and new contamination to be addressed under the statutory regime (sect. 47(1), EMA).

The EMA also clearly states that liability for site contamination is joint and several (sect. 47(1)). Although it does not have a specific provision on proportionate liability, the Act allows responsibility to be apportioned among responsible parties, either by a court or by the MOE as part of a remediation order (sects. 47(2) and 47(5)). It also allows a 'minor contributor' to have their liability for remediation costs reduced. To qualify, the party must show that (a) only a minor portion of the contamination is attributable to them; (b) either no remediation would be required solely as a result of their contribution, or the remediation costs attributable to them would be only a minor portion of the overall remediation costs; and (c) it would be unduly harsh to apply the joint and several liability principle (sect. 50(1), EMA).

Responsible parties are liable to any person or government authority who incurs reasonable remediation costs at a contaminated site, whether they are incurred on or off the site (sect. 47(1), EMA). 'Remediation costs' include the

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Case Study 4.4 (continued)

costs of preparing a site profile, costs of carrying out a site investigation and preparing a report, legal costs associated with seeking contributions from other responsible parties, and any relevant fees (sect. 47(3), EMA).

Several exemptions from liability are specified in the legislation. Generally a person is not responsible for site contamination if they had no control over, or participation in, the contamination or if they exercised due diligence with respect to the release that caused the contamination (sect. 46(1), EMA). A site owner or operator is exempt from liability if they 'innocently acquired' the site (sect. 46(1)(d), EMA). This means that, at the time of purchase or operation, the site was contaminated and they had no knowledge of this, or reason to suspect it, despite making all appropriate enquiries. Other exempt parties include government bodies that involuntarily acquire ownership of contaminated land (provided they do not cause or contribute to the contamination); secured creditors who act only to protect their financial interest and do not cause or aggravate the contamination (sect. 45(4), EMA); anyone who assists with or advises on remediation works at a site (unless they acted or advised negligently) (sects. 46(1)(h) and 46(1)(i), EMA), and producers and transporters of hazardous waste (sect. 46(1)(f), EMA).

The MOE can issue remediation orders at any stage if site remediation is not achieved voluntarily (sects. 48(1) and 48(6), EMA). A remediation order can require the person to undertake remediation, contribute to costs of anyone who incurred remediation costs, and provide security (sect. 48(2), EMA). Remediation orders are generally reserved for high-risk or large-scale sites (Ministry of Environment (BC) 2009b: 2). The MOE also has the statutory power to undertake remediation of a site itself at any time if existing remedial works are inadequate, including sites subject to voluntary remediation agreements (sect. 58, EMA). The associated costs are recoverable from the responsible party by the MOE.

Role of Private Professionals

The BC contaminated sites legislation has facilitated a reliance on approved environmental professionals in the management of low-risk and moderate-risk contaminated sites. The EMA provides for a roster of private professionals who are qualified to do certain types of tasks, such as carrying out investigation and reporting activities, preparing documents and providing recommendations on cleanup options (sects. 42(1) and 42(4)). Protocol 6 (Eligibility of Applications for Review by Approved Professionals) (Ministry of Environment (BC) 2010d) aims to ensure best practices by professionals in site investigation and remediation.

One of the primary tasks of private professionals is to review site information and perform risk assessments regarding any hazards to human health and the environment posed by the relevant contamination (Ministry of

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Case Study 4.4 (continued)

Environment (BC) 2008: 4). Responsible parties engage professionals directly for their services, and must pay the required fees. Approved professionals can also be retained by the MOE to review a report or plan for a contaminated site, and to give their opinion as to the adequacy of site investigations, proposed remedial work and monitoring programs; the need for remediation; and/or whether a document complies with statutory requirements (sect. 10(1), CSR; Ministry of Environment (BC) 2010b: 2).

Only qualified, approved professionals can make recommendations to the MOE that specific applications be approved (Ministry of Environment (BC) 2010d: 3). Protocol 6 distinguishes between ‘Numerical Standards Approved Professionals’ and ‘Risk-based Standards Approved Professionals’. Whereas Numerical Standards Approved Professionals are qualified to make recommendations for a wide range of contaminated sites instruments based on numerical standards and screening level risk assessments (i.e., Determinations of Contaminated Site, Approvals in Principle, Certificates of Compliance and Contaminated Soil Relocation Agreements), Risk-based Standards Approved Professionals may only make recommendations for a few types of instruments, based on screening level or detailed risk assessments.

Importantly, approved professionals in BC do not have decision-making powers in relation to contaminated sites, and cannot approve remediation plans or provide regulatory sign-off. Also, for high-risk sites or sites where risk-based remediation standards are used, the MOE must directly review all relevant reports prior to making any remediation decision, rather than delegating this duty to an approved professional.

To be listed on the Government-approved roster, professionals must have the requisite educational qualifications and work experience, pass the roster examination, hold membership of the peak professional organisation for their field of expertise, and have adequate professional insurance (Ministry of Environment (BC) 2010b: 1, 2009d). The performance of approved professionals is assessed regularly by CSAP and audited by the MOE (Ministry of Environment (BC) 2009d: 7–8). Professionals who have failed to perform to the required standard may be suspended from the roster (sect. 42 (4), EMA).

Site Identification, Investigation and Assessment

Identification

Identification of potentially contaminated sites in BC generally takes place through the land use planning system, wherever there is a development proposal, a change in use or a change in ownership of a commercial or

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industrial site. The EMA requires a 'site profile' to be submitted by the site owner, developer or other specified persons to the relevant authority (i.e. the municipality, planning authority or the MOE) prior to planning approval or a sale transfer (sect. 40(1)). A site profile contains readily available information about the past and present uses of a site, together with a basic site description (Sched. 1, CSR; Ministry of Environment (BC) 2010a: 1).

There are several triggers for the provision of a site profile. If a person knows, or should reasonably be aware, that a site was used previously for industrial or commercial purposes, and they are applying for a subdivision, a rezoning, a development or demolition permit, or an approval for soil relocation in relation to that site, they must submit a site profile to the authorities along with their application (sect. 40(1), EMA). A trustee, receiver or liquidator of a former industrial or commercial site must submit a site profile after taking possession or control of the site (sect. 40(7), EMA). The vendor of a contaminated site with industrial or commercial zoning must provide a prospective purchaser with a site profile prior to the agreement of transfer.

Investigation

If there is reason to suspect that a site may be contaminated based on its current or previous use as identified in the site profile, the site owner or another person can be required by authorities to carry out a preliminary and/or detailed site investigation. If the site profile was initially received and assessed by a municipality or planning authority, the matter is referred to the MOE for a formal decision as to whether a site investigation is required.

A preliminary site investigation involves reviewing existing records for site information, interviewing people involved with the site, and determining the general location and extent of any contamination. If more information is needed, a detailed site investigation must be undertaken. This involves carrying out more detailed work to determine the location, extent and impact of contamination, and submitting a report to the MOE. The information gathered during the detailed investigation assists in developing a remediation plan or risk assessment approach (Ministry of Environment (BC) 2009a: 3). The MOE decides whether the investigation complies with regulatory requirements (including environmental quality standards contained in the Contaminated Sites Regulation) and whether further investigations are needed (sect. 41(3), EMA). The MOE must then give notice of its decision to the site owner/operator.

Technical Standards

The scientific process for investigating, assessing and remediating contaminated sites in BC involves applying environmental quality standards, which are divided into numerical and risk-based standards. The use of

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approved standards is expressly required by the EMA (see, e.g., sect. 39(1)). Generic numerical values for soil, groundwater, surface water, sediment and vapour are listed in the Contaminated Sites Regulation (Scheds. 4–7 and 9–11), while a procedure for developing site-specific numerical standards is contained in an MOE policy document (Protocol 2—Site-Specific Numerical Soil Standards 1998).

The site-specific standards allow for limited modification of the generic numerical values in the Regulation, based on site information (Ministry of Environment (BC) 1998: 2), and are the most flexible type of numerical standard (Ministry of Environment (BC) 2009c: 1). They may be used to determine whether a site is 'contaminated' for the purposes of the EMA, whether a site has been satisfactorily remediated, and whether a proposed soil removal meets provincial requirements (Ministry of Environment (BC) 1998: 2). Risk-based remediation standards represent acceptable risk levels from exposure to substances at sites, and aim to ensure environmental and human health protection (Ministry of Environment (BC) 2009c: 1). They are contained in Section 18(1) of the Contaminated Sites Regulation.

Risk Assessment

A screening-level risk assessment (SLRA) may be undertaken for low-risk and medium-risk sites by private professionals once the preliminary and detailed investigations have been carried out. SLRA generally cannot be used for high-risk sites without prior approval from the MOE (Ministry of Environment (BC) 2008: 4). The purpose of an SLRA is to determine, based on the available site information, whether the contamination poses an unacceptable risk to human health or the environment. If the risk posed by the site contamination is found to be acceptable, the site is eligible for a certificate of compliance without undergoing further assessment or remediation. If the risk is unacceptable, appropriate remediation or risk management measures must be considered.

Site-based risk assessment is an acceptable practice in BC, and can be used for sites where it is impractical or impossible to remove contaminants due to technological, physical or financial constraints. It involves determining the risks and hazards to environmental and human health posed by the residual contamination. Site-specific information is taken into account when assessing how the contaminants can be managed onsite to ensure that risks are minimised over the long term. The results of the site-based risk assessment can be compared with the risk-based standards in the Contaminated Sites Regulation (sect. 18(1)). If the risk estimates exceed the risk-based standards, the site may need to be managed to reduce impacts to levels within the standards (Ministry of Environment (BC) 2005: 2).

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The Remediation Process

Site remediation in British Columbia in generally undertaken voluntarily by responsible parties rather than through enforcement mechanisms (Ministry of Environment (BC) 2011: 15–16). Where remediation is carried out under a voluntary remediation agreement, a remediation plan must form part of the agreement, and the proposed tasks and timeline for remediation must be acceptable to the MOE (sect. 51(1)(d), EMA).

Where a person does not voluntarily remediate a site, the terms of remediation may be stipulated in a remediation order issued by the MOE (sects. 48 (2)(a) and 83(2)(f), EMA). Before issuing a remediation order, the MOE must take into account the severity of the actual or potential impacts of the contamination to determine the need for remediation and the degree of urgency required (Ministry of Environment (BC) 2009b: 2). However, in practice, remediation orders are rarely used, and are reserved for the most high-risk sites or sites where the responsible party refuses to take action (Ministry of Environment (BC) 2011: 15–16, indicating that only one remediation order was issued between 2009 and 2011).

To avoid long delays in site redevelopment, the EMA allows a liable party to seek an 'approval in principle' from the MOE in relation to a proposed site remediation (sect. 53(1.1)). This involves an MOE director (or, for non-high risk sites, an approved professional) reviewing the site investigation and assessment reports, remediation options, any public comments and the remediation plan. For high-risk sites or sites where risk-based remediation standards are used, the MOE must directly review all relevant reports prior to making a remediation decision, rather than delegating this duty to an approved professional. If satisfied by the proposed remediation plan, the MOE can issue an approval in principle, with or without conditions, allowing the remedial works to proceed (sect. 53(1.1), EMA; Ministry of Environment (BC) 2009b: 3). To date, however, the approval in principle mechanism does not appear to have been widely used in BC (Ministry of Environment (BC) 2011: 15–16).

Remediation Standards

A contaminated site needs to meet the environmental quality standards set for the intended site use, in order to be considered adequately 'remediated'. A decision must be made for each contaminated site as to whether numerical standards or risk-based standards are to be used as remediation goals (Ministry of Environment (BC) 1998: 2). Risk-based remediation standards are contained in Section 18(1) of the Contaminated Sites Regulation. The decision to use numerical standards or risk-based standards depends on the type of site, contaminants and receptors involved. If numerical standards are chosen,

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and sufficient site-specific information is available, then site-specific cleanup standards may be developed for substances at the site. Site-specific standards can only be used for those substances that are covered by the numerical standards in the CSR Schedules (Ministry of Environment (BC) 1998: 2). They are calculated for each site based on specific site characteristics and features (Ministry of Environment (BC) 2009c: 2).

In the 2010–2011 fiscal year, around 60% of all sites that were remediated in BC used numerical standards, and about 40% used risk-based standards (Ministry of Environment (BC) 2011: 15). These figures refer to sites for which Certificates of Compliance were issued during 2010–2011. Almost all of the sites undergoing independent remediation relied on numerical standards; by contrast, sites with professional/MOE involvement were almost evenly divided with their use of numerical standards and risk-based standards. Risk-based standards tend to be used for more complex sites where complete removal of the contamination is not possible or practical, necessitating long-term risk management measures such as containment, control and onsite monitoring.

Remediation Options

Specific remediation options or methods are not identified in BC legislation. Instead, there is an emphasis on achieving the relevant cleanup standard for a particular site. However, the EMA does state that a person carrying out remediation must give preference to remediation alternatives that provide permanent solutions to the maximum extent practicable, taking into account the following factors: any potential for adverse effects on human health or the environment; the technical feasibility, risks and costs associated with alternative remediation options; and the potential economic benefits, effects and costs of the remediation options (sect. 56(1), EMA). Failure to give preference to a permanent remedial solution to the maximum extent practicable may result in the MOE refusing to issue an approval in principle or certificate of compliance (sect. 56(2), EMA).

Voluntary Remediation/Brownfield Measures

Voluntary Remediation

Voluntary remediation can take place in one of two ways in BC: through either a 'voluntary remediation agreement', between a responsible party and the MOE, or 'independent remediation', with minimal involvement from the MOE but some reliance on private professionals. Provisions for both of these

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site management procedures are set out in the EMA (sects. 51 and 54) and the Contaminated Sites Regulation (sects. 39(1) and 57).

Independent remediation is a common occurrence in BC and is appropriate for most low-risk and moderate-risk sites. Independent remediation is used for approximately 60% of all contaminated sites remediated in BC (Ministry of Environment (BC) 2012). Parties must notify the MOE promptly upon initiating an independent remediation, and within 90 days of completing it (sect. 54(2), EMA). Over 600 notices of independent remediation initiation, and over 500 notices of independent remediation completion, were submitted between 2010 and 2011 (Ministry of Environment (BC) 2011: 16). Independent remediation must be conducted in compliance with regulatory requirements, but can be completed with minimal supervision by the MOE.

The primary role of the MOE in the independent remediation process is in receiving notifications from parties. However, it has statutory powers to inspect and monitor an independently remediated site to assess its compliance with the regulations, as well as to issue a remediation order, require public consultation and review, and impose any conditions on the remediation that are reasonably necessary (sect. 54(3), EMA).

As an alternative to independent remediation, a liable party may enter into a voluntary remediation agreement with the MOE (sect. 51(1), EMA). The agreement can require financial contributions and security from the liable party, specify a remediation schedule and any other requirements for achieving remediation, and require a formal opinion (from a specialist panel) as to the allocation of remediation costs among the liable parties (sects. 49(4) and 51(1), EMA). If the party complies with the terms of the agreement, they are discharged from any further liability (sect. 51(2), EMA). Any other liable parties not named in the agreement remain liable, but their total potential liability is reduced by the amount specified in the agreement (sect. 51(2)(c), EMA). However, voluntary remediation agreements have been used only rarely in BC to date (Ministry of Environment (BC) 2010c: 5).

Brownfield Measures

There are an estimated 4,000–6,000 brownfield sites in British Columbia (Government of British Columbia 2012c). The Contaminated Sites Regulation provides some legal certainty for parties who wish to redevelop a brownfield site, making the conditions for reuse more favourable. A responsible party may seek a certificate of compliance from the MOE, which confirms that a site has been cleaned up to the relevant regulatory standard (either numerical or risk-based) (sect. 49(1), CSR; Ministry of Environment (BC) 2009b: 3). A certificate of compliance can be issued for a portion (or several portions) of a site (sect. 53(6), EMA). This makes it easier for parties to complete the

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development of a large or complex site in stages, particularly where a range of uses may be intended. The certificate of compliance tool is widely used in BC (Ministry of Environment (BC) 2011: 15).

In addition to statutory tools, the BC Government also introduced a key policy document, the BC Brownfield Renewal Strategy, in 2008. The Strategy advocates streamlining the remediation process, improving remediation liability and risk management provisions, using strategic public investments to promote brownfield redevelopment, creating more brownfield tools for local governments, and raising public awareness (Ministry of Agriculture and Lands (BC) 2012).

The Brownfield Renewal Funding Program is the main public investment scheme in BC. The Program helps site owners and other parties (e.g., developers, municipalities, non-profit organisations and First Nations) pay for site investigations and related activities on brownfield sites, where redevelopment has not already been achieved through market forces and where benefits from reuse can still be obtained (Government of British Columbia 2012a). Approximately CDN$4.2million has so far been allocated to eligible applicants since the Program was established (Ministry of Forests, Lands and Natural Resource Operations (BC) 2011). Funding may be also available from the federal Green Municipal Fund in the form of low-interest loans and grants. In addition, a tax exemption is available for up to 10 years for certain revitalisation projects, through municipal governments (under sect. 226 of the Community Charter: Ministry of Community Services (BC) 2008).

Future Liability for Contamination

Generally, sites cleaned up to risk-based standards are still considered ‘contaminated’ and ongoing liability for their management cannot be avoided by site owners or operators (Ministry of Environment (BC) 2009b: 3). The legislation provides that a certificate of compliance can be invalidated if the site use changes in the future, or if new contamination is subsequently discovered (sect. 53(5)(a), EMA; see also Sowinski 2008: 10). However, the liability of responsible parties for future contamination is limited to an extent. If a change in site use or new contamination is caused by another party, it is generally they (and not the liable party who holds the certificate of compliance) who will be held responsible for the associated cleanup costs (sect. 46(1)(m), EMA).

Post-Remediation Measures

Responsible parties remain liable for the costs of any ongoing monitoring that must be undertaken at a site where contamination remains in place and a risk

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management approach is being used. If a site that has been cleaned up and certified to numerical standards later becomes 'contaminated' again due to a change in site use, the person who made that change becomes responsible for any further remediation and/or monitoring required (Ministry of Environment (BC) 2010c: 3).

Long-term restrictions can be imposed on site use as part of statutory tools such as certificates of compliance and voluntary remediation agreements, both of which are provided for in the EMA. Before issuing a certificate of compliance for a contaminated site, the MOE can specify conditions, such as monitoring requirements and restrictions on the type of permitted site use (sect. 53(3)(a)(iv), EMA). These conditions may require the responsible party to prepare and implement a risk management plan for onsite contaminants (Ministry of Environment (BC) 2010c: 4), install the necessary equipment, and provide adequate financial security (sect. 50(1), CSR; sect. 53(3), EMA). A certificate of compliance can be withheld or revoked by the MOE if the proponent subsequently fails to meet the specified conditions (sect. 53(5), CSR). Financial security may be required by the MOE where a covenant alone is unlikely to be effective in ensuring that remediation is carried out (sect. 48(4)(b), CSR). Security can include letters of credit, deposits, registered bonds, bill notes, bank drafts, money orders, certified cheques and, as a last resort, real property (Ministry of Environment (BC) 2007: 2).

Sites that are subject to long-term risk management are noted on the publicly-accessible BC Site Registry (sect. 8, CSR; sect. 43, EMA). A restrictive covenant may also be registered on the land title to restrict certain activities and warn potential site purchasers (sect. 219, Land Title Act 1996; sect. 48(1), CSR). This is generally required by the MOE only if a notation on the Site Registry alone would be inadequate for managing long-term risks at the relevant site. The covenant may be discharged in the future if it can be shown that the site has been remediated to the specified standard.

Public Participation

Site Register

The EMA requires all contaminated and potentially contaminated sites in British Columbia to be noted on the publicly accessible, provincial Site Registry (sect. 43). This includes sites being screened or investigated for possible contamination, sites being remediated, remediated sites and sites where contamination is to be managed and/or monitored over the long term. For each site, the Registry contains background site information, details of the relevant parties, and the current cleanup status (sect. 8, CSR; sect. 43, EMA). In addition, any relevant voluntary remediation agreements, site

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profiles, reports, approvals in principle, certificates of compliance, notifications of independent remediation, declarations, determinations, orders, and decisions by the MOE or the Environmental Appeal Board are noted in the Registry (sect. 43(2), EMA; sect. 8(1), CSR).

In addition to the Site Registry, there is a database of contaminated sites owned and/or remediated by the Crown. The Crown Contaminated Sites Database was initiated in 2004 and now contains details of 845 sites, with more to be added in the future (Ministry of Forests, Lands and Natural Resource Operations (BC) 2012). Different categories of sites are included, ranging from those which pose a low or minimal risk to those which pose a high risk to humans and/or the environment

Public Consultation

The MOE has broad powers to require public consultation and review during contaminated site management, especially during the remediation planning process (sect. 52(1), EMA; sect. 55(1), CSR). However, public participation is not an automatic requirement for all contaminated sites. Factors taken into account by the MOE in deciding whether to require a public consultation or review include: the size and location of the contaminated site; the nature of the contamination and its potential for human exposure, environmental impacts and offsite migration; the proposed remediation methods and the potential for long-term impacts; opportunities for public consultation already provided through the land use planning system; whether public consultation would help inform a site investigation or the remediation decision; and the extent to which public consultation has already taken place.

A responsible party can be required by the MOE to carry out public consultation in respect of proposed remediation at a site, or a public review of remediation activities already carried out (sect. 52(1), EMA). This is the case even where a site is undergoing independent remediation with minimal supervision by the MOE (sect. 54(3)(c), EMA). However, public consultation cannot be required once an approval in principle or certificate of compliance has been issued for a site (sect. 55(3), CSR). Specific procedural requirements for public consultation and review are set out in the Contaminated Sites Regulation (sect. 55(1)).

A party responsible for a risk-managed site must also participate in, and pay for, a public community-based consultation process prior to seeking confirmation from the MOE that the site has been remediated to risk-based standards (sect. 18(2)(b), CSR). This process assists in developing a recommendation on the acceptable level of human health risk for the site, as well as identifying appropriate remediation methods (sect. 18(2)(b)(i), CSR).

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Analysis

Several features of the British Columbia regulatory approach to site contamination appear to be particularly innovative or successful. These include the use of site profiles to identify potentially contaminated sites, a clearly defined role for private professionals in managing low-risk and medium-risk sites, measures for independent remediation that require minimal regulatory supervision, the use of institutional controls, and the availability of a publicly accessible site register for all sites suspected and/or confirmed to be contaminated. The inclusion of these features is commendable, and contributes to a fairly comprehensive regulatory regime for site contamination. A few minor deficiencies, such as the lack of uptake of voluntary remediation agreements, do not significantly detract from this overall impression.

The Use of 'Site Profiles'

The statutory requirement for a site profile is an important tool that allows the authorities to obtain basic information on sites and screen them for further action. It is particularly useful because it involves coordination between the planning system and contaminated sites management system, enabling many potentially contaminated sites to be identified when a planning application or a transfer of sale is made. In the 2010–2011 fiscal year, 281 site profiles were received by the MOE, and 113 of these indicated that further site investigations were required (Ministry of Environment (BC) 2011: 15). Early and systematic identification of potentially contaminated sites helps to minimise the detrimental effects of site contamination that would otherwise remain undetected over the long term.

The Site Registry

Apart from protecting human health and the environment, the Registry is designed to provide information to contaminated site stakeholders to help them predict likely costs, and minimise their liability, in relation to the remediation of specific sites (Ministry of Environment (BC) 2006: 1). While in some other jurisdictions, the role of site registers is not universally seen as beneficial to property owners in particular, the BC Government has operated the Registry since 1997, apparently without any major controversy.

Provisions for Voluntary Remediation

Provisions in the EMA that allow for voluntary remediation—either independently or through voluntary remediation agreements—enable parties dealing

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with contaminated sites (e.g., developers) to minimise time delays and legal uncertainties during the site remediation process. Most contaminated sites in BC are remediated voluntarily, almost all of these through the independent remediation process (Ministry of Environment (BC) 2009a: 5). This is a relatively high proportion compared to most other jurisdictions, and results in significant time and cost savings for the BC Government. It also helps to ensure that contaminated sites are remediated and returned to use more quickly. Where there is significant reliance on private professionals instead of direct regulatory supervision by the MOE (particularly those undergoing independent remediation), auditing procedures are in place and the MOE can intervene at any stage if necessary. About 1 in 20 of all risk classifications by private professionals are audited by the MOE (Grubb and McNaughton 2011: 3).

Use of Institutional Controls

The use of institutional controls to secure post-remediation measures in BC is made possible through statutory mechanisms. The certificate of compliance is a particularly innovative and widely used tool, enabling authorities to specify post-remediation measures that must be implemented prior to certification being issued. Around 40% of all sites issued with a certificate of compliance between 2010 and 2011 were remediated to risk-based standards, and these are likely to have involved institutional controls (Ministry of Environment (BC) 2011: 15). Similarly, land use restrictions may be set out in voluntary remediation agreements, although this mechanism is not commonly used.

Authorities have two further tools at their disposal to impose institutional controls. The first is a notation on the Site Registry to warn potential site users and purchasers of any relevant limitations and requirements. The second option, if a notation on the Registry would be insufficient, is a restrictive covenant. This may be registered against the property title for a very specific purpose (e.g., to set conditions for remedial/containment works, set conditions to prevent a change in site use, or impose monitoring requirements).

The availability of the above mechanisms gives stakeholders greater flexibility in deciding how institutional controls are to be implemented. It also provides better long-term protection for public health and the environment, as restrictions and responsibilities can be defined clearly in statutory documents and individuals with a prospective interest in the site can be well informed. This is an important feature of the BC site contamination regime, as it caters for an aspect of site management that many other countries are yet to address through legislation.

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A Clearly-Defined Role for Private Professionals

At least one-third of all sites are remediated using the services of site contamination professionals (Ministry of Environment (BC) 2009a: 5). This allows the MOE to focus limited resources on the most high-risk sites, and streamlines the site remediation process. The significant reliance on private professionals is balanced by the fact that the MOE retains ultimate decision-making powers, such as issuing approvals and certificates. Requirements regarding qualifications and experience are clearly specified and the performance of professionals is audited regularly.

Regulatory Deficiencies and Lessons Learned

At present, BC legislation does not specifically allow the transfer of liability for remediation from a responsible party to another party, except in the case of mining sites and mineral exploration sites. For those sites, some previous owners and operators may be allowed to extinguish their liability for remediation in the process of transferring a mining or mineral exploration permit (sects. 68 and 69, EMA). Although legislative amendments were proposed in 2010 to include new liability transfer provisions, these are yet to eventuate.

As in several other jurisdictions, there are currently no statutory provisions in BC requiring the preparation of a health and safety plan for the remediation of a contaminated site. A health and safety plan would ensure that on-site workers, site users and nearby communities are adequately protected during site investigation and remediation works.

The provisions in the EMA that facilitate voluntary remediation agreements are rarely used in British Columbia, possibly due to the statutory provision which grants broad authority to the MOE to re-open its decisions at a later date (sect. 60, EMA; Sowinski 2008: 9). However, given the widespread use of the EMA's independent remediation procedures, which allow for prompt and cost-effective site cleanup with minimal regulatory oversight, this is not necessarily a major concern. Whether remediation is achieved independently or through voluntary remediation agreements is not as important as whether the cleanups themselves are complying with regulatory standards and requirements.

In sum, the factors identified here are minor deficiencies that do not detract from the comprehensive scope of the BC site contamination regime. Instead, they may be seen as areas for future improvement, for some of which the BC Government is already considering reform action.

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Chapter 5
Responsibility for Site Contamination

5.1 Introduction

The inclusion of a strong legal framework for the imposition of responsibility for remediation is essential to the effectiveness of domestic legislation on site contamination. However, the unique complexities of the site contamination issue make the allocation of responsibility a challenge for lawmakers. As Berveling (2005: 156) notes,

> a substantial time difference can occur between the action of contamination and its manifestation as a problem, raising difficulties in attributing liability.

'Historical contamination' is the term used to describe contamination that has been caused by past (often industrial) activities on a site, and can be distinguished from 'new' contamination. It presents a particular problem for many countries because the party or parties involved in the contamination may no longer exist, may be insolvent, or may have been state-owned. To complicate matters further, successive site owners, occupiers and other parties may unwittingly exacerbate or contribute to the contamination over time. The question then arises as to who should bear the cost of remediation, whether the costs are to be shared between parties, and if so, how.

This chapter first considers why the range of parties potentially responsible for contaminated site cleanup should be clearly defined in legislation. The relative strengths and weaknesses of the various types of liability that might be used in site contamination law are briefly discussed. Both traditional and more conventional mechanisms for imposing responsibility for site contamination are examined, noting the benefits of a combined approach. Lastly, consideration is given to the issue of financing the cleanup of 'orphan' sites.

E. Brandon, *Global Approaches to Site Contamination Law*,
DOI 10.1007/978-94-007-5745-5_5,

5.2 Definition of Responsible Parties

In domestic site contamination law, a clear method of allocating responsibility to relevant parties for identifying, managing, remediating and monitoring contaminated sites is essential to the effectiveness of the overall site contamination regime (Berveling 2005: 2). It is important to ensure that parties responsible for the contamination of a site, instead of the taxpayer, assume liability for its remediation wherever possible (Preston 2009; Berveling 2005: 157). This principle of 'polluter pays' is widely recognised and implemented in relation to contaminated sites in developed countries (CCME 2006: principle 1; Environmental Liability Directive 2004, art. 1). However, application of the 'polluter pays' principle may not always be feasible in countries where publicly-owned operators have caused most of the site contamination. In those countries, governments will generally remain responsible for funding remediation works (Boyd 1999: 6–7).

The 'Recommended Principles on Contaminated Sites Liability', originally developed by the Canadian Council of Ministers of the Environment in 1993 and revised in 2006, comprise a set of 14 principles that are intended to form the basis of future provincial legislation on the issue. The Recommended Principles are outlined in Case Study 5.1 below.

The CCME's Recommended Principle 6 promotes the identification of specific classes of 'potentially responsible' parties as the most effective way of casting a wide net for liability. According to the CCME, these classes could include present owners, previous owners, tenants and other occupiers (both previous and present), lenders, receivers/receiver-managers/other trustees, manufacturers, distributors, generators, transporters, corporate directors and officers, parent corporations and a 'catch-all clause' to catch other potentially responsible persons who would not otherwise be caught in the liability net (CCME 2006).

In the United Kingdom, a broad range of parties may be identified as potentially responsible and made to take remedial action or pay for remediation works (e.g., under Part 2A, Environmental Protection Act 1990). These include parties who are, or have been, involved with the relevant site at some point, who could be held responsible in the absence of the actual polluter. It is not yet clear how large the pool of potentially responsible parties will actually be in practice, although the 2007 *National Grid* decision clarified the point that, in the absence of clear statutory wording on the issue, the identity of a polluter should not be enlarged to include successors to a company whose identity is different from that of the polluter itself. More recent decisions have imposed liability on the original polluters and the developers (see, e.g., *Corby Group Litigation v Corby Borough Council* 2008; Thornton 2009: 13).

Case Study 5.1 Recommended Principles on Contaminated Sites Liability (Canada)

Recommendations have been made on key principles for legislation and policy on liability for contaminated site remediation in Canada. In 2006, the Canadian Council of Ministers of the Environment (CCME) revised the key document, Recommended Principles on Contaminated Sites Liability, to facilitate the implementation of a more consistent approach to contaminated sites liability across Canada. Although the 'recommended principles' take the form of 'statements of the policy options' rather than draft legislative provisions, they are intended to provide a model framework on which individual provincial governments can develop legislation and regulations (CCME 2006: 3).

The recommendations include more general, 'underlying principles' to guide the legislative design, as well as 'specific principles' on substantive issues. In brief, the 'underlying principles' (Principles 1–5) include the following:

- The polluter pays principle should be paramount in designing contaminated sites remediation policy and legislation;
- The principle of 'fairness' should also guide governments in their allocation of liability;
- The openness and accessibility of the remediation process, and the degree to which it encourages public participation, are fundamental to the development and operation of policy and legislation;
- The principle of 'beneficiary pays' should be applied to prevent unjust enrichment from remediation works; and
- The principle of sustainable development should guide government policy and legislation on contaminated sites remediation, by integrating environmental, human health and economic concerns.

The 'specific principles' (Principles 6–14) recommended by the CCME are as follows:

- A broad net should be cast to determine potentially responsible parties for remediation, but lenders, receivers and trustees should in general be conditionally exempt from personal liability;
- Remediation legislation should provide the necessary authority and means to enable the recovery of public funds expended on site remediation from those responsible for the contamination;
- Governments should strive to formulate an approach which will facilitate the efficient remediation of sites and fair allocation of liability, and avoid costly litigation wherever possible;
- A list of 'liability allocation factors' should be used to allocate liability to responsible parties depending on their specific circumstances, level of involvement, and contributions by other parties;

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Case Study 5.1 (continued)

- Alternative dispute resolution procedures should be made available by governments as a means to resolve issues of liability for contaminated sites, with a 'default' of joint and several liability among all responsible parties if the negotiation process should fail;
- Governments should retain the power to designate sites as 'contaminated', but should do so in accordance with a clearly stated designation policy, based on risks to human health and the environment and with provisions for public consultation and notice;
- A responsible party should be issued with an official certificate of compliance by the relevant regulatory authority once the site has been remediated to required standards, but that certificate should not exclude prospective liability;
- Benchmarks should be developed (with 'full public input') for the remediation of contaminated sites, which will vary depending on the land usage and location of particular sites. This would allow remediation plans or orders to be tailored to individual sites; and
- The liability associated with a contaminated site should be transferable between parties so as to facilitate site remediation, but must be done in compliance with all relevant legislation and subject to full disclosure of site information.

While most of the recommended principles were not contentious, there were a few, such as the question of joint and several liability, and the list of 'potentially responsible parties', which caused considerable debate among stakeholders.

5.3 Nature of Liability

The nature of the liability to be imposed for remediation of contaminated sites has always been a controversial issue. Developed countries continue to debate the most appropriate and effective method for imposing liability (Boyd 1999: 6; Richardson 2002: 303). Possible options for imposing liability for contaminated sites essentially include strict liability, fault-based liability, joint and several liability, and/or proportionate liability. Waite (2005: 40) describes a spectrum of liability in relation to environmental harm, ranging from 'no liability' to 'absolute liability'. Some countries (e.g., the United States) employ a combination of liability methods, whereas others (e.g., Member States of the European Union) use one predominant method.

5.3.1 Retrospectivity

One of the problems with existing environmental protection laws in many countries is that they do not adequately address historical site contamination. This is in part because most environmental protection laws are designed to have prospective, not retrospective, effect. As Fowler (2007: 3–4) observes,

> There are still numerous jurisdictions that continue to rely on their powers to regulate polluting activities under their general environmental protection legislation, believing these to be sufficient to enable them to address the problem of site contamination. At present, this attitude is also almost universally adopted in developing countries, where the nature and extent of site contamination problems is only poorly understood.
>
> [. . .] In order to address 'historic' site contamination, there is a need to be able to impose liability on responsible parties retrospectively, including where those parties did not act contrary to any law in place at the time of committing the acts or omissions that have resulted in site contamination. General environmental protection legislation does not normally provide for such retrospectivity and this must therefore be provided for in specific provisions addressed to the problem of historic site contamination.

However, even laws that have been specifically designed to ensure the cleanup of contaminated sites may not go far enough. For example, the absence of a retrospectivity clause is viewed as a major limitation to the scope of the European Directive on Environmental Liability (2004) which consequently does not cover the hundreds of thousands of contaminated sites that already existed across the EU prior to the Directive's entry into force (Layard 2006: 138).

Retrospective liability for site contamination is controversial, mainly because the contamination may have been lawfully caused at the time, or the responsible parties may have had little or no role in the actual contamination (World Bank 2007). There may be other consequences, including decreased property values for contaminated sites and a preference by developers for pristine 'greenfield' sites instead of potentially contaminated sites so as to avoid any possible future liability (World Bank 2007).

However, despite the harshness of retrospective liability, it 'has, in some countries, coerced industries into better environmental behavior and substantially minimized major health risks' (World Bank 2007). According to the World Bank (2007), retrospective liability is now considered 'the hallmark of modern soil statutes'. The United States was an early pioneer in the application of retrospective liability for contaminated sites, with the enactment in 1980 of its federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, also known as 'Superfund'). A more recent example is Germany's federal Soil Protection Act 1998, which was specifically designed to address historical (as distinct from new) site contamination within its general soil protection framework.

Retrospective liability can be essential to avoid unnecessary delays to site remediation and, wherever possible, to avoid the allocation of remediation costs to the taxpayer. In developing countries and those with economies in transition, much of the historical contamination may have been caused by state-owned operators, such as utility providers. In this instance, there may be little choice but to use public funds for site remediation. However, in countries where state-owned activities are not the major cause of historical contamination, retrospectivity should be a key feature of statutory liability.

5.3.2 Strict Liability

The concept of strict liability was famously enunciated in the 1868 English case, *Rylands v Fletcher*, in which the House of Lords held that a property owner was strictly liable for the consequences of unduly dangerous activities or structures maintained on their land. In general, strict liability requires only proof that the relevant party committed the relevant acts or omissions that have given rise to the property damage. It can be distinguished from fault-based liability (i.e. negligence), whereby a person is liable for any harm caused by a breach of their duty of care to another person. To establish negligence, the victim of the breach may face a heavy burden of having to prove that a duty of care existed, and that the breach caused the relevant harm.

In the context of site contamination, strict liability relieves the claimant or enforcement authority of the obligation to prove that the contamination resulted from negligence, or that the party's conduct was intentional. Such a burden of proof would be particularly difficult to overcome in relation to environmental harm, as it may not be possible to establish fault of the defendant. Application of the strict liability rule allows liability for contamination to be determined relatively promptly and without the need for protracted litigation (Kingsbury 1998).

There are other benefits to the use of strict liability in site contamination legislation. The application of strict liability rules may help to reduce the likelihood of orphan sites by deterring wrongful behavior (Alberini and Austin 2001). It can also help 'internalise' remediation costs (i.e., making polluters pay, and others connected with the relevant site), rather than placing that burden on the community as a whole (Bergkamp 2001: 5). Arguably, parties carrying out an inherently dangerous activity should bear the costs of any consequent harm to property and the environment. In addition, according to Faure (2009: 145), the strict liability rule offers an in-principle guarantee to the victim that they will receive compensation.

Strict liability is a central tenet of the European Directive on Environmental Liability and numerous national environmental laws, including CERCLA in the United States (sect. 107(a), CERCLA; Faure 2009: 138). Even before the European Liability Directive, strict liability was a particularly common concept in soil pollution statutes and case law, in countries such as the United Kingdom, Germany, Sweden and France (Faure 2009). However, courts in Australia and Canada have been reluctant to apply the strict liability rule in the specific context of site contamination (e.g., *Burnie Port Authority v General Jones Pty Ltd* 1994; *Smith v Inco Ltd* 2011).

5.3.3 Fault-Based Liability

In contrast to strict liability, fault-based liability is imposed only where it can be shown that the defendant was negligent and that their act or omission actually caused the harm in question. In this instance, the plaintiff needs to demonstrate the negligence or fault on the part of the defendant, the damage suffered, and a causal link between the conduct and the damage (Faure 2003: 100). Fault is determined on the basis of whether or not the person to whom the damage is attributed observed the prescribed duty of care in carrying out the relevant activity (Kummer Peiry 2005: 1).

According to Bergkamp (2001: 3), the distinction between fault-based and strict liability

> is relevant to what could be called 'unavoidable damage', damage that cannot be prevented by taking reasonable care or, in economic terms, damage whose cost [sic] are less than the cost of preventing it.

In recent years, fault-based liability has become less widely used in domestic regulatory regimes for site contamination or environmental harm, in light of the growing preference for strict liability. In the European Union, fault-based liability is generally imposed only where a non-hazardous activity has caused environmental harm, such as harm to biodiversity (EUROPA 2004).

5.3.4 Joint and Several Liability

Joint and several liability can make any one (or all) of the potentially responsible parties liable for the entire cleanup costs at a site. This option has attracted criticism for allowing governments to look to the nearest and most convenient 'deep pocket' to pay for site contamination, even though that party may not have been directly involved or even aware of the occurrence of the contamination (CCME 2006: 7). As Page (1997: 80, citing Wilkerson and Church 1989) observes,

> joint and several liability provides the government with a powerful tool to collect the funds needed for cleanup, particularly when the government cannot find the parties who contributed most of the toxic substances to the site or when these parties are not able to pay for the cleanup. In these situations, the amount that the parties pay for the cleanup may be unrelated to the proportional share of that party's contribution, even when they have minimal connection to the contamination event.

One of the potential advantages of having joint and several liability—even if only as a form of 'back-up' liability—is that it can be used as an incentive for potentially responsible parties to resolve liability among themselves and without recourse to litigation (Sigman and Stafford 2011). It is also considered a useful technique in situations where it can be proven that each defendant contributed to the site contamination, but the exact contribution of each is difficult to demonstrate, particularly when the injury is indivisible (World Bank 2007). However, it could not be applied to sites where there are many different (and usually unidentifiable) contributors to the site contamination, such as landfill sites (UNEP/ADEME 2005: 44).

A case study of the federal approach to allocating liability for site contamination in the United States is provided below (Case Study 5.2), and includes a discussion of how joint and several liability is applied. The US can be considered a pioneer in the development of its liability regime for contaminated sites, which is now over 30 years old and has evolved significantly over time. The case study examines other key features of the statutory framework, such as strict liability and retrospectivity, and demonstrates the complexities of the liability allocation process.

Case Study 5.2 United States—Federal Liability Regime

The United States' federal contaminated sites legislation, the Comprehensive Environmental Response, Compensation and Liability Act 1980 (CERCLA), has been noted since its enactment for the complex liability framework it creates (Dixon 1995: 1; Judy and Probst 2011: 199). CERCLA operates alongside the Resource Conservation and Recovery Act 1976 (RCRA), which provides a system for managing waste disposal and hazardous wastes. The role of RCRA is to help prevent site contamination from occurring, to impose remediation responsibilities as permit conditions, and in some cases to compel remediation. Essentially, RCRA applies when sites are still operational and licensed, whereas CERCLA applies to abandoned or inactive sites. CERCLA is the focus of this discussion on liability for contaminated site remediation in the United States.

The broad liability scheme provided by CERCLA represents an attempt to both maximise the cleanup prospects for contaminated sites, whilst minimising the cost to taxpayers on the basis of the 'polluter pays' principle. According to Judy and Probst (2011: 193, 213), CERCLA aims to achieve this by encouraging PRPs to reach settlement with the United States Environmental Protection Agency (USEPA), compensating government action, rewarding voluntary cleanup and, if necessary, forcing cleanup by PRPs. While the CERCLA liability provisions have sometimes been criticised as 'draconian', they are also considered to have been highly successful in making PRPs carry out site cleanups themselves, or meet the costs of such work (Judy and Probst 2011: 215).

CERCLA has some innovative features that make it distinctive from other national liability frameworks elsewhere in the world. A key feature of the CERCLA liability regime is the wide range of PRPs that can be held responsible for site cleanup. It identifies four categories of PRPs, including the current site owner or operator; a previous site owner or operator who owned/operated the site at the time of the disposal; generators of hazardous substances; and transporters of hazardous substances to the relevant site (sects. 101(20)(a) and 107(a)). Liability under CERCLA is retrospective, strict, and joint and several.

The use of retrospective, strict, joint and several liability in CERCLA has attracted controversy, as it can make parties who have had a relatively minor

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Case Study 5.2 (continued)

role in the contamination, fully liable for its cleanup. However, another key feature of CERCLA is that it allows PRPs who are held liable for site cleanups to seek contributions from other parties involved in the contamination. In addition, the US Government has gradually introduced statutory liability protections for some parties to help counteract the potentially harsh effect of CERCLA (Judy and Probst 2011: 196–197). These features of the federal liability regime are discussed in more detail below.

The first step for USEPA in the regulatory enforcement process is to identify any PRPs that fall into the four categories of liability, and determine the nature and extent of their individual contribution to the relevant contamination. It does this by carrying out interviews, onsite investigations and title searches, reviewing records, and requesting information from various other sources. The second step is to determine whether the PRPs have any potential defences to liability, and whether any limitations to, or exemptions from, liability apply.

Potentially responsible parties are liable under CERCLA for all costs incurred by USEPA or "any person" in taking removal or remedial actions at the relevant site, as long as those actions are consistent with the NCP (sects. 107(a)(4)(a) and 107(a)(4)(b), CERCLA); natural resource damages (sect. 107(a)(4)(c)); and the costs of any health assessments carried out for a site (sect. 107(a)(4)(d)). The retrospective effect of CERCLA means that PRPs can be held liable for contamination that occurred prior to its enactment in 1980 (USEPA 2012a, b). Liability is also strict, so a PRP cannot argue that they were not negligent, or that they were operating within industry standards when the contamination occurred (Judy and Probst 2011: 195).

PRPs are joint and severally liable for Superfund cleanup costs, meaning that any one PRP may be held liable for the entire cleanup of the site where the harm caused by multiple parties cannot be separated (*Burlington N. & Santa Fe Railway Co. v. United States* 2009; Judy and Probst 2011: 195, 225). This mechanism allows USEPA to pursue all PRPs at the outset of the site cleanup process, if by doing so it can maximise the likelihood of remedial action being taken, and/or cleanup costs being repaid, in a timely fashion.

Critics argue that joint and several liability results in PRPs with the 'deepest pockets' being targeted (see, e.g., Lyons 1986–1987; Richardson 2002: 320–321), and subsequent lengthy and costly litigation between the PRPs to sort out their contributions to the costs (see generally, Dixon 1995). However, Judy and Probst (2011: 233) suggest that there is some recent evidence to refute the claim that joint and several liability leads inevitably to protracted litigation.

The 'contribution' provision of CERCLA allows a PRP who has been held liable by USEPA for remedial actions and/or costs to seek contribution from other PRPs for an 'equitable share' of these costs (sect. 113(f)(3)(B)). They can do so whether their liability has been allocated through litigation, or in a

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Case Study 5.2 (continued)

settlement agreement with USEPA. In the 2004 case of *Cooper Industries, Inc. v. Aviall Services, Inc.*, the Supreme Court held that a PRP who had undertaken site cleanup voluntarily, in the absence of either settlement or litigation, could not seek contribution from other PRPs under CERCLA. They were only entitled to do so if they had been sued by, or had entered into a settlement agreement with, the government regarding site cleanup.

The narrow judicial interpretation of Section 113 in the *Aviall* case prompted PRPs to try using the cost recovery provision of CERCLA as an alternative means of seeking contributions from other PRPs. In the U.S. Supreme Court's *United States v. Atlantic Research Corporation* (2007) decision, a PRP succeeded in using Section 107 to recover from other parties the costs it had incurred by voluntarily undertaking site cleanup. This decision suggested that PRPs would still have a private cause of action against other PRPs if they could not make use of Section 113.

However, a controversial effect of the *Atlantic Research Corporation* ruling was that it potentially exposed PRPs who had already settled with USEPA to cost recovery action from other PRPs (Yeboah 2008: 280, 288). The Federal Government was concerned that the decision would enable PRPs to pursue parties who wanted to settle their liability issues with USEPA, when those parties had previously been protected from lawsuits by CERCLA. USEPA therefore moved to clarify certain contribution rights and protection from claims in its model settlement agreements (USEPA 2009: 2). In the recent case of *Solutia, Inc. v. McWane, Inc.* (2012), the 11th Circuit Court of Appeals held that a party seeking contribution under Section 113 could not simultaneously pursue cost recovery under Section 107. It held that Section 113 was the only appropriate avenue for recouping costs for PRPs who have incurred remedial costs under a consent decree.

There are very few explicit defences to Superfund liability in CERCLA. These are limited to situations where the PRP can prove that the contamination was caused by an act of God, act of war, or an act or omission of a third party with whom the PRP had no contractual relationship (sect. 107(b)(1)-(3), CERCLA). Where a PRP relies on the latter defence, they must show that (a) they exercised due care with respect to the relevant hazardous substance, taking into account its characteristics, and in light of all relevant facts and circumstances; and (b) they took precautions against foreseeable acts or omissions of the third party, and any foreseeable consequences of those acts or omissions (sect. 107(b)(3), CERCLA).

Several types of PRPs have only limited liability, or are effectively exempt from liability, for site cleanup costs under CERCLA. These include 'de minimis' parties (sect. 122(g), CERCLA) and 'de micromis' parties (sect. 107(o), CERCLA) who contribute only a very small amount of the waste or are unable to pay part of the cleanup costs; municipal solid waste facilities (sect. 107(p)); and owners of property located above contaminated aquifers

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(USEPA 2012a). In addition, the Brownfields Act 2002 amended CERCLA to include liability protection for 'bona fide' prospective purchasers, contiguous property owners and innocent landowners. Together, these are known as 'landowner liability protections'.

Liability protection is afforded to a bona fide prospective purchaser who acquires a property, even if they know or suspect that contamination exists on the property, as long as all hazardous substance disposals ceased at the site prior to the acquisition (sects. 101(40)(A) and 107(r), CERCLA). Contiguous property owners are also entitled to liability protection, provided their property is not the source of the contamination, and they have not known about, contributed to, or consented to the contamination in any way (sect. 107(q)(1)(A)(i), CERCLA). Innocent landowners are protected from liability where they have acquired a property without knowing of the contamination, unless they subsequently cause or contribute to contamination themselves (sects. 101(35)(A)(i) and 107(3)(b), CERCLA).

Landowners in these three categories must meet essential 'threshold criteria' and ongoing statutory obligations (also known as 'common elements') in order to qualify for liability protection (USEPA 2003: 2). They must have made 'all appropriate inquiries' into the environmental condition of the property and any potential liability prior to acquiring their property; demonstrate no affiliation with any other PRP; comply with any land use restrictions and institutional controls that apply to the site; take reasonable steps regarding hazardous substances on their property; provide cooperation, assistance and access to the relevant site for cleanup (and, if applicable, operation and maintenance) purposes; comply with information requests; and provide legally required notices (if applicable) (sects. 101(4)(B)-(H), 107(q)(1)(A), and 101(35)(A)-(B), CERCLA).

USEPA has an 'enforcement first' policy, whereby it will invoke its statutory powers wherever necessary to secure cleanup by PRPs before using federal funds for site remediation (USEPA 2002). However, CERCLA gives the Federal Government wide powers to carry out site assessment and remedial action itself if necessary, at the cost of the PRPs (Judy and Probst 2011: 194–195). USEPA has authority to act on the Federal Government's behalf at any site in the United States where contamination is suspected, not only at NPL sites. It can recover from PRPs the costs of any measures taken to assess and clean up a site that are consistent with the NCP (sects. 105 and 107(a)(4)(B), CERCLA).

USEPA can also force unwilling PRPs to remediate a site where suspected or actual contamination poses an imminent or substantial danger to public health or the environment (sect. 106(a), CERCLA). USEPA exercises this power primarily by issuing unilateral administrative orders (UAOs), although in practice such orders are not frequently used (United States Government Accountability Office 2009: 4, cited by Judy and Probst 2011: 229).

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Nonetheless, the statutory power is a significant tool, as PRPs receiving UAOs may be ordered to pay treble damages if they do not comply with the terms of the orders (sect. 107(c)(3), CERCLA).

As Judy and Probst observe (2011: 195, citing the United States Government Accountability Office 2009: 10, 27), "[t]he liability scheme provides a strong incentive for PRPs to negotiate settlements with EPA, and it also provides incentives for pollution prevention and voluntary cleanup of sites not listed on the National Priorities List (NPL) or subject to federal enforcement". PRPs are more likely to undertake site assessment and remediation voluntarily if they are given more control over the measures taken, and costs associated with those measures, under a settlement agreement (Judy and Probst 2011: 227). The prospect of regulatory enforcement action being taken against them, if settlement is not reached, provides further motivation.

In addition to creating a strong liability regime, CERCLA emphasises that negotiated settlements with PRPs should be attained wherever practicable and in the public interest, in order to expedite site cleanups and minimise litigation (sect. 122(a)). The result of this two-pronged statutory approach is that most site cleanups are achieved voluntarily, through negotiation with the PRPs and at their cost (Judy and Probst 2011: 194, 223). Most negotiated settlements are given effect through either a judicial consent decree (approved by the court) or administrative consent order (issued by USEPA), and the use of these instruments has risen significantly over time (Judy and Probst 2011: 223).

5.3.5 Proportionate Liability

Proportionate liability is sometimes seen as the answer to criticism of the joint and several model (e.g., Association of Municipalities of Ontario 2009: 4–5; Economic References Committee (Australian Senate) 2002: para 3.58). Under proportionate liability, each defendant is only required to contribute to the damages awarded in proportion to their degree of liability as decided by the court. Some vocal stakeholders in the United States and Canada (e.g., Association of Municipalities of Ontario 2009; American Tort Reform Association 2012) are now pressuring their governments to replace a joint and several liability scheme with proportionate liability.

It is also possible to apply proportionate liability to all instances where the defendant is, for example, less than 50% or 25% liable for the relevant damage. Where the defendant's proportion of liability exceeds the chosen threshold, then joint and several liability can be applied (Underwood 2007: 1–2). This method of allocating liability is also loosely known as 'modified proportionate liability' (Association of Municipalities of Ontario 2009: 4–5).

5.4 Mechanisms for Imposing Responsibility

5.4.1 The 'Command and Control' Approach

The 'command and control' approach generally comprises a set standard (the 'command') and a 'control', which monitors and enforces the standard. The approach is based on the assumption that governments are best placed to formulate and enforce regulations for environmental protection (Mirovitskaya and Ascher 2001: 187). Traditional mechanisms for imposing responsibility for contaminated sites include 'cleanup orders', a broad term that includes assessment, investigation and remediation orders; taxes and penalties; and pollution abatement orders. By the late 1980s, the traditional approach was attracting widespread criticism for being 'economically inefficient, excessively rigid, slow, uncoordinated, and, ultimately, ineffective' (Kelemen 2004: 209). However, it still offers some advantages for managing site contamination when combined with other mechanisms.

5.4.2 Non-traditional Mechanisms

Non-traditional mechanisms for imposing responsibility for site contamination include incentives to motivate polluters to reduce the risks posed by their activities, facilities or products (Anderson 2002: 2). Incentives usually comprise financial rewards (such as remediation grants, tax relief, loans, subsidies or performance bonds) or exemptions from liability. Some of these are used widely in the United States, United Kingdom (see Luo et al. 2009: 1126) and some provinces of Canada (e.g., British Columbia).

Other non-traditional mechanisms may be as simple as requiring site operators or owners to provide detailed information to the public, or using the 'threat' of liability against polluters to promote action. The latter can be a powerful incentive to encourage potentially responsible parties to engage in better environmental practices and compensate affected parties (Anderson 2002: 7). In the site contamination context, this could encourage polluters to undertake the necessary remediation works within a prompt timeframe. Incentive-based mechanisms are arguably more cost-effective, wide-reaching and flexible than traditional approaches, with the further advantage of stimulating technological innovation (Anderson 2002: 2; Kelemen 2004: 209).

In the United Kingdom, the main driver of contaminated site remediation is the development process (Luo et al. 2009: 1128; Sheehan and Firth 2008). When development consent is sought by a site owner or developer, the local authority can require that remediation be undertaken and other specific conditions met prior to granting consent (Luo et al. 2009: 1128). The local authority also has the power to require site investigations, oversee remediation strategies and ensure that remediation is completed to an acceptable standard of quality.

Financial incentives, such as tax relief and remediation grants, play a significant role in the reuse of contaminated sites in the UK, although they are primarily directed at brownfields (Luo et al. 2009). Regulatory mechanisms such as enforcement orders, or 'cleanup orders', remain important as a safety net for contaminated sites that are not addressed through the planning process, are not sufficiently remediated, or where liability is disputed. Berveling (2005: 157) considers investigation and remediation orders to be among several 'fundamental' elements for 'effective legislation dealing with the management and regulation of contaminated sites'.

5.4.3 Transfer of Liability

There is a growing trend in some developed countries whereby owners of contaminated sites are being allowed to transfer their responsibility contractually to other parties (e.g. purchasers), who then assume liability and engage in voluntary cleanups. For example, under Part 2A of the Environmental Protection Act (1990) (UK), the relevant statutory guidance allows for the transfer of liability to the buyer in certain circumstances (Department for Environment, Food and Rural Affairs (UK) 2012: 51). A transfer of liability may be permitted where a payment has been made between the parties for the purpose of site remediation, the buyer has been provided with information on the contamination that is not misleading, and the vendor no longer retains any interest in the land.

Full disclosure of information relating to the site contamination is usually required by the relevant legislation (e.g., sect. 30, Contaminated Sites Act 2003, Western Australia). In addition, transfers of liability can be made subject to certain conditions, such as the requirement of remediation to a specific standard, the capacity of the transferee, and regulatory compliance (Canadian Council of Ministers of the Environment 2006: 11–13; Environment Protection (Site Contamination) Amendment Act 2007 (South Australia). The ability to transfer liability for site contamination can improve legal certainty, thereby facilitating brownfield development (Canadian Environmental Law Association 2004: 7). However, any legislative provision allowing transfer of liability should be carefully drafted and clearly stipulate the type and extent of the liability being transferred, together with an enforcement mechanism should the transfer fail.

5.5 Remediation of 'Orphan' Sites

'Orphan' sites are those for which no identifiable party can be found to take responsibility for remediation, or where a responsible party can be found but is insolvent or otherwise unable to undertake remediation. In such cases, it is equally important to have measures in place to ensure that remediation proceeds (UNEP/

ADEME 2005: 44). Orphan sites may remain contaminated and disused for a considerable time until public authorities assume responsibility for remediation themselves, or a developer considers the site presents a profitable redevelopment opportunity. Developers will remain reluctant to develop a contaminated site where liability issues remain unresolved, unless the relevant authority gives them an incentive to do so.

One option for addressing orphan sites is to create an industry fund to which all operators involved in a particular industry must contribute by way of a tax. A tax on the chemical and petroleum industries was a hallmark of the federal US legislation, CERCLA, in its early days. An industry tax was also selected as the funding source for the Orphan Site Reclamation Fund in British Columbia (Oil and Gas Commission Levy and Orphan Site Reclamation Fund Tax Regulation 1998). Alternatively, a tax can be imposed on domestic and industrial waste (UNEP/ADEME 2005: 47). Whatever type of tax is selected, remediation works on orphan sites are then financed from the dedicated fund. An industry tax is a politically sensitive issue which industry groups tend to firmly oppose, but perhaps no less so than a broad liability regime such as that in the United Kingdom.

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Chapter 6
Promoting National Site Contamination Law: The Challenge of Harmonisation

6.1 Introduction

A major conclusion from Chapter 4 above was that there were inadequate provisions for site contamination at the national level in many countries. This problem affects countries to a different degree, either because there is a reliance on general environmental legislation to address complex site contamination issues, or because the existing site contamination law lacks some important provisions. As can be seen from the analysis of international law in Chap. 3 above, there have been no formal international initiatives to address site contamination comprehensively. Consequently, there is little and inconsistent guidance for countries that are considering measures to address the issue for the first time. Likewise, there are no 'best practice' guidelines which may be used as a benchmark for countries seeking to update their existing site contamination laws.

All of these factors demonstrate that there is a clear need for comprehensive, dedicated domestic legislation for the long-term management of site contamination. As Berveling (2005: 163) notes,

> Only by enacting legislation dealing specifically with contaminated sites is it possible to deal effectively with the problems and issues peculiar to contaminated sites, embrace the principles of ecologically sustainable development, and ensure the continued sustainable use of land and soils.

Specific legislation contains clear definitions and provisions tailored to the site contamination issue, whereas broad or generic legislation lacks effectiveness by attempting to serve multiple purposes (Berveling 2005: 157). The generic legislation (e.g., an environmental protection law) may have been introduced well before the complexities of the site contamination issue were properly understood. Therefore it may not include important provisions, such as investigation or remediation orders, allocation of liability or transparency measures for decision-making on site contamination management. This level of detail is an advantage that specific legislation also holds over the common law, which in some countries may be ill-equipped to resolve complex site contamination issues (Berveling 2005: 156).

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A further justification for having dedicated legislation for site contamination is the gradual relaxation of remediation standards over recent years, and the trend in some countries towards voluntary remediation, particularly of brownfields. The practice of treating and leaving contaminants in situ is gaining favour among remediation professionals, partly due to technological improvements and partly due to lower remediation standards. These factors taken together mean that a higher number of contaminated sites will require ongoing monitoring and possible future remediation, raising further issues of liability and appropriate remediation standards. Comprehensive, specific legislation is designed to address all of these eventualities.

The question therefore is not whether specific legislation is justified, but rather how best to promote its development so that developing countries benefit from the lessons learned in the past three decades by industrialised countries, and developed countries ensure that any perceived gaps in their legislation are filled. There is a particular need to assist countries which are undergoing rapid industrialisation, and which do not have the necessary legislative tools to deal with the likely high incidence of site contamination that will follow. These countries generally have neither the time nor the expertise to develop their own site contamination measures through ‘trial and error’, a process which would leave unaddressed more public health problems and environmental damage than would otherwise be necessary.

An examination of the means by which national site contamination law can be most effectively promoted requires an evaluation of a range of options. This evaluation will be undertaken firstly by considering the role and potential effect of international law measures, in Chap. 7, and secondly by considering alternatives to international law, in Chap. 8. However, before undertaking this evaluation, it is necessary to explore the underlying assumption that it is both appropriate and feasible to contemplate a level of consistency in approach to the subject of site contamination law. It is likely that any coordinated efforts to promote national site contamination law will involve some degree of legal or policy harmonisation, whether as a deliberate goal or an accidental consequence. It is proposed therefore, in this chapter, to examine the concept of ‘harmonisation’ in terms of its relevance to the particular context of site contamination law.

Where harmonisation is deliberately pursued, it will involve promoting a particular framework for contaminated site management. Each element of the framework would be considered by those who design it as necessary for a new or revised legal regime. The design itself would be based on lessons learned through the combined experiences of developed countries in regulating site contamination since the 1970s. While all of the elements included in the framework would be important and relevant for every country, the framework would retain sufficient flexibility to reflect the different social, cultural, political, economic and technical conditions in the domestic context.

Where harmonisation occurs unintentionally, it may be because many countries are using the same model or set of guidelines to develop their own legislation or policy, so regulatory regimes develop common features between countries. Alternatively, it may happen where several countries independently choose to emulate an innovative approach to site contamination taken by one particular country. This uncoordinated process is also known as 'diffusion', which is discussed further in the section below.

This chapter will examine the concept of harmonisation, how it occurs, and its implications for parties affected by it. It will then explore the relevance of harmonisation to the development of site contamination law around the world, and how it may give rise to issues of effectiveness and legitimacy. Specifically, the question will be asked as to whether harmonisation could and should be promoted among countries with different causes and degrees of site contamination, different land uses and soil types.

6.2 Defining Harmonisation

It is important to note at the outset that the focus of this chapter is on harmonisation of national site contamination laws (i.e. legal harmonisation), rather than harmonisation of practices. The distinction between legal harmonisation and other forms of harmonisation is not always clearly enunciated in the relevant literature. However, it is significant in this context because many harmonisation initiatives could potentially impact on site contamination practices, without leading to any improvements in the domestic regulatory regime.

Stevens (1993: 42) noted some time ago, prior to the recent debate regarding the scope of harmonisation:

> The term 'harmonization' is inexact and now encompasses the different processes for enhancing the use of policy instruments internationally. For the most part, the purpose of these efforts is not so much to achieve identical regulations or standards, but to converge international methods for developing and administering standards.

The definition of harmonisation remains imprecise and actively debated 20 years later, but in relation to law, the term generally refers to 'the process by which national laws and regulatory standards become increasingly similar, comparable or at least equivalent' (Gkoutzinis 2005: 64, citing Ancel 1976–1977; Polach 1959; David 1968). The effects of harmonisation are usually to eliminate any major differences between countries and to create minimum requirements or standards (Backer 2007: 13, citing Kamba 1974: 501). Fazio (2007: 16) observes that international harmonisation of law is a 'fragmented and *ad hoc* process, which has been constructed according to multiple different interests and to preserve public policies in the face of transnational challenges.'

In its most basic form, harmonisation is about the 'search for commonalities' (Backer 2007: xiii–xiv, 20). A set of universally applicable rules of behaviour is usually the desired outcome of harmonisation efforts (Backer 2007: xiv). The underlying belief of proponents is that harmonised laws mean less complicated international dealings (commercial or otherwise), resulting in greater predictability and reduced transaction costs (Gkoutzinis 2005: 65). Another strong belief is that harmonisation improves the quality of national rules because it introduces common international norms that represent ‘the expert international consensus of distilled legal wisdom and best practice’ (Gkoutzinis 2005: 66).

Backer (2007: xiv) contends that harmonisation can take many forms, such as voluntary and non-coercive (e.g. influential model legislation, codes of best practice or an industry-wide agreement) or mandatory and specific (e.g. European Union Directives or protocols to international treaties). This broad view is supported in the commercial law context by Fazio (2007: 17), Gkoutzinis (2005) and Guzman (2003). However, other commentators take a narrower view of harmonisation. For example, Busch and Jörgens (2005: 863) contend that the term ‘harmonisation’ relates only to legally binding requirements specified in international agreements or supranational (e.g., EU) regulations.

Busch et al. (2005: 149, citing Rogers 2003) identify harmonisation as just one of three mechanisms which can lead to policy convergence, the other two mechanisms being imposition and diffusion. In their view, diffusion is a horizontal process, with decision-making remaining at the national level. Where there is no existing international regime on a subject, international policy diffusion may result in a ‘regulatory revolution by surprise’.

According to Busch and Jörgens (2005), imposition occurs where a country is intentionally coerced by external actors to adopt a particular policy that it would otherwise not have adopted. Imposition takes place through economic or political threats or conditionality, such as in a precondition to a development loan. Policy diffusion is defined as ‘a process by which policy innovations are communicated in the international system and adopted voluntarily by an increasing number of countries over time’ (Busch and Jörgens 2005: 865). As discussed below, with reference to the widespread emulation of the United States’ National Environmental Policy Act 1969 (NEPA), policy diffusion could also be seen as a form of unintentional harmonisation. The United States Congress did not intend NEPA to be emulated in other countries when it enacted the legislation, nor did the US Government actively promote its use internationally.

In contrast with imposition and diffusion, Jörgens (2003: 5) argues, harmonisation involves ‘the deliberate and cooperative attempt by a particular set of countries to solve problems which they are collectively confronted with.’ Their main motivations are usually to address transboundary problems which cannot be solved alone, or to standardise different national regulations and thus avoid trade distortions. At odds with Busch and Jörgens, other commentators (e.g., Knill 2005) argue that harmonisation is not distinct from policy diffusion, but rather it is one of many types of policy diffusion. The latter term can be used to refer to processes that might result in increasing policy similarities across countries, thereby leading to policy convergence (Knill 2005: 766, citing Elkins and Simmons 2005: 36). According to Knill (2005: 766), policy diffusion can include

> all conceivable channels of influence between countries, reaching from the voluntary adoption of policy models that have been communicated in the international system, diffusion processes triggered by legally binding harmonization requirements defined in international agreements or supranational regulations, to the imposition of policies on other countries through external actors.

Much discussion has also been undertaken about the diffusion of law, as distinct from policy diffusion, although the fields are arguably closely related. The existence of different fields of 'diffusion' has also been a point of discussion (see, e.g., Twining 2004). Diffusion of law is said to take place when one legal order, system or tradition influences another in some significant way. Twining (2004) contends that most commentary on the spread of law between countries to date has been made on the basis of incorrect assumptions.

The assumptions referred to by Twining (2004: 16) include the common belief that it is advanced countries that transfer their laws directly (and largely unchanged) to less developed ones, and that by doing so they are filling a perceived 'gap' in existing law so as to modernise the recipient country. Furthermore, he argues that it is often wrongly assumed that legal rules or institutions are transferred only in a one-way direction, involving a formal legal enactment or adoption, and that the main facilitators are government agencies. If a particular law has been transferred and subsequently remained in place for a long time, its longevity is sometimes seen as an indicator of its success or effectiveness (Twining 2004: 16).

Twining seeks to disprove these assumptions by highlighting the many ways in which law can move between and among different countries. He contends (2004: 13) that

> [. . .] borrowing, blending, and other forms of interaction can take place at all levels [of law] and between different levels; interaction can be vertical, horizontal, diagonal, or involve more complex pathways.

Specifically, Twining perceives that there is an 'extraordinarily diverse' range of possible relationships between legal systems. He comments (2004: 15), for example, that

> they may complement each other; the relationship may be one of cooperation, co-optation, competition, subordination, or stable symbiosis; the orders may converge, assimilate, merge, repress, imitate, echo, or avoid each other.

From the complex picture drawn by Twining, it is evident that diffusion of laws can take place between many kinds of systems and actors, at and across different geographical levels, not just horizontally between legal systems (Twining 2004: 19). Diffusion can also take an indirect and sometimes complex path. It is important to keep these observations in mind in any discussion of harmonisation, so that all possible influences and interactions between domestic and international legal systems can be accounted for.

It is easy to confuse diffusion or convergence with harmonisation, given the very similar or overlapping processes and results involved. To add to the confusion, some authors use the terms interchangeably (e.g., Gkoutzinis 2005: 64). However, harmonisation is generally understood to refer to a process rather than an end result (Gkoutzinis 2005: 65; Backer 2007: xiii, xviii). By contrast, policy convergence 'describes the end result of a process of policy change over time towards some common point, regardless of the causal processes' (Knill 2005: 768). Knill (2005: 768) defines policy convergence as 'any increase in the similarity between one or more characteristics of a certain policy [. . .] across a given set of political jurisdictions [. . .] over a given period of time.'

In relation to Busch and Jörgens' (2005) position, it seems artificial to confine harmonisation to one type of process, when the term itself does not clearly connote either a voluntary or a coercive intent. In addition, Twining indicates that the diffusion of laws may occur on a wide range of levels, in many different forms and between different actors. For this reason, the broadest possible interpretation of the term 'harmonisation' will be used in the context of site contamination in the following discussion. Harmonisation will be taken to include the full array of voluntary and mandatory measures. The broader perspective on harmonisation taken in this chapter facilitates a more comprehensive discussion of possible avenues for improving site contamination laws and policies around the world.

To respond to the broad stance on diffusion of laws taken by Twining and others, as mentioned above, a distinction will also be made between harmonisation originating at the international level ('top-down' harmonisation), and at the national or sub-national level ('bottom-up' harmonisation). Although it is acknowledged that Twining (2004: 13) perceives the movement of laws to occur in many different directions, including vertically, horizontally, and diagonally, the discussion here will primarily address vertical—and to some extent, horizontal—harmonisation. Indeed, it is sometimes assumed that harmonisation is only vertical, and only top-down. Much of the literature on legal harmonisation focuses on this phenomenon. Busch and Jörgens (2005: 863) comment that

> In international relations, harmonization is conceptualized as a multilateral and state-centered process where international negotiations among sovereign states and subsequent policy formulation lead to domestic implementation and compliance.

Yet, as Twining (2004: 23) notes,

> Exclusive concentration on the spread of state law tends to go hand-in–hand with a formalistic and technocratic top-down perspective that underestimates the importance of informal processes of interaction.

Taking the broad view, top-down harmonisation may either take place through hard law, such as a treaty, or soft law, such as declarations, resolutions, or codes of practice. Fazio (2007: 17) contends that soft law 'currently constitutes one of the most significant sources of the harmonization of laws'. For example, harmonisation may occur where an industry-wide, voluntary code of practice is developed at the international level, and subsequently influences domestic lawmaking on that issue across the world. Although a global industry code of practice is more likely to influence site contamination *practices* rather than relevant *legislation*, domestic laws may eventually endorse the code and incorporate it by reference. One example is the International Cyanide Management Code, which has so far been implemented by 106 signatory companies across 46 countries since its formulation in 2002.

However, 'bottom-up' harmonisation is also an important contributing factor to the spread of laws and policies. It occurs where a particular regulatory approach to an issue is developed at the local or national level and is subsequently emulated or adapted for use in other countries, either because it is seen as 'state of the art', or due to market pressures. In the context of site contamination, government representatives, industry groups or prominent soil scientists may learn of a particular 'tried and tested' approach to an aspect of site contamination at an international conference or through the internet, and advocate its emulation by their own government.

An example of 'state of the art' emulation is the Dutch soil guideline values, which gained widespread recognition in the 1980s and were adopted, at least initially, by several other countries in their soil pollution policies (Jörgens 2003: 1). Another example is the implementation of environmental impact assessment (EIA) procedures by the United States in the early 1970s, which led many countries to follow suit with almost identical EIA policies (see, e.g., Eccleston 2008: 299). By contrast, emulation in response to market pressures occurs when one country with a large market enacts more stringent domestic laws than others, effectively forcing them to raise their own regulatory standards to compete. This process is called 'upward harmonization' by Wirth (2007: 97) in the context of the European Union. However, it should be noted that the EU has complex rules on harmonisation, which may affect more stringent national laws.

The 'horizontal' spread of laws between legal systems, or 'cross-level diffusion', is an important and relatively neglected phenomenon (Twining 2004: 18). Diffusion can occur not only between national legal systems, but also at and between the regional and local levels. The agents of horizontal diffusion tend to be non-state actors, such as multinational companies, academics, jurists and industry professionals (see, e.g., Twining 2004: 22). Even the existence of literature on a particular regulatory issue can lead to diffusion of laws. Twining (2004: 22) contends that 'there are grounds for believing that in law, as in other spheres, persuasion at grass roots and other levels is likely to be more effective than top-down law-making [...]', although he notes that this issue needs further empirical research.

The more informed and broadly encompassing view of harmonisation (or diffusion of laws) put forward by Twining is important to the discussion of harmonisation in relation to site contamination law. Countries such as the United States and the Netherlands are already actively promoting their own approaches to site contamination in some developing countries (e.g., the United States Environmental Protection Agency in China, and the Dutch Government's NL Agency in Romania).

For their part, developing countries have already demonstrated that they can, and do, 'choose eclectically from several foreign sources' in terms of their law (Twining 2004: 18). Twining gives the example of Turkey in its choice of legal codes from several European countries. Another example is Indonesia, which drew from two or three sources for its modern environmental law, according to Bedner (2008: 171). It is essential to understand how countries are influenced in their selection or acceptance of a foreign law, how their own legal system and other factors interact with foreign counterparts, and the factors that shape the domestic formulation of law. It is particularly important to note, in the context of site contamination, the role of other actors apart from government agencies (such as multinational corporations) in diffusing law, and the potential for interactions to be two-way.

6.3 Types of Harmonisation

This section summarises the spectrum of harmonisation methods available, although again it should be noted that these comprise primarily vertical and horizontal methods. In addition, there is an emphasis on the distinction between harmonisation of laws, and harmonisation of practices which may eventually lead to law. Not all of the methods summarised below will be of assistance to legal harmonisation efforts in the area of site contamination.

6.3.1 Binding Protocol to an Existing Treaty, or a New/Amended Binding Treaty

Harmonisation may occur in response to obligations under a binding international or regional agreement, whether it is a framework treaty or a subsequent protocol. Although governments are free to commit to, or exclude themselves from, treaty provisions, once a government becomes a party to a treaty it is bound by its obligations. Usually there are legal and economic consequences for non-compliance with treaty provisions. As Fazio (2007: 14) notes,

> the more international conventions are accepted worldwide (and ratified by numerous countries of different legal traditions), the greater will be their significance for the process of harmonization of laws.

However, the degree of harmonisation achieved ultimately depends on the extent to which all parties implement and enforce the treaty provisions.

6.3.2 Loan Conditions and Bilateral Aid Agreements

Harmonisation may take place where a global or regional development bank, or a national aid agency, insists on a particular type of regulatory change by recipient countries in exchange for finance or other assistance. Busch and Jörgens (2005: 863–864) identify this practice as ‘economic conditionality’. Mandatory provisions regarding regulatory change would normally be contained in the conditions to a development loan or bilateral aid agreement. In practice, bilateral aid agreements are one of the most common vehicles for legal harmonisation (see, e.g., Woodman 2003; Gerwitz 2003: 615).

6.3.3 High-Level Declarations or Resolutions

Where the United Nations General Assembly, United Nations Environment Programme Governing Council or any other major international institution makes a declaration or resolution on an issue, it often serves to both raise awareness of that issue and influence the actions and policy agendas of countries (e.g., Rio Declaration on Environment and Development 1992). The far-reaching influence of this form of 'soft law' is attributed to the high degree of legitimacy of intergovernmental forums, particularly where heads of state or government ministers are present. Where several or many countries respond in a similar way to a high-level statement, harmonisation may occur.

A declaration or resolution can also have longer-term consequences if it eventually becomes 'hard law', such as by incorporation into the text of a binding treaty. Fazio (2007: 21–22) cites the example of the 'Goals and Principles of Environmental Impact Assessment' adopted by the United Nations Environment Programme Governing Council in 1987. These were subsequently incorporated into the Espoo Convention on Environmental Impact Assessment in a Transboundary Context (1991).

6.3.4 Guidelines or Recommendations

International organisations, such as the Organisation for Economic Cooperation and Development (OECD) and the World Bank, commonly develop guidelines or principles for the management of certain domestic issues. These may be in the form of a 'manual', 'recommendations' or 'draft principles' and are intended to assist governments in drafting new or amending legislation or policies. One such example is the document titled 'Elements of Good Practice in Legal Frameworks for the Implementation of the Stockholm Convention on POPs in Latin America' (2007), produced jointly by the United Nations Environment Programme and the Center for International Environmental Law.

Guidelines may also be directed at natural and legal persons rather than States themselves, thus giving them a wider application than other forms of international law (Fazio 2007: 19). Harmonisation may take place where several countries follow the guidelines voluntarily in their domestic regulatory approach to the relevant issue, and the domestic approaches become more similar over time.

One international organisation, the United Nations Industrial Development Organization (UNIDO), has prepared a manual to deal with aspects of a particular type of site contamination: persistent organic pollutants (POPs). The online manual sets out key elements that need to be addressed by those responsible for POPs contaminated sites. UNIDO has also produced a 'toolkit' to assist governments and other decision-makers with prioritising sites contaminated with POPs. More details are given in Case Study 6.1 below.

The UNIDO Manual (2012) states that 'one of UNIDO's goals is to transfer knowledge on POPs related issues to the directly affected actors that are dealing with contaminated sites'. The Manual is intended to provide 'a first-aid approach to help in dealing with POPs contaminated sites' (UNIDO 2012). From these statements, a few limitations to the Manual are apparent: it addresses only sites contaminated with POPS, although some of its recommendations could arguably also be applied to other types of site contamination; it is only designed to provide

Case Study 6.1 The UNIDO Manual for POPs Contaminated Sites

This initiative by UNIDO provides definitions of contamination and contaminated soil, and briefly outlines the various effects of site contamination on humans, animals and the environment (UNIDO 2012). A list of 'clues' is provided to help detect contaminated sites. Health and safety recommendations are made for site visits involving detailed investigations and remediation works. Workers are encouraged to follow certain procedures for site investigation works to minimise further contamination.

The UNIDO Manual contains specific checklists for both preliminary and detailed site investigations. The section on detailed site investigation and monitoring includes technical specifications for collection and analysis of samples. Soil gas analysis is a particular focus of this section, together with the application of geophysical investigation methods and borehole sampling procedures. In relation to site monitoring, the Manual addresses groundwater contamination control through monitoring wells, recommending the design and implementation of a 'strategic monitoring network'. The elements of procedures of a good monitoring system are described, and include groundwater level measurements, collection and analysis of water samples, and ideal monitoring frequencies.

Apart from the online Manual, UNIDO also produced a 'Contaminated Site Investigation and Management Toolkit' in 2010. The Toolkit is designed to assist governments and other stakeholders, with the primary aim being to aid developing countries with the identification, classification and prioritization of POP-contaminated sites, and with the development of suitable technologies for land remediation in accordance with best available techniques and best environmental practices' (UNIDO 2010: 4). The Toolkit reviews legal and policy issues relating to contaminated site management, and sets out a process for conducting a site investigation, assessing site risks, managing contaminated sites, and financing site remediation. It utilises case studies to illustrate certain practical aspects of these procedures.

initial guidance; and it is aimed at individuals rather than governments, so its provisions are unlikely to be adapted into legislation.

Nonetheless, the Manual is an interesting example of efforts by an international organisation to provide practical guidance on the site contamination issue, in response to growing demand for such guidance and a perceived gap in domestic regulatory frameworks. The UNIDO Toolkit (UNIDO 2010) also makes up for some of the deficiencies of the Manual, by providing a greater level of detail for governments and other decision-makers in the management of POPs contaminated sites.

A set of guidelines prepared by an international organisation would be well placed to promote domestic site contamination law, because it could contain guiding principles and essential elements for legislative drafting. The guidelines could be given a high profile internationally through conferences, networks and websites. They are less likely to attract criticism from community or environmental groups for lack of participation or transparency, because provision could be made for this at every stage of their preparation and implementation. The main limitations of guidelines may be that they are not as detailed as a model law, and are not necessarily intended to be transposed directly into domestic legislation without elaboration.

6.3.5 ISO Standards

Standards produced by the International Organization for Standardization (ISO) are the product of consensus among its 157 members, all of which are networks of national standards institutes from individual countries (ISO 2012). According to the ISO, 'standards' are established by consensus and approved by a recognised body and provide, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the 'optimum degree of order' in a given context (International Organization for Standardization and International Electrotechnical Commission 2004: Guide 2). ISO standards cover a wide range of technical and procedural issues, and are intended for global application regardless of individual countries' socio-economic, political or cultural circumstances.

Harmonisation is possible where governments choose to adopt ISO standards by reference in legislation and policy instruments, perhaps for political or economically competitive reasons, and apply them consistently. For example, some local governments in China have adopted ISO 9000 standards (e.g., the local government in Shaoxing City, and subsequently other local government offices in Zhejiang Province, China: Harvard Kennedy School 2006).

Many federal agencies in the United States have also implemented ISO 14000 environmental management systems, in response to Executive Order No 13148 (Greening the Government through Leadership in Environmental Management; President Clinton 2000). The Executive Order directed all major federal agencies to develop and implement environmental management systems by end 2005. Out of the 200 federal agencies that had implemented EMS by 2002, nearly all had chosen the ISO 14001 model (Connaughton 2002: 2). Connaughton also notes (2002: 2) that 'the U.S. government has been an ardent supporter and believer in the international standards process, and specifically, the ISO 14000 family of environmental standards.'

Although harmonisation of these particular ISO standards is still somewhat limited in the two examples given above, the development suggests the potential for wider implementation at the local, provincial/state and national levels in the future.

6.3.6 *Codes of Practice*

Codes of practice, or 'best practices', tend to be developed by international or regional networks, global industry groups, multinational companies, trade associations (Fazio 2007: 37–38) and occasionally by international organizations. Codes created by multinational companies and trade or industry associations have attracted some criticism for being too vaguely worded and aimed at improving market profile rather than actual standards and practices (Fazio 2007: 38, citing, for example, Pitt and Groskaufmanis 1990).

Where a sufficiently detailed code of practice is consistently followed by a particular industry, multinational company or international organisation in countries, harmonisation of practices can result, although not harmonisation of laws. While their harmonising effect is limited, industry or corporate codes of practice may stimulate government responses to the relevant issues. They can also 'demonstrate the existence of consensus within national and international communities and the necessity of regulation in certain areas' (Fazio 2007: 38).

6.3.7 *A Model Law or Policy*

A model law or policy on a particular issue may be developed and promoted by an international organisation, network of professionals, or even a multinational company. The intention of model law proponents is usually to provide a basic framework, and sometimes more detailed guidance, for countries which lack an adequate regulatory regime on the issue. A model law or policy can also provide a useful benchmark for countries wanting to improve their existing regulations. If the uptake of the model law or policy is widespread and consistent among countries, significant harmonisation of laws or policies may occur (for example, the widespread uptake of the model legislation, the Uniform Environmental Covenants Act, across the United States: Uniform Law Commission 2012).

6.3.8 Emulation of 'State of the Art' Practices in Other Jurisdictions

Where governments learn of successful or 'state of the art' approaches to an issue in other jurisdictions, whether through international conferences, the internet, or other means, they may emulate those approaches themselves without any prompting by external actors. By doing so, and if other governments do likewise, they may contribute to the unintentional harmonisation of laws or policies in that field. In most instances, the originating country or jurisdiction does not actively promote the adoption of its regulatory approach by others, but information on the approach is readily available. A country may simply follow another's approach because it has encountered similar site contamination problems and it can save time and expense by emulating an existing, 'proven' approach. Wirth (2007: 92) notes:

> Through straightforward exchanges of information, formal or informal, public policy in one jurisdiction may be informed by experience in another. In this manner, there may be agreement on what constitutes 'good practice' standards that one jurisdiction may copy in some measure from another, with or without modifications to suit individual circumstances.

Occasionally, however, an innovative regulatory approach is actively promoted outside its original jurisdiction, and in this case any harmonisation that occurs is intentional. Intentional harmonisation may occur when one country encourages others to follow its example by promoting its own regulatory approach at national or international conferences, interstate or foreign training sessions and through the internet. It may see economic advantages to its trading partners or geographical neighbours having similar approaches to site contamination, or it may simply wish to help other countries address the issue in a more comprehensive way. The advantages may even be viewed by the countries concerned as flowing in both directions, such as the minimising of competition distortions and pressuring other countries to change their own policies (Wirth 2007: 92).

One example of unintended harmonisation through policy emulation is that of the Dutch 'soil guideline values' (SGVs), which were used in the Netherlands from the early 1980s and subsequently adopted as a benchmark in several European and other countries (Ferguson 1999: 53). The purpose of Dutch SGVs was to remediate contaminated land to a standard that would allow it to be used for any purpose, including residential occupation ('multifunctionality').

At a time when awareness of serious site contamination was growing in many developed countries, the multifunctionality standard seemed attractive to countries that had not yet devised their own policies on the issue. However, it became evident over time that the implementation of such a high standard would be costly and time-consuming, and most countries using the Dutch SGVs abandoned or adapted the approach in favour of less stringent remediation targets. In the late 1990s, the Dutch Government also introduced changes to make its soil policy more flexible (Ferguson 1999: 45–47).

Another example of emulation from the national level to the international level, resulting in unintentional harmonisation, is in the area of environmental impact assessment procedures. A significant precedent was set by the United States Congress in its adoption of the National Environmental Policy Act 1969 (NEPA). NEPA has been emulated widely, with at least 80 countries adopting identical or similar environmental impact assessment (EIA) procedures globally since the 1970s. Eccleston (2008: 299) states that 'so many [countries have adopted similar provisions], in fact, that today some have postulated that NEPA may have become the most emulated statute in the world'.

The successful emulation of NEPA worldwide, in comparison to the Dutch soil guideline values, is most likely attributable to the character of the legislation. NEPA contains principles and procedures that are broadly applicable in any domestic context, but the Dutch soil guideline values were specific to Dutch soil conditions and land uses. Soil types and uses are highly variable factors between countries, and any soil guideline values need to reflect the social, economic and political choices made by individual governments.

The following brief case study of the Uniform Environmental Covenants Act (UECA) in the United States provides an example of bottom-up harmonisation occurring from the state level upwards to the national level, within a federal constitutional system. This harmonising effect was intentional, and it demonstrates how quickly a regulatory approach can spread to other jurisdictions when it is actively promoted. As far as is known, however, the harmonising effect of UECA does not yet extend to the international level.

Case Study 6.2 The Uniform Environmental Covenants Act (United States)

The main purpose of the UECA is to safeguard the long-term remediation of contaminated sites through the use of enforceable, permanent environmental covenants attached to the sites (Uniform Law Commission 2012). The Act was designed to maximise the reliability of covenants by eliminating any legal provisions or principles that might undermine them. By doing so, it was hoped that site owners and operators would be more likely to accept land use controls, and that greater redevelopment of brownfields would be encouraged.

The interests of all parties affected by site contamination, including those living or working on such sites, were considered in the preparation of the UECA. Implementing states have the option of whether to create a registry of contaminated sites subject to environmental covenants. The UECA does not define the clean-up standards to be applied for site remediation; instead, these are left to individual states.

First drafted in 2003, and adopted by several US states in 2005, the UECA has since rapidly spread to nearly half of the states, with several more likely to adopt the uniform legislation in the near future. A national taskforce was formed in 2005 by the individuals involved in drafting the law, so that it could

(continued)

Case Study 6.2 (continued)

be promoted nationwide in a coordinated manner. The efforts of the taskforce have been supported by several other influential US organisations, and appear to have been effective.

By its nature, the structure and content of the legislation is such that it can be applied in any state, requiring little or no modification, and its benefits for site remediation and the real estate market are clear. All of these factors have made the UECA a suitable candidate for unanimous nationwide adoption, a goal which seems likely to be achieved in the next few years.

6.3.9 Emulation Due to Market Pressure

The unilateral effect of one country adopting more stringent standards than its trading competitors has been called 'upward' harmonisation by Wirth (2007), although he applies the broad term only to the specific example of market conditions. Wirth contends (2007: 97) that 'upward' harmonisation occurs

> when a jurisdiction with high standards and that commands a very large market makes a unilateral regulatory decision, even one that ostensibly applies only internally. If that jurisdiction's market share is sufficiently large, regulatory requirements can affect an even larger area, including those under the control of other sovereign authorities. Whether states or private entities, the trading partners of a jurisdiction adopting demanding regulatory standards may find it disadvantageous to produce products or services that do not meet the higher requirements, even if other markets have less rigorous regulatory standards. The net effect is an upward pressure on standards even outside the jurisdiction that established them.

Wirth (2007: 98) gives the example of the European regulation on chemicals management (Regulation No. 1907/2006 on the Registration, Evaluation, and Authorisation of Chemicals 'REACH'), which he contends will have a significant impact on US markets. The relevant federal legislation on chemicals in the United States, the Toxic Substances Control Act (1976), is said by Wirth (2007: 100) to be 'considerably less rigorous' than REACH.

REACH requires stringent testing and registration of all potentially harmful chemicals to be sold on the European Union market. As a result, the chemicals industry in the United States will have to adapt its operations and procedures to comply with REACH or it will lose business (Wirth 2007: 102–103). While this is not legal harmonisation, because the United States has not yet introduced legislation to mirror the REACH provisions, at a minimum it represents widespread harmonisation of practices. Wirth (2007: 103) suggests that the relevant federal legislation and statutory authority in the US will be reassessed and possibly replaced in the near future.

6.4 Justifications for Harmonisation

Given a wide range of means by which harmonisation of environmental laws may be pursued, it is pertinent to consider whether such a strategy is appropriate in the specific context of site contamination law. In relation to the broader context of environmental protection, harmonisation has been supported by Stevens (1993) on the following grounds:

> For reasons of both ecology and national sovereignty, environmental policies and standards will differ from country to country, reflecting each nation's relative situation and their collective choices [. . .] Nevertheless, an environmental imperative for harmonization does exist, and stems from emerging global and transboundary pollution and resource problems. Cooperative efforts addressing global warming, stratospheric ozone depletion, preservation of biodiversity, and similar problems will involve more harmonized international environmental policy approaches.

Other commentators also support the view that harmonisation is a 'sensible approach' for matters such as environmental protection and health and safety (Guzman 2002: 272–273). While a more detailed comparison between site contamination and other 'global' environmental issues will be left to Chap. 7 (below), it is not difficult to conclude that soil and water contamination threaten vital natural resources and that these problems are encountered in many parts of the globe, and that therefore the case for harmonisation might be extended to this particular context.

The benefits offered by harmonisation of site contamination law—however it occurs—include the potential for a greater level of protection for soil, water and public health than might otherwise be achieved through poorly coordinated or inadequate domestic measures. The European Parliament noted (2006: 10) that a framework directive on soil was needed at the European level

> to articulate the efforts of Member States to improve the protection of soils and its sustainable use, to control the transboundary soil degradation effects, to protect aquatic and terrestrial ecosystems, and to preclude distortion of competition between economic operators.

General domestic environmental laws and policies rarely encompass the whole spectrum of site contamination management, focussing more commonly, for example, on water pollution or soil protection as discrete areas.

By contrast, harmonised laws may result in countries having at least minimum procedures for dealing with site contamination over its whole 'life cycle'. Such procedures would aim to prevent contamination wherever possible, detect it at its earliest stages, and manage it effectively once it has been detected. Harmonisation may also help to reduce the burden of contamination on future generations by setting higher cleanup standards and requiring post-closure monitoring, provisions which are not commonly included in the existing body of domestic site contamination laws but can be identified as desirable goals for long-term site management.

In its preparatory work on the draft European Directive on Soil Protection, the European Parliament (2007: 8) stated that

> A systemic approach for the identification of contaminated sites, based on monitoring objective parameters and a common list of activities, is needed to gather the necessary information and establish databases in order to manage the legacy of soil contamination, thus giving a signal to economic operators so that they take effective preventive measures to avoid future contamination.

Harmonisation of site contamination laws would offer greater certainty for governments (particularly at the local level), developers, site contamination consultants, local communities and individuals. Those parties would be able to look to other countries, where similar procedures have already been implemented, to observe their likely effects and incorporate them into their decision-making. Market conditions may become more favourable for the redevelopment of contaminated sites where developers are given appropriate incentives. In Europe, creating a 'more uniform playing field' for the EU-wide property investment market was seen as an important goal of harmonising environmental liability rules (Layard 2006: 132, citing Hollins and Percy 1998: 126; see also Lawrence and Lee 2003). The benefits of having similar laws and policies in place across many countries are clearly identified in relation to international commercial transactions (Gkoutzinis 2005: 65), so it is likely that they would also be relevant to contaminated sites involving international stakeholders.

Instead of having a haphazard collection of environmental laws—none of which are specifically tailored to site contamination, but intersect with it in some way—harmonised laws could set clear parameters for all decision-making in relation to site contamination, contained within one comprehensive regime. These would be easily recognisable from country to country, even if specific details such as 'trigger' values and cleanup standards vary in practice. The lessons learned by developed countries in the 1980s and 1990s in the early stages of site contamination policy could provide valuable input to the preparation of any guidelines, code of practice or model law. Developing countries should also have an important role to play in the drafting of such material, to maximise its relevance and utility to their own circumstances and to bring a broader perspective to the drafting process.

Apart from allowing developing countries and economies in transition to 'leap-frog' developed countries in their site contamination law, harmonisation could also be a more cost-effective option than learning by 'trial and error'. Raustiala observes that 'the strategy of adopting successful foreign models can markedly reduce regulatory costs' (Raustiala 2002: 59–60). Although the point is made that where the costs of regulatory change are high, the benefits of importing a law or policy may not justify change, there can be 'substantial gains from choosing off-the-shelf models' where the cost is low. Raustiala (2002: 59–60) cites deLisle (1999) to support this contention:

> The costs of independent invention (including the 'trial and error' of pursuing blind alleys already explored by others or the expenses of devising genuinely new laws and institutions) can easily outweigh the expected marginal gains from an indigenously crafted arrangement that might better suit local needs and circumstances.

Furthermore, harmonisation would allow the costs of site remediation to be allocated so as to more accurately reflect the role played by certain individuals or companies in the contaminating activities, leaving industry funds or taxpayers to pay only for ‘orphan’ sites where no responsible party can be identified or effectively pursued. Currently, some countries routinely sponsor site remediation out of the public purse, allowing polluters to escape all or partial liability for costs (see, e.g., European Environment Agency 2007). In the absence of harmonised laws this practice may continue simply because it is easier and there is no incentive or obligation to change. In addition to shifting the cost burden from the public to the polluter at the domestic level, harmonised site contamination laws would mean that polluters cannot evade liability for cleanup by relocating their polluting activity to another jurisdiction. In the European Union, distortion of competition has been used as a further justification for harmonised soil protection laws (European Parliament 2006: 10).

6.5 Qualifications and Limitations Relating to Harmonisation

Some concerns have been raised about the legitimacy of harmonisation measures in their various forms. Historically, as Backer (2007: xiv) notes, ‘every attempt to integrate behavior within a single set of norms, has met resistance’. Harmonisation measures are not always embraced by everyone, and may be strongly resisted by individuals, communities and industry groups, who may see such initiatives as an attempt to shift power from the local or national level to the international level (Backer 2007: xiv–xv). In the context of harmonisation through treaties and other formal international mechanisms, Gkoutzinis (2005: 53) argues that

> the process of international legal convergence and harmonization invariably requires voluntary constraints on national regulatory autonomy and a certain transfer of law-making or standard-setting power from the national arena to a supranational body [or] organization [. . .]

Instead of seeing the benefits that are offered by harmonisation, people may view it as resulting in a loss of control and transparency over decision-making. As Stone (2001, cited by Jörgens 2003: 5) observes, harmonisation involves some sacrifice of national autonomy and sovereignty. Given that soil and water have traditionally been understood as ‘local’ or ‘national’ issues, any steps by international actors to harmonise site contamination procedures are likely to meet considerable resistance.

A lack of legitimacy is not the only concern of harmonisation critics. Some argue that, instead of being a positive force for domestic legal systems, harmonisation may actually undermine the development of effective legal systems. Pistor (2002: 98) contends that this could happen because countries need to develop their own legal systems through a process of ‘creative destruction’, fine-tuning their laws in response to their individual circumstances. According to this argument, laws will not be as effective if they are imposed by an external body rather than being allowed to evolve 'naturally' in response to domestic forces and factors. Pistor (2002: 98) argues that the external supply of best practice law 'sterilizes' the domestic lawmaking process, distancing it from political and socioeconomic factors and the processes of continuous adaptation and innovation.

In an extension of this argument to the soil conservation context, some believe that the wide range of soil types and uses found across different countries would make a harmonised approach to soil protection both inappropriate and difficult to achieve. It can be assumed that any proposal to harmonise site contamination laws and policies would attract the same criticism, given that soil is directly affected by contamination. Indeed, Cairney and Hobson (1998: 8) point out that 'some differences in national responses to the identification of land contamination will inevitably and very properly persist. Geological, population growth and land scarcity factors alone make this inevitable.'

There is an assumption by some commentators that one method of managing an environmental problem may be suitable for one country but not necessarily good for another. McAusland (2005: 230) captures the essence of this argument in the simple statement that 'in general, dissimilar countries should have dissimilar standards'. She goes further, saying that 'policy harmonization by perfectly symmetric countries may be bad for the environment and global welfare if governments are politically motivated and/or pollution is less than fully transboundary' (McAusland 2005: 230).

A further limitation with respect to harmonisation arises in the context of international treaties. Where many of the parties to a treaty lodge reservations, the harmonising effect of that treaty may be undermined. Reservations allow States to establish conditions for their participation in an international treaty. Fazio (2007: 33) acknowledges the reality that

> the diversity of legal systems in the international community may prevent some States from taking part in certain international treaties without being capable of unilaterally amending and adapting such treaties to their own legal and political reality.

While reservations generally either have to be accepted (sometimes unanimously) by the other parties to the treaty in question, or explicitly permitted in the treaty text, there has been a greater emphasis in recent years on allowing reservations so as to encourage broader participation in treaties (Fazio 2007: 33–34).

6.6 Overcoming the Limitations of Harmonisation

The principal limitations of harmonisation are its perceived lack of legitimacy, the potentially 'sterilising' effect of harmonisation on domestic law-making processes, the ability of parties to an international treaty to lodge reservations limiting their obligations, and—with specific relevance to site contamination—the high variability of soil types and uses, and a distinct lack of public awareness of the issue.

The perceived lack of legitimacy for harmonisation, and the belief that harmonisation may 'sterilise' the law-making process, are reasonable concerns to raise. However, both problems may be at least partially overcome if every effort is made to maximise the transparency and adaptability of the harmonisation instrument. Legitimacy and transparency are less problematic for instruments made at the international level, where a clear decision-making process is followed and relevant documents may be publicly accessible. Any harmonisation efforts pursued outside the international law-making arena should strive to maximise transparency in the same way, wherever possible. They should also seek to obtain a clear mandate for taking action on the site contamination issue, whether it comes from a prominent international organisation, a transnational network of site contamination professionals, or a major international conference.

To minimise any potential 'sterilising' effect, the proposed international agreement (eg, a protocol on site contamination) should contain only the essential provisions for a comprehensive site contamination regime and leave the remaining details (such as numerical soil standards) to be decided by the individual countries. If the proposed method of harmonisation is a 'model law' or code of practice, the aim would be similar, even if the effect is non-binding rather than binding. In addition, the involvement of developing countries in the preparation of a harmonisation instrument would potentially strengthen its adaptability.

It can also be contended that using an 'imported' law or policy is better than having no law or policy in place at all for the management of site contamination. At least an imported model would represent the distilled knowledge of countries which have already encountered serious site contamination problems, and incorporate the best known practices for managing them. A country can choose to adapt an imported model to its own circumstances over time, wherever possible and permitted by international law if treaty obligations are involved. But the complete lack of a regulatory framework for site contamination is likely to prove costly in terms of public health, the environment, urban development and the taxpayer.

Given the differing administrative infrastructures, and the differences in capabilities, training and ethos of the administrative authorities between one country and another, there may be a need to devise different regulatory 'models' to suit particular countries or types of countries, particularly with regard to enforcement provisions. This is more likely to lead to the successful 'take-up' and implementation of domestic legislation in developing countries in particular, although it would also make the idea of a model law potentially more attractive to developed countries.

With regard to the undermining effect of treaty reservations on harmonisation, it is conceded that greater participation in treaties may be a more desirable and practical goal than the identical implementation of treaty provisions across countries. Participation may come at the price of consistent harmonisation, but if it helps to achieve the universal application of treaty norms, then one of the main elements of international harmonisation is satisfied (Fazio 2007: 33). According to

Fazio (2007: 34), the recent preference for this view 'reflects the difficulties inherent in the process of legal harmonization given the diversities present in the international community'.

The high variability of soil types and soil uses between countries has, since the European Soils Directive was first proposed, become a less persuasive argument against harmonisation. While it is conceded that there are some limitations to using uniform soil standards across countries, the diversity in soil types is actually seen as a compelling reason for a harmonised approach to soil protection. The European Parliament (2006: 4) noted that, in fact, 'the huge diversity [in soil types] *necessitates*, in addition to national bottom-up approaches, a European strategy' (emphasis added). However, any harmonised approach should retain sufficient flexibility to allow individual countries to set their own soil values depending on domestic conditions and land uses.

A similar justification could conceivably be extended to harmonisation efforts towards soil protection at the international level. Arguably, the fact that many countries have unique soil conditions means that developing the best approach for soil protection is a potentially time-consuming and costly exercise. If appropriate guidance is available on the basic necessities for a soil protection regime, those countries can then get on with the task of making that regime suit their unique circumstances, perhaps exchanging technical assistance and scientific expertise with other countries. If such an argument succeeds for soil protection, the prospects for a harmonised approach for site contamination will be much improved, because its image as an almost exclusively 'domestic' issue is tied to this restricted understanding of soil.

The lack of public awareness of site contamination may be overcome by a strong public awareness campaign and, where possible, greater public participation in decision-making. This will be no small task for proponents of harmonisation of site contamination law, given the view traditionally held by decision-makers that site contamination is a 'local' issue, and given the invisibility of site contamination to the broader public. A campaign to promote harmonisation would need to be two-pronged: educating the public to generate political momentum, and informing decision-makers of the benefits of harmonisation. Efforts should focus on improving public awareness of the importance of clean soil and water for people and the environment, and the effects of site contamination.

The advantages of harmonising laws and policies on site contamination with those of other countries should be made clear to the authorities responsible for managing the problem. This could be achieved by convening international or nationwide conferences on site contamination management, to which speakers from countries with established, proven regimes as well as local decision-makers would be invited. Information sessions or training programs could also be held for local officials, with their foreign counterparts or delegates from an international organisation explaining the proposed structure and content of a harmonised approach to site contamination. Any training programs would need to take local conditions and needs of the relevant country into account.

6.7 Who Might Promote Harmonisation of Site Contamination Law, and How?

Given the wide interpretation of 'harmonisation' adopted in this chapter, the actors likely to promote harmonisation of site contamination law, and their potential methods, vary considerably. There are already some established actors in this area, as well as some emerging ones, and others who could play a significant role in the foreseeable future. Most of these actors are primarily involved with soil science and soil protection. As previously noted, few of the established actors promote the harmonisation of site contamination law in a comprehensive manner, but instead most focus on a particular aspect of interest to their members or relevant to their mandate.

The United Nations Environment Programme, together with the French Environment and Energy Management Agency (ADEME), produced a comprehensive manual on the management of contaminated sites in the mid 1990s. The UNEP/ADEME Manual, revised in 2005, deals with a wide range of aspects of site contamination and promotes the use of specific legislation for the issue, although it does not provide draft legal provisions. It is intended as a reference manual for governments and contaminated site managers, particularly in developing countries.

Despite its high-level origins, the UNEP/ADEME Manual does not appear to have been actively or widely promoted and it is difficult to know what impact, if any, it has actually had on developing countries. Therefore, even with the backing of the largest international environmental organisation, such an initiative may fail to influence domestic decision-making on site contamination due to lack of promotion. The proponents of any new guidelines on site contamination would have to work harder to promote them among national governments.

The Tutzing Proposal, which contains a draft international convention on soil use, was first put forward by a small group of European soil scientists and academics in the late 1990s (see Held et al. 1998). It has made minimal progress since then, but the International Union for the Conservation of Nature (IUCN) has taken on board the idea to some extent and incorporated it into its recent work (Hannam and Boer 2004). At the time of its inception, the Tutzing Proposal was a bold move, and it is indicative of the urgency perceived by the soil science community for an international instrument for soil protection even in the 1990s.

The established actors in promoting harmonisation on soil and site contamination include the Sustainable Use of Soils and Desertification Specialist Group within the IUCN Commission on Environmental Law, the Food and Agriculture Organization (FAO), the World Bank and the North Atlantic Treaty Organization (NATO).

The Environmental Law Programme of the IUCN has prepared and now actively promotes guidelines for national legislation on soil (Hannam and Boer 2004). Momentum has also been growing recently within the IUCN, and in the international soil science community generally, towards an international instrument on sustainable soil use (Boer and Hannam 2011). Two draft versions of such an instrument have already been prepared, and these are discussed further in Chap. 7 below. This is the closest any organisation has come to a 'model law' on site contamination to date, although the principal focus of both draft instruments is on sustainable soil use.

The FAO (2000) has published guidelines on issues relating to soil contamination by pesticides, primarily for the benefit of developing countries. As mentioned earlier in this chapter, the United Nations Industrial Development Organization (UNIDO) has also developed a quite detailed 'toolkit' to assist developing countries with identifying, assessing and managing sites contaminated with persistent organic pollutants. The Contaminated Site Investigation and Management Toolkit (UNIDO 2010) contains guidelines and case studies on practical aspects of the contaminated site management process. It has initially been used in Ghana and Nigeria, but it is envisaged that it will also assist all African countries and other developing countries around the world (UNIDO 2010: 4). The main limitation of the FAO and UNIDO publications is that they are specific to one type of site contamination.

The World Bank has policies requiring environmental assessments to be carried out for each of its funded projects, with sites being screened for any likely adverse impacts (World Bank 2007). It has also produced a 'Pollution Prevention and Abatement Handbook' (World Bank 1998) for reference by Bank and project staff, which provides acceptable emission levels. In addition, the World Bank encourages borrowing countries to prepare and implement 'Environmental Action Plans' to identify and address major environmental problems within their borders (World Bank 2000). It has sometimes required developing countries to adopt national environmental action plans as a precondition for their loan, resulting in the widespread adoption of such plans (Jörgens 2003: 22).

By implementing similar procedures for all of its projects, the World Bank is promoting a form of harmonisation, at least in regard to environmental assessment generally. As there appear to be no specific procedures in place for site contamination, it is doubtful whether the current, general procedures are sufficient to address the problem consistently, wherever it arises.

Since 1980, NATO has sponsored several detailed pilot studies on the technical aspects of contaminated land, through its Committee on the Challenges of Modern Society (CCMS). The CCMS, which became the NATO Science for Peace and Security Program in 2006, assists the transfer of technological and scientific solutions between countries with similar environmental problems. Pilot studies have included, for example: Environmental Aspects of Reusing Former Military Lands (1999), Evaluation of Demonstrated and Emerging Technologies for the Treatment of Contaminated Land and Groundwater (1986–to date), Rehabilitation of Old Landfills (2004), Mega-sites (2005) and Small Sites in Urban Areas (2006).

The most recent pilot study, completed in 2007, was on Prevention and Remediation Issues in Selected Industrial Sectors (NATO and CCMS 2007). Its purpose was to 'define and explore best practices for reducing the environmental and health impact on soil and groundwater' from particular industrial sectors and site types (NATO and CCMS 2007: 1). If the result of these pilot studies is a set of 'best practices' which are applied across many of the countries NATO is involved with, they may have a harmonising effect.

Emerging actors in the harmonisation of soil or site contamination law include various international networks and several multinational companies. International networks of soil scientists and individuals involved with contaminated land continue to play an active role in promoting aspects of site contamination, raising awareness of the issue generally, and influencing new regulations such as the proposed European Soils Directive. The International Union of Soil Sciences (IUSS), the International Committee on Contaminated Land (ICCL), the International Soil Conservation Organization (ISCO) and the Common Forum on Contaminated Land in the European Union (Common Forum) are all prominent examples of such networks.

For many international or regional networks, their primary role is to facilitate the exchange of knowledge and experiences in relation to soil or contaminated sites, whilst lobbying governments for regulatory change is a secondary role. However, the daily exchange of information between network members in countries all over the world contributes to harmonisation, even if it is unintentional and difficult to track. Often the individuals in such networks are government officials from environmental ministries or enforcement agencies, or respected scientists, all of whom may have considerable influence on lawmaking and other decision-making in relation to site contamination within their own countries.

Multinational companies have begun to develop their own policies for dealing with contaminated sites that they own or operate in various countries, to satisfy due diligence requirements and minimise future liability for remediation costs. For example, Rio Tinto has prepared an 'Environment standard' for hazardous materials and contamination control at its sites, which states that internal criteria for site contamination must be developed where government regulations are absent or incomplete, and such criteria 'must be in line with internationally accepted regulations, guidelines, definitions and methodologies' (Rio Tinto 2008: 4). A contaminated sites register is also to be developed and maintained for all Rio Tinto sites, and remediation strategies are to be drawn up for all contaminated sites where investigations have shown there is 'an unacceptable environmental impact' (Rio Tinto 2008: 4, 6).

GlaxoSmithKline, according to its 2002 report, has employed 'global standards that require [. . .] the identification and management of contaminated land' (GlaxoSmithKline 2002: 48). At the time of the report, the company also commonly entered into agreements with local government authorities to remediate contaminated land that it has used, and remediation was carried out 'to levels that are consistent with the expected future use with the land and with local regulatory requirements' (GlaxoSmithKline 2002: 48). If multinational companies like these implement their stated policies, then there may be a degree of consistency in the management of their contaminated sites across several countries. However, the extent of harmonisation would be very limited, because each company tends to develop its own policy rather than foster an internationally agreed approach.

The review of past, established and emerging actors in the harmonisation of soil and site contamination law informs a prediction of future actors and initiatives in this area. One might assume that the most likely actors to promote harmonisation are international organisations such as the UN, UNEP or IUCN. Yet the UN has been silent on the issue to date, and UNEP has shown no intention to expand on the manual it produced in the mid 1990s by proposing more formal obligations to act on site contamination. The IUCN may continue to actively promote the harmonisation of soil (and to some degree, site contamination) laws and policies at two levels: pursuing an international treaty on soil whilst providing guidelines for countries in drafting domestic soil laws.

The IUCN has the advantage that its members include both government delegates and distinguished scientists, making it easier to secure the approval of governments for its initiatives. The inter-sessional work program of the IUCN is directed by resolutions of the World Conservation Congress (WCC), which convenes approximately every 4 years. The Commissions of the IUCN, including the Commission on Environmental Law, can take actions that pertain to and are consistent with the WCC resolutions. A strong case for action on site contamination would need to be presented at a World Conservation Congress, perhaps by a dedicated group of soil scientists or site contamination professionals.

It is possible that some sections of the international soil science community, separately from or in collaboration with the IUCN, will put forward proposals for an international treaty on soil. What is more likely, however, is that the international soil science community as a whole will support efforts by others to achieve an international agreement, but their own focus will be more on harmonisation of practices rather than of laws. Harmonisation efforts from their perspective would include sharing information and expertise on particular aspects of soil management with their counterparts in other countries, such as at regular conferences and on internet discussion forums. They may also work towards ‘best practice’ codes for specific technical procedures, such as soil assessment.

The situation may change if the proposed European Soils Directive becomes law; European soil science organisations in particular may become keen to promote an international version. For their part, international organisations may also be more easily persuaded to consider an international treaty if the regional initiative proves successful. Similarly, but in the context of site contamination, the members of groups such as the International Committee for Contaminated Land and Common Forum on Contaminated Land are more likely to pursue informal avenues towards harmonisation of practices, rather than aiming for a binding international treaty on the issue. This may reflect a lack of resources and motivation to promote an international treaty on the part of group members, and an understanding that the current international political climate does not favour the making of new treaties.

The harmonisation activities of industry groups and multinational companies will continue to be confined to particular industry sectors or sites. Even though these may be spread quite widely around the world, and the codes of practice or policies may be followed consistently, the harmonisation effects will be relatively small and generally limited to practices rather than laws. What may prove to promote legal harmonisation on a larger scale is the role of multinational companies and the World Bank in pressuring governments to adopt new regulatory regimes. Multinational companies may even be involved in the legal drafting process for the countries in which they operate, if existing laws are non-existent or not ‘conducive’ to the desired development. Predictably, the resulting laws would favour the interests of the companies over and above any environmental or public health safeguards.

6.8 Conclusions

The broad view of harmonisation favoured in this chapter facilitates the consideration of a wider range of options for promoting domestic site contamination law. While it is difficult to find a precise definition of harmonisation on which most commentators agree, it is generally accepted that the process of harmonisation causes national laws and policies to become increasingly similar over time. Most literature focuses on top-down harmonisation, emanating from the international level, rather than bottom-up harmonisation, which begins at the local or national level and radiates outwards and upwards. An example of the latter, with specific relevance to site contamination, is the adoption of the Uniform Environmental Covenants Act across the United States.

Types of harmonisation range from mandatory and coercive measures, such as binding treaty provisions or loan preconditions, to voluntary initiatives. The concept of harmonisation adopted herein encompasses not only deliberate efforts to harmonise laws and policies, but the unintentional spread of similar regulatory approaches. From a brief outline of the different types of harmonisation, it is evident that many actors may be actively or unwittingly involved in harmonising processes.

It is also interesting that the traditional proponents of harmonisation, international organisations, no longer dominate the scene. Instead, they have been joined by proactive international networks of professionals and industry representatives, and even multinational companies, all of whom have a significant role to play in harmonisation of domestic laws and policies. Similarly, treaties are now just one of the tools available for international harmonisation: resolutions, guidelines, codes of practice and loan preconditions may be equally effective and possibly easier to achieve.

The justifications for harmonisation of site contamination laws and policies are readily apparent, but the method itself is not without controversy. A comprehensive, systematic approach to site contamination in every country would help to ensure that all aspects of site management are adequately and competently addressed. There is a clear need for guidance on site contamination laws for emerging industrialised countries, as well as developing countries. Even countries with some measures already in place would find much usefulness in an internationally recognised ‘best practice’ set of guidelines or in treaty provisions on the issue.

Opponents of harmonisation, however, argue that it lacks legitimacy, removing control over decision-making and lawmaking from the local or national level to the international level. Another perceived problem is that countries with different circumstances should not have uniform laws or policies imposed on them, but rather domestic regulatory regimes should be shaped by domestic factors. This point has been raised in the context of regional soil protection efforts, on the basis that the high variability of soil types and soil uses between countries precludes any harmonisation of laws or policies. In terms of site contamination, the chronic lack of public awareness of the issue is another impediment to harmonisation.

However, there may be ways of overcoming such obstacles to harmonisation. For instance, greater participation by stakeholders in the development of harmonisation initiatives may overcome legitimacy concerns. The argument that different countries should have different laws can also be countered by reference to the European regional soils initiative, and the cases put forward for international harmonisation in other areas of the law. Furthermore, the lack of public awareness of site contamination could eventually be remedied by a strong education campaign at the international, national and local levels.

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Chapter 7
An International Response to Site Contamination

7.1 Introduction

The purpose of this chapter is to assess the feasibility of an international instrument on site contamination. First, the question of whether site contamination is an issue of international concern will be explored. Second, an analysis will be undertaken as to how and why other environmental issues have become the subject of MEAs, drawing lessons for a possible agreement on site contamination. Third, there will be a discussion of the appropriate form of such an instrument. Fourth, the possible content of an international instrument on site contamination will be briefly addressed. Finally, conclusions will be drawn as to the feasibility and prospects of an international instrument on this issue.

7.2 Reasons for an International Response to Site Contamination

There are compelling reasons for an international response to the issue of site contamination. The review of international law in Chap. 3 demonstrates that no existing treaty deals specifically with site contamination. Similarly, the survey of national approaches to site contamination in Chap. 4 illustrates that very few existing domestic laws address the issue comprehensively or directly. As a result, site contamination continues to present a major challenge to governments around the world. As the Common Forum on Contaminated Land in the European Union (2011: 6) noted recently,

> Many developing countries continue to face significant challenges with massive land contamination as a result of industrial activities. Equally there is no globally accepted policy and regulatory framework to address these issues in an integrated way which accounts for the impacts on public health, local environment and economic opportunities.

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It is apparent that if countries formulate their own approach to site contamination without the benefit of external guidance or reference to ‘proven’ approaches used elsewhere, the result is usually fragmented and ultimately inadequate.

In countries where the effects of site contamination are only now emerging, particularly in developing countries, governments are often either unaware of the full implications of the issue or lack the technical and financial capacity to respond. An international instrument could facilitate the provision of technical and financial assistance to developing countries (in relation to soil protection, see Wyatt 2008: 192–195), particularly in the important early stages of identifying potentially contaminated sites and prioritising the most urgent sites for remedial action. This process in itself would assist such countries to gain a clear picture of the extent of the site contamination problem within their jurisdiction and would reinforce the need to act decisively.

At a minimum, the high profile gained by inclusion of the site contamination issue in an international instrument would raise awareness of the need to address it, at both the national level, among political leaders and legislators, and at the local level, among the general public. An international agreement would give the persuasive message that the issue needs prompt attention and strategic action. This heightened awareness is particularly important for addressing the challenge of site contamination, as it occurs largely out of the public eye and its effects may only become obvious to surrounding populations over a long timeframe (Wyatt 2008, in the soil protection context).

An international response to site contamination would set out the essential elements for a national legislative framework for site contamination, based on the combined expertise and experience of developed and developing countries and those with economies in transition. It would provide clear guidance for national lawmakers and, depending on its legal status, it could even require countries to take action on the issue and report regularly to an international body on their progress. Whatever its form and content, an international response to site contamination would be carefully drafted to allow for maximum flexibility and to ensure effectiveness at the domestic level.

7.3 Site Contamination as a Matter of International Concern

The term ‘site contamination’ encompasses the effects of the contamination of soil, water and in some cases, air, within a specific and usually confined geographical area. Soil is recognised as a finite resource, because it replaces itself at a much slower rate than it is actually used, or rendered infertile, by human activities. Soil is essential for the survival of species. Clean water is also a scarce resource in some places, and it remains essential for human consumption and the survival of plants and other organisms. Both soil and water have traditionally been regulated at the national or local level, rather than the regional or international level.

Some aspects of the environment have already been identified as matters in which the global community as a whole has a valid interest, on the basis that such matters either go beyond national borders or merit cooperative global efforts towards their resolution. These ‘collective environmental concerns’ (Brunnée 2007: 552) tend to fall into one of three categories: ‘common areas’, ‘common heritage of mankind’ and matters of ‘common concern’. As Brunnée (2007: 553) notes, all three concepts deal with environmental challenges that call for collective action of some kind. The meaning of ‘collective action’ is discussed further below.

‘Common areas’ are those which are located beyond the jurisdiction of States, and include the high seas, Antarctica, and outer space (Brunnée 2007: 552). However, it remains controversial whether Antarctica and outer space even fall within the ambit of this concept (see, e.g., Mgbeoji 2003: 830; Biermann 1996: 430). ‘Common heritage of mankind’ is a somewhat similar notion, but refers to the resources that lie outside States’ jurisdiction, such as deep seabed minerals and possibly resources in the Antarctic. It is generally recognised to have originated in 1967, through a proposal by the representative for Malta during negotiations for the United Nations Convention on the Law of the Sea (Pardo 1967). Traditionally, the term has described resources that were ‘a gift of nature which were to be enjoyed by everyone’ (Thomas 2005: 246). The principle of free availability applied, such that free and unlimited access to the resource would be permitted.

Site contamination as an issue in itself could not be described as a ‘common area’ because its geographical incidence is disparate and one contaminated site is generally distinct from, and unrelated to, another (except in the case of contaminants migrating offsite). Nor could site contamination be considered a part of the ‘common heritage of mankind’, because it is a multifaceted environmental problem rather than a discrete resource. Site contamination also involves environmental damage, whereas the terms ‘common areas’ and ‘common heritage’ can be construed as applying only to areas or resources which ideally should remain intact.

The question could be asked whether soil and water, the two natural elements predominantly affected by site contamination, might be described as ‘common areas’ or ‘common heritage of mankind’, instead of the site contamination issue itself. However, soil and water affected by contamination are mostly located within national borders, and only occasionally across a shared border (e.g., the transboundary air pollution that was the subject of the *Trail Smelter Arbitration* 1938 and 1941; and the transboundary water pollution of a US river and lake system emanating from the same site in Canada, that led to the ‘Trail Smelter II’ case, *Pakootas v Teck Cominco* 2006). According to the specific criteria used to define a ‘common area’, areas within national jurisdiction are expressly excluded. On this basis, neither would meet the usual criteria of a ‘common area’, except perhaps for the contamination of seas beyond national jurisdictions.

For the same geographical reason, it is unlikely that soil or water would be considered ‘common heritage of mankind’ in the traditional legal sense, even though they are vital resources to which, in principle, all should have unrestricted and equal access. In Europe, some references have been made to soil as ‘common heritage' or 'cultural heritage'. For example, soil has been recognised as 'a determining element of the landscape and the cultural heritage of Mankind' (Council of the European Union 2002b, cited by van Calster 2004: 14), and 'a common heritage, [whose] protection is in the public interest' (Council of Europe 2003: 10, cited by Layard 2006: 146).

Fitter (2005: 186) contends that soil is a 'global common', requiring careful regulation alongside the atmosphere, freshwater and the seas. Use of the term 'global common(s)' is taken to imply a global resource rather than a 'common area' or 'common heritage'. Fitter (2005: 186) notes that 'one global common remains virtually unprotected, however, and that is soil.' He observes that soil is a less obvious 'global common' than water and air, which are 'well-mixed systems, where the consequences of changes are rapidly dispersed'.

Soil is generally a solid medium, so it moves slowly and soil damage tends to have local effects. However, Fitter (2005: 186) notes, 'the global stock of soil is a common for humanity: we need the food that we can produce only by relying on it'. Soil damage in one area can have far-reaching impacts, if it means that more food, for example, needs to be produced elsewhere as a result, or if people are displaced because the soil no longer supports them.

As Layard (2006: 147, citing Birnie and Boyle 2002: 143) points out, there is a concern that the concept of 'common heritage' implies ownership and exploitation by all. She suggests that it would be preferable 'to avoid any debates over ownership, and refer (if at all) to soil quality as a "common concern"' (Layard 2006: 147, citing as an example the United Nations General Assembly Resolution 43/53 on the Protection of the Global Climate for Present and Future Generations of Mankind 1988: para 1).

The concept of 'common concern' has emerged more recently than the other two concepts. Its precise origins are unclear, but it has been invoked in the preambles to at least two major international environmental conventions and one soft law instrument since the late 1980s (i.e., the Framework Convention on Climate Change 1992, para 1; Convention on Biological Diversity 1992, para 3; and the New Delhi Declaration of Principles of International Law on Sustainable Development 2002). The alternative expression 'common interest' has also been used at times (see, e.g., Matz 2002: 17). However, 'common interest' may be a weaker concept than 'common concern', as the latter emphasises potential dangers and implies that international governance is essential for the survival of humankind rather than simply desirable (Biermann 1996: 431).

According to Boyle (1997: 86), the term 'common concern' implies that 'the international community has both a legitimate interest in resources of global significance and a common responsibility to assist in their protection'. Describing the concept, Kiss and Shelton (2000: 251, cited in Fitzmaurice and Elias 2005: 340) state that:

> [it] does not connote specific rules and obligations, but establishes the general basis for the international community to act, making clear that the subject matter is one of international concern. The acceptance of both the right and the duty of the international community to protect the global environment implies the need to strike a balance between international

> action and national sovereignty. In principle, proclaiming that the global environment is a matter of common concern to humanity means that actions affecting it are no longer solely within the domestic jurisdiction of states.

The term 'common concern' usually applies to global environmental challenges, such as climate change and ozone depletion, which can only be resolved through the collaboration of many States. Sustainable development was proposed by the International Law Association in 2002 as a matter of common concern; marine pollution has also been informally proposed (Biermann 1996: 426). Arguably, site contamination does not require this level of collaboration because, in an ideal scenario, domestic measures would be sufficient to deal with a problem that is largely confined to domestic borders. However, domestic measures to date have been inadequate or non-existent. Furthermore, if addressing common concerns is primarily about providing benefits common to all States, then 'collective benefits' can also be achieved by protecting certain resources located within domestic borders, such as biological diversity (Brunnée 2007: 553).

In terms of global incidence, site contamination can be described as a widespread problem among States. Despite this, it is unlikely to be accepted as a matter of 'common concern' on its own, given the narrow nature of the issue in comparison to those issues already accepted as matters of 'common concern'. However, it may be a different story for the element mostly affected by site contamination: soil. Knowler (2004: 543) notes that the issue of soil degradation is 'a [. . .] problem with global ramifications, [so] there is a clear rationale for intervention at the international level'. Fazio (2007: 6) observes, more generally, that

> Issues of global warming, soil and water pollution, nuclear waste and ozone layer depletion represent global risk factors that transcend the capabilities of States and even of regional organizations, and can only be dealt with through global efforts.

Soil protection has similar attributes to other issues of common concern, and the protection of soil as an essential resource for present and future generations would provide clear and common benefits to all States, given the high degree of humanity's reliance on soil for our existence and functioning.

There are countless different types of soil, and soil is an essential component for many ecosystems, which form the basis of biological diversity (Rio Convention on Biological Diversity 1992: art. 2). As Fitter (2005: 187) observes, soil is 'home to an exceptional diversity of organisms [. . .] Loss of soil therefore also represents loss of biodiversity, but how much is not known'. Thus the careful management of soil is key to addressing biodiversity as a 'common concern' (Council of the European Union 2002a: para 1). Yet current domestic measures for soil protection appear inadequate to prevent or mitigate further contamination (see, e.g., Hannam and Boer 2002).

Brunnée (2007: 553) notes that, 'in the case of common concerns, collective action is often quite literally required'. An example is given of all States having to cooperate, presumably through a formal international agreement, on reducing global greenhouse gas concentrations to combat climate change. Therefore, the 'common concern' concept entitles, and perhaps even requires, all States to cooperate internationally to address the concern (Brunnée 2007: 566). Significantly, climate change was recognised by the United Nations in 1988 as a matter of 'common concern', because the climate was 'an essential condition which sustains life on earth' (Biermann 1996: 430, citing U.N. Resolution 43/53). Collaborative international protection of soil could be similarly justified, although not only in relation to site contamination.

In sum, it may be possible for international organisations such as UNEP and IUCN to promote soil protection as an issue of 'common concern', if sufficient awareness of its importance to humanity and other species can be raised at the international level. If it can be widely accepted by the international community that soil protection is a matter of 'common concern' alongside climate change and biodiversity, that acceptance could be the starting point for a more concerted effort to address the issue of site contamination. Unfortunately, the requirement for much greater public awareness on the issue is likely to stall any movement towards an international treaty for the foreseeable future.

As implied above, any discussion of soil protection as a common concern is likely to be a very sensitive political issue at both the domestic and international levels, given the perceived implications for sovereignty issues and industry sectors. However, increased awareness of the need for more sustainable management of soil, and reassurances that sovereignty would not be significantly undermined, may help to overcome these problems. In relation to biodiversity, the Convention on Biological Diversity 1992 overcame similar resistance by reaffirming the principle of state sovereignty over resources, at the same time as imposing a duty on States to cooperate in the sustainable management of their resources (Cullet 2003). The principle of State sovereignty recognises the right of States to exploit their own resources pursuant to their own environmental policies, subject to the responsibility to ensure that activities within their own jurisdiction or control do not cause damage to the environment of other States (Cullet 2003).

Another factor which may hamper the recognition of soil protection as a matter of international concern, is the current emphasis within UNEP on the need for greater synergies between existing MEAs rather than the creation of new MEAs (e.g., United Nations Environment Programme 2006). This relates to a growing concern that there are too many environmental treaties focusing on specific areas, resulting in gaps, duplication and an overwhelming body of legal obligations for States. For example, in relation to soil protection, some argue that efforts would be better spent on strengthening existing soil provisions in the climate change, biodiversity and desertification treaties, and incorporating any new soil protection measures into their regimes (Hurni et al. 2006: 13).

In 2004, the secretariats of the UN Convention to Combat Desertification 1994 (UNCCD), Convention on Biological Diversity 1992 (CBD) and UN Framework Convention on Climate Change 1992 (UNFCCC) prepared a joint paper on improving synergies between the three treaties (United Nations 2004). Since then, the Secretariats and Conferences of the Parties for each of the Conventions have been working towards this goal (e.g., United Nations Environment Programme 2008: 7). For example, the strategy of the UNCCD Secretariat has involved strengthening institutional links, assessing operational options (e.g. through the Joint Work Programme with the CBD), and developing common policies and strategies (e.g., through the Joint Liaison Group: United Nations 2007).

The ‘synergy’ argument assumes that the existing treaties are capable of adequately addressing soil degradation, and that a ‘piecemeal’ approach spread over several treaties is as good as a new, comprehensive treaty dealing with all aspects of soil degradation. It is also made on the basis that new soils measures would be opposed less if they are introduced by way of amendment to existing treaties, rather than in the form of a new treaty (Hurni et al. 2006: 52). The 2005 Selfoss Declaration on the Conservation and Sustainable Use of Global Soil Resources, the outcome of a conference hosted by the International Union of Soil Sciences, called for a new international instrument on sustainable soil use, but also recognised the potential for synergy between the three main conventions (International Union of Soil Sciences 2005).

There is also a question as to whether it is appropriate to link site contamination and soil protection together at the international level, given the major differences between the two issues. They have very different causes and effects, and require their own particular regulatory approaches. For instance, soil management does not address groundwater contamination, which is an important part of the site contamination issue. If site contamination is dealt with under the same aegis as soil protection in a global instrument, countries may not recognise the important distinctions between them and regulate them accordingly. On the other hand, a pragmatic view might be that linking site contamination with soil protection is the only option with any prospect of succeeding in terms of a binding treaty.

The emphasis could be on using the soil protection issue as a springboard to gaining international recognition, and once this goal is achieved, to proceed with more targeted international action based on the merits of the site contamination issue itself. It could be clearly distinguished from soil protection at a later stage, when such distinctions are less crucial to the overall objective of motivating countries to act on the issue. Distinctions could also be made in the text of relevant international instruments, such that the importance of the issue is not undermined, but countries are alerted to the differences.

To conclude, site contamination does not fit the profile for either a common area or common heritage, and it is probably too narrow an issue to be a matter of common concern, despite its global incidence. Soil protection may eventually be accepted as a common concern, given that soil is an essential element for life and forms a component of biodiversity. In this regard, it shares similar attributes to the common concerns of climate change and biodiversity. However, to attain this status, the soil protection issue must attract much greater public awareness, and overcome the obstacles of sovereignty issues and treaty fatigue (on the latter, see Kanie 2007: 74, citing Najam et al. 2006). Arguably, it would not be an appropriate ‘vehicle’ for global action on site contamination in any case.

7.4 Examples of Recent International Regimes on Related or Similar Matters

There are already some examples of international regimes for environmental issues whose characteristics have some similarity or relevance to site contamination. Of particular interest to this book are the logistics of why, and how, these issues reached the international law-making agenda. From the examples below it is possible to draw some lessons and comparisons for an international approach to site contamination. There are both advantages and disadvantages to taking either a hard law or soft law approach, which are well illustrated by the selection of instruments reviewed here. A binding treaty on a specific issue may be upheld as a successful role model, contrary to the common assumptions that treaties are too lengthy or costly to negotiate. Likewise, a soft law initiative does not necessarily guarantee prompt action or consensus on an issue, although its function as a short- to medium-term step towards future binding measures cannot be overlooked.

The issues of chemicals, contaminants, soil protection and land degradation intersect at various levels with, or are similar to, site contamination. Their subject matters also fall within three main ‘clusters’ of treaties which have been facilitated and coordinated by UNEP, i.e. chemicals, biodiversity and the atmosphere (Andresen 2007: 429). Aspects of site contamination relate to all three clusters, although this does not necessarily mean that it would be an eligible or likely subject for international law-making.

The issues surveyed below carried sufficient weight to make it to the international agenda, a process in which scientific evidence and UNEP generally played key roles. This analysis attempts to discover what ‘global’ attributes these issues had, or how they otherwise displayed the need for global action. For these reasons, an investigation into the origins of the respective regimes may indicate firstly, what the prerequisites are for an environmental issue to attract an international response, and secondly, whether site contamination ‘has what it takes’ to do so.

7.4.1 Chemicals and Contaminants

There have been many international efforts to control, minimise or prevent the use of particular chemicals or groups of chemicals. The Stockholm Convention on Persistent Organic Pollutants 2001 (POPs Convention) has been summarised in Chap. 3 and its origins will be evaluated in more detail below. In addition, lessons will be drawn from the UNEP-mandated Strategic Approach to International Chemicals Management 2006 (SAICM), the European Community Regulation on Chemicals and their Safe Use 2006 (REACH), and initiatives to address mercury and heavy metals at the international and regional level. These include steps by the UNEP Governing Council towards international measures on mercury, and the

1998 Heavy Metals Protocol to the United Nations Economic Commission for Europe (UNECE) Convention on Long Range Transboundary Air Pollution.

7.4.1.1 The POPs Convention

The objective of the POPs Convention is to prohibit the use of a dozen particularly toxic and long-lasting chemicals (including PCBs, DDT and dioxins), by way of either immediate ban or gradual phase-out. It also aims to improve the management of POPs, reduce stockpiles and promote less toxic alternatives to the use of POPs (arts. 3, 5 and 6). POPs are highly detrimental to human health and capable of circulating globally.

The POPs Convention entered into force in 2004, following only 2 years of formal negotiations. Evidently there was sufficient concern at the international level to culminate in a binding agreement within such a short timeframe. The provisions of the agreement have since been widely endorsed by governments, industry groups and environmental organisations, despite strong debate at the negotiation stage. This high level of commitment indicates that implementation is likely to be equally widespread and supported by stakeholders (Yoder 2003: 113–114). Yoder (2003: 148, citing McGinn 2002: 75–76) has predicted that the treaty would be considered 'one of the main environmental achievements in the decade following the 1992 Rio Earth Summit'.

The mandate for an international agreement on POPs grew out of a series of separate incidents around the world in the 1970s and 1980s, involving injury or loss of life from the use of POPs, particularly pesticides (Yoder 2003: 115–116). National and regional bans on POPs soon followed in some developed countries (Yoder 2003: 122). However, regional bans had limited effectiveness, as many developing countries were not parties to the regional agreements. Therefore, POPs could still be imported to them. In addition, as it became known that POPs are easily transported across borders and continents by wind and water, the need for international regulation was clear (Yoder 2003: 117, 122–123).

Prior to the Rio Earth Summit in 1992, UNEP, the International Labour Organization (ILO) and the World Health Organization (WHO) had been collaborating on efforts to address chemicals management, through the Intergovernmental Programme on Chemical Safety (IPCS). The UN Conference on Environment and Development (UNCED) Preparatory Committee invited these organisations to identify possible intergovernmental mechanisms for chemical safety and management. In response, UNEP, ILO and WHO held a meeting of experts in London in 1991 to discuss the issue (International Institute for Sustainable Development 2010a). The meeting also discussed priority areas for an international strategy. The outcome was a recommendation, subsequently forwarded to UNCED, to establish an intergovernmental forum on chemical risk assessment and management.

At the UNCED Earth Summit in 1992, action on POPs was identified as a target in Agenda 21 (United Nations Conference on Environment and Development 1992). In particular, Chapter 19 of the Agenda contained an international strategy for action on chemical safety, and called for the creation of an intergovernmental forum on the issue. Subsequent efforts towards a binding international treaty on POPs were led by UNEP. In April 1994, the Executive Heads of UNEP, ILO and WHO convened an International Conference on Chemical Safety, at the invitation of the Swedish Government. The Intergovernmental Forum on Chemical Safety (IFCS) was established as a platform for high-level international environmental policymakers, and held its first meeting at this conference (World Health Organization 2008). According to Yoder (2003: 125), the IFCS played ‘a critical role in developing a mandate for negotiating the POPs convention’.

During the mid 1990s there were initiatives by both UNEP and IFCS to assess the global POPs problem and formulate the draft for a binding international agreement. At the 1995 UNEP Intergovernmental Conference to Adopt a Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, governments called for a global legally binding instrument on POPs (United Nations Environment Programme 1995). In 1995, the IFCS was invited by UNEP to develop recommendations on international action, including any information that would be needed for a possible decision on an appropriate international legal mechanism on POPs (United Nations Environment Programme Governing Council 1995).

In early 1997, the IFCS presented its findings to the international community at a meeting of the UNEP Governing Council (United Nations Environment Programme Governing Council 1997a Yoder 2003: 125). The final IFCS reports stated that a sufficient basis existed to recommend the development of a legally binding global treaty on POPs, and that an intergovernmental negotiating committee should be set up to negotiate it (Lallas 2000: 109). In response, the UNEP GC gave the green light to the negotiation of a binding international agreement by adopting Decision 19/13 in 1997 (United Nations Environment Programme Governing Council 1997a; Yoder 2003: 125). It established the Intergovernmental Negotiating Committee (INC) and set a deadline of 2 years for the treaty to be finalised.

The first INC meeting took place in mid 1998 and negotiations continued until 2000 (Yoder 2003: 125–126). UNEP served as temporary secretariat for the INC and provided logistical and operational support for all eight of its meetings. It also coordinated funding for the negotiations and facilitated the participation of NGOs and international organisations (Yoder 2003: 152). On the key role played by UNEP, Lallas (2001: 707) comments that ‘UNEP and many other international organizations made significant contributions that helped to move the treaty process forward’.

The participation and specific needs of developing countries arose as one of several challenging issues during the early negotiation of the POPs Convention. For instance, developing countries were more concerned about other, less toxic chemicals than the POPs identified by developed countries. Developing countries also relied on many of the POPs for agricultural and medical use, such as DDT to prevent malaria (Yoder 2003: 137). In addition, the funding and supervision of POPs reduction and elimination programs in developing countries attracted controversy. Such tensions between developing and developed countries are commonly encountered in the negotiations for any modern multilateral environmental agreement (Yoder 2003: 129). However, participation by health and environmental

NGOs enabled many issues to be resolved during the POPs negotiations because they presented a wide range of perspectives and put forward common positions (Yoder 2003: 132–133).

The INC's Rules of Procedure allowed NGOs to obtain observer status at the POPs negotiations, and thereby participate in formal meetings and side events (Yoder 2003: 133). It was UNEP's concern about lack of participation in MEAs, particularly by developing countries, that led to these 'novel' provisions. Compared with most MEA negotiations, those for the POPs Convention were seen as highly inclusive. According to Yoder (2003: 152), extensive participation by government representatives, NGOs and affected industry throughout negotiations 'can make all the difference in MEAs'.

The roles of NGOs at the POPs negotiations varied between making interventions, generating awareness, providing different perspectives and expertise, and highlighting problems among negotiators (Yoder 2003: 133). A group of NGOs came together under the name of the International POPs Elimination Network (IPEN) to present a common position on POPs, with the original aim of giving NGOs from developing countries a solid platform in the POPs negotiations. These NGOs both educated their countries' delegates about the environmental and health risks of POPs, and stated their own positions during negotiations (Yoder 2003: 133). IPEN evolved over subsequent INC meetings to include many NGOs from both developed and developing countries.

Apart from NGO participation in the negotiation process, draft provisions of the treaty were more readily accepted because scientists generally agreed on the high degree of persistence and toxicity of POPs (except for DDT) and their effects on health (Yoder 2003: 141). In addition, a cost-benefit analysis indicated that the costs of continuing to use POPs would far outweigh the benefits. After five negotiating sessions, compromises were reached on controversial issues, such as DDT, adding new chemicals to the POPs list, and funding of developing countries, so that the text of the POPs Convention was finalised (Yoder 2003: 146–147). Adoption of the Convention text was made easier because alternatives to POPs were available, industries were able to adapt to them and perhaps even benefit financially from them, and there was widespread support from all sectors for the regulation of POPs. These are particular attributes of the POPs issue which may not be comparable to other environmental issues, except ozone-depleting substances (Yoder 2003: 151).

From the above discussion, it appears there are two general factors which set the necessary conditions for a new international agreement: whether the environmental issue has particular characteristics which would invoke widespread support for international regulation, and whether strong support from the scientific community and environmental NGOs exists.

In the context of site contamination, there is clear scientific evidence of environmental damage and risks to health caused by contaminated sites, and this would provide a sound basis for any action at the international level. Indeed, some sections of the international community, particularly networks of soil scientists, have already been actively promoting global action on some aspects of site contamination relating to soil. For example, one of the 22 'commissions' of the International

Union of Soil Sciences (IUSS) is dedicated to the study of soil degradation control, remediation and reclamation (Commission 3.5). While many of these efforts have a specific focus, their combined results should not be underestimated, as they help to lay the foundations for further development of international law on soil and site contamination.

In addition, some organisations have been advocating much broader action, such as the IUCN's Commission on Environmental Law in its work towards an international framework for soil protection and model national soil legislation (Hannam and Boer 2002, 2004). Other international organisations have prepared guidelines for the national management of contaminated land (UNEP/ADEME 2005), guidelines on specific issues such as soil description (Food and Agriculture Organization 2000), and reports on various site contamination issues (e.g., remediation technologies, prevention of site contamination, large scale sites, particular industries) (e.g., North Atlantic Treaty Organization and Committee for Challenges to Modern Society 2007).

These efforts indicate that the scientific community is already proactive in the area of soil protection and, to a lesser extent, site contamination. International networks and organisations are both the instigators of, and the ongoing contributors to, an international response to soil degradation. A considerable amount of legwork has already been done and these international networks and organisations could play a vital role in raising greater awareness of site contamination, reaching consensus on related issues, and formulating treaty provisions, guidelines or codes of practice.

Some stakeholders would welcome clearer regulations for site contamination, such as NGOs, developers and site contamination consultants. However, the lack of widespread public awareness of the issue, particularly in developing countries, may present an obstacle. In the absence of local political pressure, governments would need to be persuaded of the need for collaborative, international measures against site contamination. This is a role likely to be played by the scientific community and international organisations, together with a Secretariat dedicated to the issue. Tension may also arise between developed and developing countries, as the latter are likely to have different priorities, and may not see site contamination as a pressing problem if they have had little experience of it themselves.

7.4.1.2 Strategic Approach to International Chemicals Management (SAICM)

SAICM is an international policy framework (i.e., 'soft law') which was developed to promote the sound management of chemicals, in accordance with the goal set down in the 2002 Johannesburg Plan of Implementation (United Nations 2002). The idea was endorsed in early 2002 by UNEP at the 7th Special Session of the Governing Council and Global Ministerial Environmental Forum. This endorsement was itself based on the Bahia Declaration and the Priorities for Action Beyond 2000, adopted 2 years earlier (Intergovernmental Forum on Chemical Safety 2000).

However, a possible international approach to chemical management had been discussed in various forms by UNEP since 1995 (International Institute for Sustainable Development 2003: 1).

The draft texts of SAICM were developed over three meetings of the Preparatory Committee, held between 2003 and 2005. Negotiations stalled at the Third PrepCom meeting, in 2005, over key provisions on financing and capacity building. To achieve consensus on the three draft SAICM documents, and resolve the issues of financial and technical assistance, the PrepCom set up a multi-stakeholder body, the International Conference on Chemicals Management (ICCM). These goals were subsequently achieved at the ICCM conference in 2006, where all three texts were adopted. SAICM now comprises the following non-binding documents: the Dubai Declaration on International Chemicals Management, an Overarching Policy Strategy, and the Global Plan of Action (UNEP 2006a, b, c).

The Dubai Declaration (2006a: 4, paras 5–6) provides the basis for taking international action on chemicals, noting that despite significant efforts to date,

> Progress in chemicals management has not [. . .] been sufficient globally and the environment worldwide continues to suffer from air, water and land contamination, impairing the health and welfare of millions [. . .]
>
> The need to take concerted action is accentuated by a wide range of chemical safety concerns at the international level, including a lack of capacity for managing chemicals in developing countries and countries with economies in transition, dependency on pesticides in agriculture, exposure of workers to harmful chemicals and concern about the long-term effects of chemicals on both human health and the environment[.]

The Overarching Policy Strategy (2006c: sect. I, para 1) addresses the topics of risk reduction, knowledge and information, governance, capacity-building and technical cooperation, and illegal international traffic in chemicals. It encompasses the environmental, economic, social, health and labour aspects of chemical safety, as well as agricultural and industrial chemicals, with a view to promoting sustainable development and covering chemicals at all stages of their life-cycle (sect. II, para 3). Although the Policy is directed at the management of all chemicals, it identifies POPs, mercury and others as 'chemicals of global concern' (Pt. IV, sect. A, para 14(d)(i)).

The Global Plan of Action (2006b: paras 6–7) sets out guidelines for stakeholders to implement sound chemical management procedures, and enables them to measure their efforts against a benchmark so as to identify any gaps for improvement. The Plan specifies possible work areas and associated activities, actors, targets and timeframes, indicators of progress and implementation, for each of the five objectives set out in the Overarching Policy. Promoting the remediation of contaminated sites is identified as one of several 'global priorities' on which it is 'critical for all stakeholders to take appropriate cooperative action' (para 8(l)).

It has been noted that, while SAICM is a global policy, it focuses more on developing countries and those with economies in transition, where the need for regulation is greatest (Center for International Environmental Law 2006). It clearly comprises non-binding goals and guidelines, but its appeal to stakeholders in chemical management is intended to lie in the inclusive nature of its development and its broad scope. The lesson to be drawn from SAICM, for an international approach to site contamination, is that consensus can be reached on an international policy framework through broad participation with all relevant stakeholders, and that vested interests are more likely to accept this process than a formal treaty.

The hazards of chemicals to human health and the environment are generally well understood, and already have a high profile at the local and national level, at least in many developed countries. If a similar level of public awareness and political will could be reached in the context of site contamination, and if wide participation were ensured, the prospects for a soft law instrument on site contamination would be good. The challenges for international management of chemicals are similar to site contamination in that developing countries have little or no framework in place to address the issue. It also requires a multi-level and multi-sectoral approach, targeting the various stages of chemical production and use, and the producers and users themselves. Indeed, some aspects of chemicals management would affect contaminated site management to an extent, and this link is recognised in the abovementioned provisions in SAICM relating to site remediation.

7.4.1.3 Regulation on Chemicals and Their Safe Use (REACH)

The foundations for a Europe-wide approach to chemical safety were laid in 2001, when a new system was proposed for assessing and registering chemicals on a gradual, case-by-case basis (European Commission 2001). The new approach was a response to perceived gaps in four EU chemicals directives, and the need to do more to protect public health and the environment. It was also designed to help fulfil the EU's obligations under SAICM. The new Regulation on Chemicals and their Safe Use (REACH) was finalised and entered into force in 2007. It is now binding on all EU Member States, and all aspects of its implementation are coordinated by the European Chemicals Agency (ECHA) in Helsinki.

REACH places the onus on manufacturers and marketers of chemicals to prove the safety of their products for humans and the environment, leaving regulators to focus on industry compliance and the most hazardous chemicals (European Commission (Environment Directorate-General) 2007). Manufacturers must have adequate information and risk management strategies in relation to their particular chemicals. The manufacture and use of particularly hazardous chemicals needs to be specially authorised, or even prohibited if sufficiently dangerous, by regulators. Information on chemicals is shared between manufacturers and 'downstream' users, and chemicals are to be classified and labelled consistently.

The new regulation has been promoted as the most comprehensive approach to chemicals in European history, replacing some 40 separate, uncoordinated pieces of legislation with one. It contains detailed annexes on procedures for registration, evaluation, authorisation and classification, and for several other matters. Chemical manufacturers and marketers will now have financial and legal incentives to ensure the safe production and use of their chemicals, and minimise their adverse impacts on people and the environment. For other stakeholders, such as governments and community groups, REACH is intended to provide practical guidance on how to use and dispose of chemicals safely.

REACH provides some insights with respect to a possible international approach to site contamination. Placing the burden of compliance on the manufacturers of chemicals may be similar to making contaminated site owners responsible for investigation, assessment, remediation and monitoring of their sites. The mainly supervisory role of regulators, together with their powers to authorise certain uses or activities, would be similar. There is a life-cycle approach to chemicals in REACH, which could be broadly emulated for site contamination, addressing the contaminants from the earliest possible stage until post-closure, and until they no longer pose a threat. Significantly, there are signs that REACH is beginning to have an indirect impact on domestic chemicals legislation outside of Europe. In some Asian countries, such as China, Japan and Korea, legislators are voluntarily emulating similar standards to those in REACH, in an effort to fill perceived 'regulatory gaps' (Park et al. 2008).

7.4.1.4 Mercury

Since 2003, there have been discussions within UNEP on the need for an international approach to mercury, in addition to regional and national measures. At its 22nd Session, and based on its consideration of the Global Mercury Assessment report, the UNEP Governing Council (2003) concluded that there was

> sufficient evidence of significant global adverse impacts from mercury and its compounds to warrant further international action to reduce the risks to human health and the environment and [. . .] that national, regional and global actions, both immediate and long-term, should be initiated as soon as possible.

UNEP was particularly concerned about the 'deleterious impacts on human health and the environment attributed to mercury and its capacity for global transport/cycling' (UNEP Governing Council 2003). It also felt compelled to take action in accordance with the Plan of Implementation adopted by the World Summit on Sustainable Development. In 2005, the Global Mercury Partnership was created by UNEP to promote voluntary partnerships between public and private sector stakeholders to minimise mercury releases. The UNEP Governing Council, in a joint session with the Global Ministerial Environment Forum (GMEF), also reiterated the need to assess whether further voluntary measures or a legally binding instrument were appropriate to address the global effects of mercury (UNEP Governing Council and Global Ministerial Environment Forum 2005).

In 2007, there were calls for the existing Global Mercury Partnership to be strengthened, and recognition by UNEP at its 24th Session that further long-term international action on mercury was required (UNEP Governing Council and Global Ministerial Environment Forum 2007). Once again, the Governing Council called for a review of the options, both voluntary and binding. However, delegates at the 24th Session were unable to agree on whether a commitment should be made to a binding agreement on mercury (International Institute for Sustainable Development 2007: 1).

In the meantime, it was decided that a ‘two-track’ approach would be followed, allowing UNEP to pursue voluntary measures while considering a possible future binding instrument. The UNEP GC established an ad hoc open-ended working group (OEWG) to assess both of these options in more detail, including the likely costs and procedures associated with each (International Institute for Sustainable Development 2007).

There has been opposition in the past by several developed and developing countries to the prospect of a legally binding agreement on mercury for a few reasons. One argument, made at the OEWG’s first meeting in 2007, was that there is insufficient scientific information on the effects of mercury (International Institute for Sustainable Development 2007). The United States, Australia, Canada, India and China were at the forefront of this position and favoured voluntary measures, particularly partnerships.

Another argument, made early on by the United States, was that conventions are costly to negotiate, even costlier to implement, and would take too long for an issue that requires immediate action. It is likely that concerns about the impact on domestic industry of a binding mercury agreement underpinned the formal positions taken by countries like the US, Australia and Canada, which have strong industry lobbies (Selin and Selin 2006: 265).

However, by the 25th Session of the UNEP GC in 2009, most countries seemed to have accepted the prospect of a binding international instrument (International Institute for Sustainable Development 2010b: 4). A decision was made at that meeting to proceed with preparing a binding global agreement on mercury (UNEP Governing Council and Global Ministerial Environment Forum 2009). This is in part due to the complete reversal by the United States of its opposition to a mercury treaty shortly before the meeting, reflecting a change in political leadership (see Greer 2009). The United States subsequently took on a leadership role in negotiations at the 25th Session, helping to change the views of formerly resistant countries such as China.

The consensus reached at the 25th Session of the UNEP GC can also be attributed to an increased public awareness of the effects of mercury, in particular due to the sustained efforts of both the UNEP GC and the GMEF. For example, between 2003 and 2005, UNEP organised several awareness-raising workshops and prepared guidance and training manuals in relation to mercury (Selin and Selin 2006: 264). These factors combined to generate sufficient pressure for international action on mercury, although arguably the prospects would not have looked so positive without the support of the United States.

In mid 2010, the first of five meetings of the Intergovernmental Negotiating Committee to Prepare a Global Legally Binding Instrument on Mercury took place. Three different options for the structure of a binding instrument were put forward: (1) control measures (within a convention) plus annexes; (2) convention plus protocols; and (3) an umbrella agreement with annexes. Views were exchanged by delegates as to possible key elements, although the meeting 'did not delve into the nuts and bolts of instrument design' (International Institute for Sustainable Development 2010b: 11). It was noted that 'although differences of opinion were clearly evident, negotiations were deferred to INC 2, where, many predicted, "knives will be out"' (International Institute for Sustainable Development 2010b: 11).

It is envisaged that a mercury treaty would include both binding and voluntary provisions, as well as interim activities to reduce risks to human health and the environment (International Institute for Sustainable Development 2010b: 11). Final preparatory work on the international instrument is to be completed by the 27th Session of the UNEP GC in 2013.

The lessons that may be drawn from international developments on mercury over the past decade are that, unless the scientific basis for action is widely accepted, and until there is some consensus as to the best way forward, a binding agreement is unlikely to eventuate. The active participation and leadership of a powerful country such as the United States during the early negotiation phase is also a crucial factor. The decision made at the 25th Session of the UNEP GC to endorse the idea of a global instrument and establish the INC to work towards this goal was a major step forward. Within a relatively short timeframe, a binding instrument on this issue has become a much more likely prospect.

A proposal for an international treaty on site contamination is likely to face similar resistance and apathy, perhaps even more so because its potential impacts would be seen by opponents as wider-ranging. Many countries, particularly developed countries with 'site contamination' laws or policies already in place, or with vocal industry lobbies, are likely to favour a voluntary international approach to site contamination if a choice of instruments is put forward. So too are developing countries where site contamination is not a high priority or well understood by political leaders. This could prove to be one of the greatest challenges for proponents of a treaty on site contamination, should the issue even make it onto the international agenda.

7.4.1.5 Heavy Metals in General

In 1998, parties to the UNECE signed a Heavy Metals Protocol to the 1979 Convention on Long Range Transboundary Air Pollution (UNECE 1998). Essentially, the Protocol aims to prevent or minimise the release of heavy metal compounds into the atmosphere, so as to reduce their global circulation and subsequent harmful impacts on human health and the environment. The Preamble of the Protocol acknowledges that some UNECE member countries are 'economies in transition', requiring particular assistance in meeting their obligations.

More recently, there have also been efforts to reduce the use of heavy metals at the global level. In 2006, a side event to the Fifth Session of the Intergovernmental Forum on Chemical Safety (IFCS) discussed the need for global action on heavy metals generally, including lead, cadmium and mercury. Justifications for global action included the serious risk posed by heavy metals to human health and the environment, the difficulties faced by developing countries and those with economies in transition in addressing heavy metals, and the inadequacy of unilateral actions (International Institute for Sustainable Development 2006: 1). While the use of heavy metals has declined in developed countries in the past decade, it has increased in developing countries because of growing urbanisation and a greater reliance on industrial processes.

At the IFCS side event, there was disagreement as to whether a formal international approach to heavy metals was justifiable. While some participants called for a framework convention on heavy metals, others argued that it would be inappropriate because there was no clear evidence of heavy metals being carried long distance by air. In relation to lead, it was noted that product standards were not uniform among countries, and that national policies on chemical safety should be developed (International Institute for Sustainable Development 2006). There was discussion as to promoting good practices on heavy metals globally.

The outcome of these discussions was the Budapest Statement on Mercury, Lead and Cadmium, in which the participants urged the UNEP Governing Council to both strengthen voluntary actions on heavy metals and to 'give high priority to considering [...] measures, as appropriate, on lead and cadmium, [...] including the possibility of establishing a legally binding instrument' (Intergovernmental Forum on Chemical Safety 2006: paras 14–15). The IFCS also encouraged the ICCM, working within the SAICM framework, to consider actions at the local, national, regional and global levels for mercury, lead and cadmium, and to take into account any subsequent decisions by the UNEP Governing Council in this regard (para 19). It particularly emphasised the needs of developing countries in addressing heavy metals, and their important role in global efforts.

At its 24th Session in 2007, and taking into account the Budapest Statement, the UNEP Governing Council noted the current information gaps on lead and cadmium and called for these to be addressed before further measures were taken (UNEP Governing Council and Global Ministerial Environment Forum 2007). In the meantime, governments were encouraged to reduce risks from lead and cadmium throughout their life cycle, and to contribute to an inventory of risk management strategies being compiled by UNEP. Given these delays, a binding international agreement on heavy metals is unlikely to materialise in the near future, despite the evident need for action.

There are similarities between the justifications for global action on heavy metals and on site contamination. Contaminated sites also pose a serious risk to human health and the environment, present developing countries with particular challenges, and are not adequately managed by the various approaches taken by individual countries. Unlike heavy metals, site contamination does not circulate globally, although it occurs in many places around the world, occasionally across political borders. Also in contrast to heavy metals, as yet there has been little recognition of the site contamination issue at the UNEP GC level, which could lead to a decision, nor any signs that UNEP is currently showing leadership in this area.

7.4.2 *Soils/Degradation*

7.4.2.1 International Level

At present, there is no binding global agreement on soils. As Wyatt (2008: 192) observes, given the large number of existing multilateral environmental agreements that touch on aspects of soil management, it would be easy to conclude that the issue is, overall, addressed quite comprehensively. However, she notes (2008: 192), 'despite its overlap with many soil functions, [...] the hodgepodge of legal instruments actually ignores many important technical, social, and economic aspects of soil protection.' Wyatt and others contend that, even if the soil provisions of existing environmental treaties were strengthened, many aspects of soil protection would remain unaddressed (see, e.g., Hannam and Boer 2002).

Since the late 1990s, there have been various calls for action on soils at the international level (see, e.g., Held et al. 1998). The work of the IUCN's Commission on Environmental Law has contributed greatly to the discussion of a potential new international instrument on soil. In 2002, the Commission on Environmental Law published a detailed review of national and international measures relevant to soil, identifying gaps and inadequacies, and outlining the options for a new international instrument (Hannam and Boer 2002). The report by Hannam and Boer (2002: 81) noted that, since UNCED in 1992,

> there has been an increasing realisation within the soil science community, and related groups, that a new ecologically-focused international environmental law instrument will be a critical component of the strategic plan for sustainable soil management into the 21st century.

Among the seven actions recommended in the 2002 report were the preparation of a 'generic' national soil law and a draft international instrument on soil (Hannam and Boer 2002: 87). In 2004, the former requirement was achieved with the publication by the IUCN of guidelines for drafting national legislation on soils (Hannam and Boer 2004).

On the basis of the work by the Specialist Group on the Sustainable Use of Soil and Desertification (SGSS&D), the 2004 World Conservation Congress (WCC) in Bangkok acknowledged that 'a specific global environmental law instrument for the sustainable use of soils is now justified' (World Conservation Congress 2004: 85). The WCC adopted a resolution mandating the preparation by IUCN of options for, and guidelines and materials in support of, a global legal instrument on soils (Resolution 3.072 on Legal Aspects of the Sustainable Use of Soils). The 2005 Selfoss Declaration, adopted by the IUSS, also supports the continuation of the IUCN work (International Union of Soil Sciences 2005).

In 2008, the Barcelona WCC reiterated the need to continue work on finalising the various options for a global soils instrument and on promoting implementation of the guidelines on domestic soils law (World Conservation Congress 2008: Resolution 4.093). Two draft versions of an international 'protocol' on sustainable use of soils have now been prepared by the SGSS&D under the auspices of the

IUCN Commission on Environmental Law (Boer and Hannam 2011: 6). These are currently being circulated for discussion within the international soil science and environmental law communities.

Both of the draft instruments proposed by the SGSS&D are designed as protocols to existing international environmental treaties. A preference for this type of instrument was expressed by the international soil science and environmental law communities during lengthy discussions (Boer and Hannam 2011: 6). It was considered that the soil protection provisions contained in existing treaties are currently not being implemented to their full potential, and that this should influence the choice of a global instrument for soil (Boer and Hannam 2011: 4).

The first instrument put forward by the SGSS&D, the Draft Protocol for the Protection and Sustainable Use of Soil (IUCN 2005), comprises a proposed protocol to the Convention on Biological Diversity. The second instrument, the Draft Protocol for Security and Sustainable Use of Soil (IUCN 2009), comprises a draft protocol to the UN Convention to Combat Desertification (Boer and Hannam 2011:2). The second option is the one preferred by Boer and Hannam (2011: 7), on the basis that UNCCD does not yet have an accompanying protocol, unlike the CBD. In addition, a soils protocol would arguably help overcome many of the inefficiencies from which UNCCD has suffered since its entry into force. One criticism in particular has been that UNCCD 'has failed to provide guidelines to the Parties on the types of domestic legislative frameworks required to manage their national responsibilities' under the Convention (Boer and Hannam 2011: 7).

Key practical elements of the Draft Protocol for Security and Sustainable Use of Soil would include the following (Boer and Hannam 2011: 8–9 and Appendix 2): provisions on national legislation for sustainable soil use (art. 8); requirements for National Focal Points (art. 10), and national authorities on soil where they do not already exist (art. 16); international information exchange (art. 19); and a financial mechanism to assist developing countries to combat land degradation (art. 38). Other important features include provisions on public participation and awareness (Part VIII), the identification of threats to soil (Part XI), and liability and redress (Part XIII). Part XI may be of particular relevance to site contamination, which would be identified as one of several processes threatening the sustainable use of soil.

Boer and Hannam (2011: 5) are clear in their message that an international instrument on soils is overdue:

> Protective action is urgent: there is a general realisation that the world community must take action sooner rather than later to more adequately protect soils in national and international environmental law regimes, as an integral part of the overall framework of environmental law, policy and management.

At the 2011 Worldwide Conference of Environmental Law NGOs and Lawyers, Boer and Hannam (2011: 9) recommended that the 2012 World Conservation Congress should call for the urgent negotiation and drafting of a global legal instrument on soil by the community of nations, and that the Draft Protocol for Security and Sustainable Use of Soil should be promoted to the United Nations

Conference on Sustainable Development (Rio + 20 Conference) in 2012 as the preferred instrument.

In September 2011, the SGSS&D issued a 'common statement' urging the Rio +20 Conference to 'recognise that a coordinated global science and policy and legal approach is [...] required to ensure that soils are used, managed and restored according to principles of ecosystem resilience', and to prepare a comprehensive global report on the state of the world's soils at the earliest opportunity (Specialist Group on Sustainable Soils and Desertification 2011). Despite these efforts, it does not appear that a draft soil protocol was considered at Rio + 20, and it is unclear how the matter will be pursued further at the international level.

Overall, the international scientific community has been proactive in its discussions of soil degradation and remediation, exploring the different approaches taken by individual countries, exchanging expertise, putting forward position papers on a wide range of issues, and working on more technical aspects such as soil assessment and analysis. Even relatively small but prominent groups of soil scientists have come together to propose a global instrument for soil, as the Tutzing group did in the late 1990s, thereby instigating broader discussion among the international soil community in a 'ripple effect' (Held et al. 1998).

Academic commentators also support the introduction of an international legal regime for soil protection. For example, according to Wyatt (2008: 192),

> While nations clearly can and should develop soil protecting laws and policies, even absent the spur of international action telling them to do so, an adequate international legal regime is important to bring about national and sub-national actions in several ways.

Wyatt (2008: 192–193) outlines the four main justifications for a dedicated international regime for soil as follows:

> First, without prominent international environmental action specifically and comprehensively focused on soil and its interrelated functions, the visibility of the issue is much lower and countries have less incentive to act. [...] Second, even if soil issues were to significantly rise in visibility, such as through the efforts of the IUCN, UN bodies, and soil science institutions, countries would still refrain from making some substantial efforts because of collective action problems. [...] Third, international environmental law can be essential for financing soil protection efforts. [...] Fourth, comprehensive international environmental law regimes seem to create international pressure for participation and genuine action in a way that, say, non-governmental organizations' (NGOs') promotion of an issue cannot.

All of these justifications and observations would be equally valid for the issue of site contamination, and they have important ramifications for any consideration of which avenue to pursue for international action, as discussed in Sect. 7.5 and Chap. 8 below.

7.4.2.2 Regional Level – The Draft European Soils Directive

The draft European Soils Directive (European Commission 2006) is the first EU-wide proposed regulation specifically for soil. In the years since the draft EU Soils Directive was released, its progress has been marked by controversy and uncertainty. At the December 2007 session of the European Council, the draft Directive was rejected by several EU countries, and failed to attain the qualified majority it needed to progress further (Council of the European Union 2007). This was despite an endorsement of the draft Directive by the European Parliament in November 2007. In addition, the wording of the draft Directive presented to the EU Council had already been significantly altered by the European Parliament, reducing its impact and giving Member States the choice whether or not to enact the most stringent, 'optional' provisions in the legislation.

The main objections to the draft Directive were that it breached the subsidiarity principle; that it would impose extra administrative and cost burdens on governments and businesses; and that it would duplicate existing national legislation (see, e.g., Group of the European People's Party and European Democrats 2008). The latter objection was made by the countries that already have specific legislation on soil protection or site contamination, such as the Netherlands, United Kingdom, Austria and Germany.

Under EU law, the principle of subsidiarity states that the European Union must not take action (except in the areas which fall within its exclusive competence) unless it is more effective than action taken at national, regional or local level (Treaty of the European Union 2008: art 5). In addition, any action by the EU should not go beyond what is necessary to achieve the objectives of the Treaty. Van Calster (2004: 16) contends, for example, that any proposed soil standards within the draft Directive would be unlikely to pass the subsidiarity test. Following the rejection of the draft Soils Directive, one Member of the European Parliament, Hartmut Nassauer (quoted in Group of the European People's Party and European Democrats 2008) said:

> We need effective soil protection. But the issue has to be dealt with at [the] national level. Soil is a medium with no cross-border dimension and varies a great deal in the different regions. So it is a local issue which falls within the competence of the Member States. A European Directive would be in breach of the subsidiarity principle, a main provision of the EU Treaties.

Most Member States were in favour of the draft Soils Directive, even if numbers were insufficient to allow it to pass in December 2007. Support was particularly high among the newer Member States, who saw the Directive as bringing environmental benefits (Department for Environment, Food and Rural Affairs (UK) 2007: 31–32). But there was also support during the negotiation phase from within Member States, such as the United Kingdom, which ultimately rejected the Directive.

Papanicolaou (2007: 100) commented that, at least in the context of the planning and contaminated land regimes of the United Kingdom, 'the contaminated land provisions [in the Directive] . . . do not seem to raise any particular concerns, and are welcomed by those involved in the land-remediation technologies sector.' While provisions such as mandatory soil status reports may be opposed by commercial organisations, he commented, the benefits of earlier remediation and a full inventory of sites would outweigh such arguments (Papanicolaou 2007: 100). At a stakeholder workshop convened by the UK Government, it was noted that 'the overall feeling of the delegates was that the intention to protect soils and remediate damaged soils was welcome', although concerns were raised about many 'unworkable' provisions in the Directive (Department for Environment, Food and Rural Affairs (UK) 2007: 31).

Despite some positive signs, the UK Government opposed the draft Directive following a series of public consultations, stakeholder forums and a regulatory impact assessment (Department for Environment, Food and Rural Affairs (UK) 2008: 4). In the public consultation undertaken by the UK Government in 2007, responses to contaminated land questions were dominated by industry. The general view of industry was that the draft provisions were 'far too restrictive and burdensome and a more risk-based approach should be followed' (Department for Environment, Food and Rural Affairs (UK) 2008: 3). Some called for the contaminated soil provisions 'to be dropped from the Directive altogether' (Department for Environment, Food and Rural Affairs (UK) 2008: 56). As a result of its overall consultation and assessment process, the UK Government decided that it could not support the draft Directive without amendments to bring it into line with the principles of better regulation and subsidiarity and unnecessary administrative burden and disproportionate costs (Department for Environment, Food and Rural Affairs (UK) 2008: 57).

Following the rejection of the draft Soil Directive by the European Council in late 2007, the French EU Presidency and the European Commission indicated in mid 2008 that they intended to revive it (EurActiv 2008). The text of the draft Directive was substantially watered down by the French Government in the hope that it would attract favour from industry groups and the Member States opposing the Directive (Council of the European Union 2008). This bid failed, and was followed in early 2009 by another unsuccessful attempt to revise and reintroduce the Directive, this time by the Czech Republic Presidency (Council of the European Union 2009). Once again, there was insufficient support within the European Council for the matter to proceed (ENDS Europe 2009). Spain, which took over the EU Presidency in mid 2010, issued its own early draft of the proposed Directive, and it was likewise rejected by the key Member States. The future prospects of the draft Directive remain very uncertain (European Commission 2012).

The lessons from the troubled experience of the European Soils Directive, in the context of site contamination, are that: considerable opposition from businesses and governments is likely and needs to be overcome; countries are likely to resist further commitments when they already have existing laws on a subject; the benefits of the new legislation need to be clearly spelled out, particularly where countries do have similar legislation in place; and a lack of public awareness of an issue may contribute to its failure on the legislative agenda.

A distinctive feature of the European efforts to formulate a framework for soil protection is the existence of several organisations and networks with a strong interest in the issue. These groups, such as the Common Forum on Contaminated Land, the European Environmental Bureau and the Network for Industrially Contaminated Land in Europe (NICOLE) are mainly comprised of experts within government, academia and industry. They have ongoing discussions, hold conferences, exchange information, put position papers to European Parliament committees and other bodies, issue press releases, and perhaps most importantly, present a consensus on certain aspects of soil protection. Their participation may well be vital to not only the adoption of the draft Protocol, but to its subsequent implementation and future prospects. It may also help explain the proposal for a regional framework for soil protection even though there is no existing global equivalent.

In theory, if the draft European Soils Directive were to be successfully revived and become law, it could be one major factor that eventually helps push soil protection onto the international agenda. It has been noted (Drumbl 2007: 8) that the European Union is

> Undoubtedly the most influential supranational entity in matters of international environmental law [. . .] Its administrative, diplomatic, and juridical apparatus have made it a trendsetter in matters of international environmental law-making.

However, in the meantime the setbacks for this regional initiative on soil do not bode well for the prospects of an 'umbrella' treaty on soil at the international level.

7.4.2.3 Desertification

The United Nations Convention to Combat Desertification (UNCCD) entered into force in 1996 after 4 years of negotiations. It followed the failure of an international, voluntary Plan of Action on Combating Desertification, which had been initiated by the United Nations in 1977 (United Nations United Nations 1977, 1984). Calls for a new, integrated approach to desertification were made at the 1992 UN Conference on Environment and Development, and emphasis was to be placed on action at the community level. UNCCD addresses desertification and the degradation of dryland areas, a 'major economic, social and environmental problem of concern to many countries in all regions of the world' (UNCCD Secretariat 2012).

UNCCD notes in its preamble that 'desertification and drought are problems of global dimension in that they affect all regions of the world and that joint action of the international community is needed to combat [them]'. However, the success of UNCCD in addressing desertification and its causes has been questioned in the years since it entered into force. It has been hampered by political and scientific disagreements, particularly over funding and the definition of 'desertification' (see, e.g., Boer and Hannam 2003: 152; UNCCD Conference of the Parties 2007: para 2).

While the objective of UNCCD is to prevent and reduce land degradation, its definition of 'land degradation' applies only to arid, semi-arid and dry sub-humid areas. These are areas which are particularly vulnerable to desertification, so the narrower definition is justified in the context of the Convention's focus on that issue. Suggestions that UNCCD could be extended to other forms of land degradation have not yet led to any substantial changes to the Convention, although the 10-Year Strategy for 2008–2018 envisages them. The 8th Conference of the Parties recognised in 2007 that circumstances have changed since the Convention was negotiated, with new causes and effects of land degradation and desertification emerging. The Strategy is designed to meet these challenges and promote the global goals of sustainable development and poverty reduction.

In 2009, it became evident at the 9th Conference of the Parties to UNCCD that strengthening or extending the scope of the Convention will be no easy task. As has been characteristic of the UNCCD since its earliest days, negotiations at COP9 were constrained by political divisions and a reluctance by delegates to reach a consensus on many important issues. As observers (International Institute for Sustainable Development 2009: 16) noted,

> Another underlying tension that remains unresolved is whether [UNCCD] should seek a global mandate to address land degradation or keep its focus on arid lands and Africa. Until participants have a shared approach, and until institutions within the Convention can devote 100% of their time to issues that are relevant to the objectives of the Convention, its impacts will remain elusive [. . .]

In sum, although UNCCD is a major environmental convention, it lacks the validity of strong scientific backing, widespread political support and significant funding. It appears to have lost direction since its inception, and motivation to achieve its objectives has been low in recent years. Many signatories, particularly developed countries, seem to have no or minimal interest in either implementing its provisions or expanding the Convention to address other issues related to land degradation. These problems may be overcome by the adoption of the Draft Protocol for Security and Sustainable Soil Use, which is promoted by the SGSS&D within the IUCN's Commission on Environmental Law (Boer and Hannam 2011). As discussed above, the Draft Protocol could help to overhaul and revive UNCCD to make it more relevant and effective. However, the proposed Protocol is still in the early stages of discussion and its prospects are difficult to gauge.

The experience of UNCCD to date serves as an important reminder for any efforts to address site contamination at the international level that, if a binding instrument is the chosen approach, it should be carefully tailored, as specific as possible, have maximum scientific and political support, strong compliance provisions and a secure funding mechanism.

7.4.3 The Key Role of UNEP in Initiating New International Agreements

The above survey of the origins of the POPs Convention, other chemicals instruments and UNCCD highlights the key role played by the UNEP Governing Council in facilitating the creation of new MEAs (see also Drumbl 2007: 7).

The role of UNEP as the 'leading global environmental authority that sets the global environmental agenda' was formally recognised in the 1997 Nairobi Declaration (United Nations Environment Programme Governing Council 1997b). UNEP is viewed as having been particularly successful in establishing treaties in three major 'cluster' areas: biodiversity, chemicals and atmosphere. Andresen (2007: 428) observes that

> Typically, scientists had warned about these problems, but UNEP (with other international agencies) played a key part in translating their findings and sharpening the policy focus. UNEP often also played a key role in brokering and facilitating subsequent negotiations.

UNEP carries out its facilitating and coordinating role in several ways, by: allowing new environmental issues to be discussed and promoted at high-level meetings; making resolutions on these issues if sufficiently persuaded of their importance; funding and convening subsequent conferences at the regional and international level to raise awareness and gather expertise; setting up ad hoc working groups to identify and discuss relevant sub-issues; setting up preparatory committees and secretariats to coordinate the MEA negotiations; and funding the final negotiation process.

An understanding of the process by which individual environmental issues are brought to the attention of the UNEP Governing Council, and subsequently promoted to the GC agenda, is critical to any efforts to promote an international instrument on site contamination. It usually takes at least one major international NGO (in relation to soil, this could hypothetically be the International Union of Soil Sciences, or the International Union for the Conservation of Nature) to lobby persistently for international action, perhaps over a period of several years, to convince the UNEP Governing Council of the importance of an issue. The pressure group would need to have clear scientific evidence to support their argument for urgent action, and there should be consensus on the urgency of the issue.

Once a decision is made by the UNEP Governing Council to commence negotiations on a particular issue, it usually makes some funding available and either designates an existing secretariat to oversee the process, or establishes a new body to do so. For example, the POPs Convention Secretariat served as the interim SAICM Secretariat during the negotiation process until a new one was formally established by the Convention itself (Wiser and Magraw 2005: 4). It is even possible, although rare, for a major international NGO to serve as the permanent Secretariat, as the IUCN does for the Ramsar Convention on Wetlands of International Importance (United Nations 1971).

During treaty negotiations, UNEP commonly provides the necessary facilities, staff and logistical support, together with training and funding for delegates from developing countries. Once formal negotiations are concluded, and an official Secretariat is designated, funding is dealt with under the relevant treaty provisions, and is provided either by donor countries or by a mechanism such as the Global Environment Facility (GEF). The GEF currently provides funding for programmes and projects related to land degradation, biodiversity, and POPs, among other issues (Zovko 2005: 127). There may be alternative or additional avenues of funding, which the Secretariat will be tasked with locating and securing, such as specific programs within international organisations (e.g., the UN Development Programme, or UNDP).

7.4.4 Conclusions

Overall, a comparison between all of the hard law and soft law initiatives above leads to a conclusion that a specific issue may have the greatest likelihood of reaching the international law-making agenda when public awareness of the problem is high, the underlying science is clear and the need for action is widely accepted. Already it is evident that global and regional initiatives on soil are making slow progress in the face of apathy from the international community and staunch opposition from the industry sector, respectively. Likewise, fundamental problems with the Desertification Convention have so far rendered it largely ineffective, and may undermine any future expansion of its scope. However, the experience of both the POPs Convention and the global mercury initiative highlights how it is possible for a specific issue to be elevated to the international agenda with adequate support and for major differences in viewpoints to be overcome during negotiations.

7.5 The Appropriate Form of an International Instrument

Devising the appropriate form of an international approach to site contamination is a key factor in achieving a successful outcome. The approach that has the best prospects of motivating governments to address site contamination at the national level, whether it is hard law or soft law, is to be preferred. The advantages and disadvantages of both hard law and soft law options need to be explored and compared. Factors that need to be carefully considered include the length and cost of negotiations for an agreement, prospects for compliance, political will, and other potential obstacles to domestic implementation.

There are several options for an international response to site contamination, ranging from soft law in the form of declarations or resolutions, to hard law options, such as a comprehensive treaty or a framework treaty. A comprehensive treaty would address all aspects of site contamination, without the need for further elaboration by protocol, and would be self-sufficient with its own compliance mechanisms. By contrast, a framework treaty would be supported by a subsequent, more detailed protocol. Generally, soft law includes high-level resolutions, declarations and sets of principles. It is possible to combine a hard law and soft law approach, for example by making a high-level declaration on an issue for the short term and working towards a binding treaty in the longer term. It is also necessary to consider whether an international or a regional approach would be more appropriate.

7.5.1 A Binding International Instrument

The justifications for a new, binding international regime for site contamination are identical to those given in support of a global treaty on soil protection (Wyatt 2008: 192–193). As already mentioned above, the visibility of the site contamination issue is, as for soil degradation, very low. Comprehensive, targeted international action is needed to raise awareness of site contamination and motivate countries to act. If many countries act together to introduce site contamination measures, there will be a sufficient 'collective action' incentive. Under a dedicated instrument, the costs of these new measures for developing countries—which would otherwise be prohibitive—could be compensated by developed countries, which in turn could benefit from the 'spillover effects' of good site contamination management (Wyatt 2008: 193). Such 'spillover effects' could, for example, include an improved market for remediation and other professional services, and a reduction in the risk of transboundary site contamination. Lastly, and importantly, a binding global regime may create greater international pressure for action than the combined efforts of the international community of non-government actors (Wyatt 2008: 193).

The most ambitious option for taking international action would be to create a comprehensive new treaty on site contamination, which has particular advantages over the framework and protocol option. A new 'stand alone' treaty would deal with all relevant issues up front, rather than leaving them to be negotiated in the indefinite future. A framework treaty without the necessary detailed protocol would be of little help to developing countries in particular, who need guidance on site contamination at the earliest opportunity. There would be a substantial risk that a subsequent protocol is never finalised, leaving the framework treaty largely ineffective.

Although the negotiation process for a comprehensive treaty may be more protracted, it would save valuable time and resources later, and would offer a greater likelihood of the core treaty objectives being achieved. It has been noted that the negotiation of soft law can be more expensive than the average negotiations for a binding convention (United Nations Environment Programme 2007: 20; however, note Wyatt 2008: 202). This may reflect the extensive participation which has emerged more recently in the negotiation of soft law instruments. A more inclusive negotiation process does increase the costs of an instrument (United Nations Environment Programme 2007: 20), but broad participation by all stakeholders may be a feature of many international instruments in the future, whether or not they are binding. An additional factor determining the likely cost of negotiating and finalising a binding agreement is the complexity of the issue at hand, and therefore how many sessions are needed to work through all of its aspects.

Another consideration is the scope of the site contamination issue. As it is a specific issue, confined mostly to domestic borders, and the scientific evidence of its effects is generally accepted, it could lend itself to a single detailed agreement similar to the POPs Convention rather than the framework and protocol approach.

All the stages of site contamination, together with provisions on the scientific basis of decision-making, the allocation of liability, and compliance procedures, could conceivably be included in the same document without rendering it unwieldy or requiring further elaboration.

Crucially, however, there is unlikely to be sufficient public awareness of the site contamination issue to propel it onto the international agenda in the short to medium term. Political will is particularly lacking among developing countries with little knowledge or experience of site contamination, and developed countries with influential industry lobby groups. It is somewhat more likely that the international community would eventually consider a comprehensive treaty on soil, albeit in the longer term, and that awareness of site contamination would gradually grow by association with it. As noted previously, international organisations such as the IUCN and IUSS have been at the forefront of proposals for an international agreement on soils for the past decade, and continue to lobby for this. There has been far more international dialogue on soils than on site contamination, so the prospects for the former would appear to be better (see, e.g., Wyatt 2008; Boer and Hannam 2011).

In light of this, it is pragmatic to consider a comprehensive new treaty on soil, within which site contamination would be addressed as a specific sub-issue. The international community may more readily accept site contamination when it is viewed as ‘part of a package’, one part of a global problem or goal. However, the experience gained from the draft European Soils Directive, and past global soil initiatives, must inform any future work towards a binding international soils instrument. Likely objections should be foreseen, and participation by all relevant sectors of society, industry and government should be encouraged, to overcome these problems at the earliest possible stage.

The issue of state sovereignty is likely to be major obstacle to any negotiations toward a binding international agreement on soil. A strong indication of this can be seen in the controversy over subsidiarity in relation to the draft European Soil Directive. It was also encountered in the negotiations for the CBD, but was overcome by reaching a compromise: a reaffirmation of state sovereignty over resources qualified by a duty to cooperate in managing their resources sustainably. To make its commitments more palatable to developing countries—which together hold most of the world’s biodiversity—the Convention also contained provisions on technology transfer, knowledge sharing and financial assistance (arts 16–18, 20, CBD). Such provisions would serve a similar purpose in an international treaty on soil.

States may accept a binding agreement on soil, obliging them to manage their soil resources in a sustainable manner, if sovereignty over their own land was assured. The obligations for sustainable soil management under such an agreement would differ from the CBD, by requiring that specific measures be taken for ‘new’ issues not already addressed under its auspices. For example, States could be obliged to put in place a regulatory framework for site contamination which contains stipulated provisions, and develop the substantive detail of the regulations (such as numerical soil values) to suit their own conditions. In designing the precise details of their own site contamination regulations, they would be obliged under the treaty to consider the effects of any proposed measures on the sustainability of the soil.

However, the idea of a new treaty on soil comes at a time of considerable opposition to the creation of any new multilateral environmental agreements (Stringer 2008: 138; Kanie 2007: 74, citing Najam et al. 2006). This so-called 'treaty fatigue' follows a period of intensive environmental treaty-making between the 1970s and the 1990s (Ivanova 2005: 27). Yet there is recognition that 'new' environmental issues, such as mercury, continue to emerge and require international action, whatever form that may take. It is foreseeable that within several years, significant gaps in the body of international environmental law will be evident and there may be calls for a new phase of treaty-making. In the meantime, a concerted effort needs to be made to persuade the international community of the urgent need for any new environmental agreement. This remains to be done in the context of soil protection, making it a longer term option rather than a short term one.

In the light of the current political climate, it is prudent to examine whether adding a new protocol on site contamination to an existing treaty might be preferable (in the soil protection context, see Boer and Hannam 2011; Wyatt 2008: 203–204). As for a draft protocol on sustainable soil use (see Boer and Hannam 2011), the most likely contenders for such an instrument would be UNCCD or the CBD, because both have a link with site contamination. However, UNCCD has had a controversial past, its effectiveness has been limited, and it faces an uncertain future (Gísladóttir and Stocking 2005: 104). UNCCD has been viewed by some as being too inflexible and low-profile to give soil the political impetus it requires for concerted international action (e.g., Wynen 2002: 38), although this view does not seem to be shared by Boer and Hannam (2011). With regard to site contamination, however, the link with desertification is weak. The fact that UNCCD applies only to arid and semi-arid areas further limits its relevance to site contamination.

The CBD offers broader scope for site contamination, although it would probably be addressed in the context of soil conservation rather than on its own merit. The CBD already recognises soil as a 'key component' of biological diversity, and the need for its protection at all levels is implicit throughout the treaty text. A decade ago, Hannam and Boer (2002: 64) suggested that substantial provisions on soil would need to be added to the existing treaty in a new protocol to incorporate all aspects of sustainable soil use. The Draft Protocol for the Protection and Sustainable Use of Soil, developed in 2005 and revised over subsequent years, is designed as a protocol to the CBD. However, Boer and Hannam (2011) note that the CBD already has a protocol, so an additional protocol on soil may be less likely to succeed. It must be conceded that a draft protocol to the CBD on site contamination would be even less favourably received, given the relative lack of public awareness and political momentum in this area.

The negotiation process for a new treaty would be lengthier than for a soft law instrument. A treaty would also take longer to enter into force once it has been concluded, depending on the political will of the signatories to ratify it. The advantages of a treaty are that compliance is mandatory and therefore perhaps more likely, as consequences can be imposed for non-compliance. Site contamination is an issue requiring both immediate and longer-term action by national governments if social, economic and environmental impacts are to be minimised. Binding international commitments are the preferred way of ensuring that governments take such action in the longer term, even if they are not possible in the immediate term.

7.5.2 Soft Law Options

Some commentators argue that soft law can be more effective than hard law in addressing some environmental issues. Boyle (1999: 902) notes that soft law instruments 'may be both an alternative to and a part of the process of multilateral treaty-making'. Shelton (2008: 3) notes that

> while there is no accepted definition of "soft law", it usually refers to any written international instrument, other than a treaty, containing principles, norms, standards, or other statements of expected behavior.

Recommendations, guidelines, codes of practice, resolutions and programs of action are also said to be forms of soft law (Birnie and Boyle 2002: 24–26). These instruments are designed to guide State behaviour, but are not enforceable against States.

A non-binding instrument allows States to set more ambitious, aspirational goals in the knowledge that compliance is not mandatory (Wirth 2007: 398). This gives the instrument greater flexibility, not only during early negotiations but also in later amendments and implementation (Boyle 1999: 903; Guzman 2005: 591). Soft law instruments may also offer an alternative to hard law negotiations when consensus on an issue is difficult to reach. The scope for public participation in negotiations, particularly by NGOs, may be greater for soft law (Skjærseth et al. 2006: 115). Even more importantly, soft law can be useful for formulating standards of good practice, so that both public and private sector parties know what is expected of them (Wirth 2007: 398).

More detailed provisions are possible in non-binding instruments, because there are no legal ramifications for failure to comply. For the same reason, if the instrument is well negotiated and supported by science, its acceptance by States is likely to be prompt and widespread, with domestic measures following soon afterwards. This advantage is particularly evident in countries where the ratification and implementation of a treaty requires extensive political consultation (Boyle 1999: 903; Guzman 2005: 592). Soft law can also serve to put pressure on 'laggard' States by demonstrating that many other countries are prepared to endorse a particular position (Boyle 1999: 903). On occasion, soft law may eventually become binding, either in the customary law sense through state practice (Wirth 2007: 398), or by transposition into the text of a treaty.

A soft law instrument offers the advantage of promoting action on site contamination sooner rather than later. As Boyle (1999: 903) observes, soft law instruments can provide ‘more immediate evidence of international support and consensus’. There are also no time delays for ratification, as there are for binding instruments (Hannam and Boer 2002: 58). The need for prompt action on site contamination is clear: it is an ongoing problem in many countries, its pace even accelerating in some, with inadequate or non-existent domestic provisions to counter it. Nor is there much awareness, at either the domestic or the international level, of the problem itself. Raising public awareness of site contamination would be a central goal of any soft law initiative.

The role of a non-binding instrument in the context of site contamination would be to formulate an internationally accepted, ‘best practice’ framework approach to site contamination. Without setting any binding targets or mandatory requirements, it would identify general objectives and a series of recommended steps to be taken by States to address the issue at the domestic and international level. It should also contain guidance on all of the procedural aspects of the issue, including site identification, investigation, assessment, remediation and monitoring. In addition, the instrument should specify the need for a scientific basis for decision-making and clear allocation of liability for remediation. Its capacity to promote domestic lawmaking on site contamination will depend on whether it achieves the difficult balance of providing sufficient detail on all relevant issues while remaining broadly applicable in any domestic context, regardless of political, social, economic and physical factors.

One example of a soft law instrument on site contamination could be a comprehensive set of guidelines or recommendations promoted by international organisations, such as the Food and Agriculture Organization (FAO) or the United Nations Industrial Development Organization (UNIDO). These would expand on the existing piecemeal guidelines on specific issues, such as soil analysis. Some positive steps have been taken in this direction over the past decade. For example, to fulfil its obligations under the Strategic Approach to International Chemicals Management (SAICM), UNIDO is already promoting the remediation of sites contaminated by chemicals and POPs in developing countries and emerging economies (e.g., Quick Start Programme Executive Board 2006: 4). However, a set of international guidelines on site contamination would need to be more comprehensive than any of the initiatives developed so far by international organisations.

The key challenge would be to persuade the UN, UNEP or another major international body that site contamination should be a priority on the international agenda. This may be difficult to achieve directly, given that the broader issue of soil has not yet been the subject of a formal resolution at the UN level, despite several years of work by the IUCN and others. However, one possibility would be to lobby UNEP to update, extend and reissue its existing (UNEP/ADEME 2005) guidelines on the management of contaminated sites so that they cover the full range of site contamination issues. Ideally, this would be done in conjunction with a new resolution by the UNEP Governing Council, acknowledging the problem of site contamination worldwide, so as to lift its public profile and maximise uptake of the guidelines. This option has the advantage of the groundwork already having been laid, and the problem already recognised more than a decade ago. On this basis, it may not be difficult to persuade UNEP to take action.

Indeed, either a resolution by a UN body or a high-level declaration at an international conference could be pursued as options distinct from the existing guidelines on contaminated sites management. They could expand on existing resolutions and declarations on soil made by organisations such as the IUCN and IUSS. If the United Nations cannot be persuaded to act on site contamination on its own account, a resolution on soil could instead be prioritised as the first step, followed by a resolution on site contamination and other forms of soil degradation shortly thereafter.

The initial resolution or declaration on soil should be seen as a necessary step towards a more formalised international agreement on soil—and subsequently on site contamination—because it would play a vital role in gathering information, raising awareness, and focusing governments on the issue. More specifically, it would provide the foundations for future binding commitments by setting a general framework for action and orientating domestic efforts. This strategy is also being followed by the IUCN Commission on Environmental Law in the context of sustainable soil use. Since 2000, the CEL has been developing guidelines for drafting national soil legislation and examining options for a binding international instrument for the sustainable use of soils. As noted above, two versions of a draft protocol on sustainable soil use have been produced and these are being discussed by the international soil science community (IUCN 2012).

Of the whole range of soft law instruments, a set of international guidelines is likely to have the greatest impact on domestic approaches to site contamination, at least in developing countries. The guidelines would provide a model for action where such measures may otherwise not exist. A high-level resolution or declaration alone would still have an impact, although its effectiveness would increase only in the longer term, and would be dependent on it being elaborated through further resolutions and eventually a binding agreement. However, even if the soft law instrument is limited to recommendations that countries carry out a national inventory of contaminated sites, and subsequently prepare a national action plan on site contamination, it could have a positive effect on domestic approaches to the issue.

The current lack of public awareness of both soil protection and site contamination mean that a soft law instrument on either issue can only be considered as a feasible option for the medium term. Once there is adequate public awareness and political will, negotiations for a soft law instrument need not be protracted, and politically sensitive elements may be overcome relatively easily by using more general language. It is conceivable that a soft law instrument could be concluded within 2–5 years of first being proposed at the international level, whilst a comprehensive treaty may take a further 5–10 years (Zovko 2005: 117). It must be said that, given the present political climate, a soft law instrument on soil protection has better prospects than one on site contamination.

7.5.3 A Regional Approach?

Consideration should also be given to whether site contamination would be more appropriately addressed through regional rather than international measures. Attempts by the European Union to regulate soil protection and environmental liability—both of which are somewhat related to site contamination—have so far been controversial. The problems encountered in their negotiation and implementation respectively would not necessarily arise in the context of site contamination, but the subsidiarity principle in the European Union does make this more likely than perhaps for other regions. However, soil types and causes of site contamination vary widely across regions, as well as between regions, so a regional instrument may not necessarily be better tailored to domestic conditions than an international approach. As Zovko (2005: 118) notes, 'the difficulties in regionally developing environmental rules relate to the fact that environmental issues are predominately interlinked and go beyond particular regions'.

On the other hand, it may be easier to reach consensus at the regional level and thus ensure more prompt action by the countries involved. Once regional organisations such as ASEAN have been adequately informed on the issue of site contamination, and the need for action is clearly understood, a binding agreement or non-binding declaration at the regional level could follow. However, in developing regions the site contamination issue would be competing with other important issues, such as health and poverty, and the lack of public awareness may not be so easily overcome.

The preparedness of developing regions to reach an agreement or declaration may depend on access to technology, expertise and financial assistance from more developed regions. Consequently, it would be more practical to envisage regional measures as part of a global approach to site contamination. For example, regional initiatives could be promoted in addition to domestic actions within an international soft law instrument, as with SAICM. They could also be incorporated in a comprehensive treaty, although the complications this could cause may outweigh the benefits of doing so.

7.6 Possible Content of an International Instrument

A clear definition of the key objectives of an international response to site contamination would be central to its effectiveness, and guide each of its provisions. The main objective of such an instrument would be to facilitate the timely identification and remediation of contaminated sites so as to minimise their social, economic, human health and ecological impacts. Another key objective would be to prevent or curtail site contamination wherever possible, particularly in developing countries undergoing rapid urbanisation. In addition, the application of the polluter pays principle to contaminated sites should be an overarching goal, to avoid taxpayer-funded remediation and a proliferation of 'orphan' sites.

A further key objective would be to promote the national regulation of site contamination where such regulation is either absent or inadequate to deal with the problem. A related goal is to clarify national procedures for contaminated sites for stakeholders, including regulators, developers, site owners and users and site contamination consultants, and to improve the transparency of decision-making. Other important objectives would include: promoting broad public participation in the identification and remediation of contaminated sites; ensuring the remediation of long-term disused sites or centrally located sites for beneficial uses; sharing knowledge and technology in addressing site contamination, assisting developing countries in particular; and gaining a clearer global picture of site contamination, its causes and effects.

An international response to site contamination needs to include particular features to maximise its utility and impact. At a minimum, the instrument should oblige governments to undertake an inventory of contaminated sites and potentially contaminated sites within their territory. Clear guidelines for carrying out the inventory would help to ensure that the process is informed and efficient, the most heavily contaminated sites are prioritised, and the resulting data is readily comparable with other countries. Importantly, an inventory would also serve to highlight the actual extent of site contamination, raising political awareness of the issue at both the domestic and international levels and paving the way for further action. Ideally, governments would be obliged to implement a national response to the findings of the inventory, so that follow-up is assured and problem areas are not ignored.

The proposed instrument should also establish a set of common procedures to be followed at the various stages of site contamination (identification, investigation, assessment, monitoring, remediation and post-closure). This would provide a framework within which national governments could take more specific action, adapted to their domestic conditions. It would also act as a benchmark, against which governments and the non-government sectors could measure national performance on site contamination. However, due to differences in soil types and uses, the specific technical standards to be applied throughout the identification and remediation process should be left to individual governments to formulate. The only stipulations would be that the standards are clearly spelled out in domestic regulations and that their application is both transparent and consistent, to avoid misuse.

Although it is likely to be a controversial issue, any international approach to site contamination should address allocation of liability for contaminated sites. Rather than specifying how liability should be allocated, the instrument may oblige governments to formulate a domestic system for allocating liability for site contamination to clearly identifiable parties. The majority of parties may agree that the polluter pays principle is to be upheld wherever possible, and that recourse to the public purse for remediation costs is to be minimised. Other permissible options may include industry funds or taxes for the remediation of 'orphan' sites, a cost which would eventually be passed on to the consumer. Governments should be strongly encouraged to consider the issue in detail and legislate in accordance with the objectives of the international instrument.

The issues discussed above largely reflect the traditional ‘command and control’ approach to the remediation of contaminated sites, which developed countries initially adopted in the ‘first generation’ of site contamination legislation (Fowler 2007: 4–5). This involved the use of ‘cleanup orders’ and specific standards for intervention and remediation. More recently, other methods of achieving remediation have developed alongside the formal regulatory approach, some of which represent the ‘second generation’ of legislation (Fowler 2007: 5, 2006: 12–13). It is important to consider whether these aspects should be incorporated into any international instrument on site contamination, and if so, how.

The new wave of remediation practices generally facilitate voluntary remediation by way of financial assistance and liability relief, or by threat of legal action if a negotiated agreement is not reached (Guignet and Alberini 2008: 1). Remediation may be triggered by development activity (through the relevant planning regime), corporate due diligence obligations, or by numerous other events or processes operating outside the legal regime (Smith 2008). These approaches tend to target ‘brownfield’ projects, in a bid to restore long-term disused sites to beneficial use. In some parts of North America, Australia and Europe, the recent trend has left only a small number of contaminated sites to be remediated in the ‘traditional’ way, i.e. through mandatory ‘cleanup’ orders. Much remediation now takes place voluntarily, either through the planning system or on the initiative of site owners themselves.

It may be both possible and advantageous to include provisions on voluntary remediation measures in an international instrument. Their inclusion would provide national governments with a wider, more flexible range of tools with which to address site contamination. It would also help improve the transparency of voluntary measures, which are likely to become the predominant method of addressing contaminated sites in both developed and developing countries. Whereas much of the remediation in any given country is currently undertaken in the absence of clear legislative guidelines, and sometimes even without independent supervision or approval, an international treaty could identify acceptable practices and recommend particular procedures. These could be included alongside the other provisions on mandatory investigation, assessment and remediation, allowing signatories to implement a ‘toolbox’ of measures.

In addition to a procedural framework for contaminated sites, it would be important to include substantive obligations in any international instrument on site contamination. Aside from national inventories of contaminated sites, such provisions would require or encourage governments to formulate, implement and periodically revise a national action plan on site contamination, and report regularly to an international body regarding the specific actions they have taken at the domestic level. These provisions would help to ensure that national governments act on the commonly agreed objectives and that their actions will take place within an internationally recognised framework. Specifically, these substantive provisions will ensure that governments have a clear understanding of the site contamination problem within their own borders, and what needs to be done to address that problem.

Lastly, an international instrument on site contamination should contain financial and technical mechanisms, obliging developed countries to provide financial and technical assistance to developing countries. This is vital to ensuring that developing countries benefit fully from the body of international experience with site contamination, and have the capacity to address the issue at an early stage. It may be that developed countries report annually to the responsible international body on the steps they have taken to assist developing countries or economies in transition. An international conference could also be held at regular intervals to exchange information and discuss new technologies and regulatory initiatives for contaminated sites.

7.7 Conclusions

Site contamination affects three essential natural elements: soil, water and, to some extent, air. Soil renews itself only very slowly, and not in a sufficient timeframe for the purposes of the current or next few generations of human habitation. In many places, clean water is also scarce. The protection of essential natural elements has been accepted as a 'common concern' in the context of biological diversity and climate change, obliging the international community to take urgent action. The issue of soil protection may also be accepted as a 'common concern' in the future, but it is extremely unlikely that site contamination could attain this status on its own account, primarily due to the ongoing lack of public awareness.

The review undertaken in this chapter of key international and regional initiatives on chemicals, contaminants, soil and desertification indicates the varying uptake of hard law and soft law instruments. The most effective instrument is likely to be one which focuses on a specific issue, has clear goals, is widely accepted in terms of the need for international action and the underlying science, has a broadly inclusive negotiation process, and is endorsed by stakeholders in its final form. An international treaty on desertification and a separate regional initiative on soil protection have both been hampered by controversy and inaction. Heavy metals have had limited success in reaching the international law-making agenda, with the result of some soft law instruments. By contrast, the POPs Convention stands out as a comprehensive, binding and workable instrument.

In the context of site contamination, the main obstacles to an international agreement are a very low level of public awareness and the lack of initiative by international organisations or networks to persuade the international community of the need for global action on the issue. Some recent global initiatives, such as the Toxic Sites Identification Program, are helping to change the status quo. Political momentum may be less problematic for an instrument on soil protection, which has been the subject of considerable efforts by international groups, such as the IUCN and IUSS, in the past few years.

A global instrument on soil would also have the advantage of drawing lessons and, potentially, support from the regional soil initiative in Europe. Although the political climate is not currently supportive of any new multilateral environmental agreements, this may change in coming years. In the meantime, a soft law instrument is best considered as a medium-term option for site contamination, with a view to achieving a binding, comprehensive agreement on site contamination over the longer term if there is sufficient public awareness.

The key features of an international soft law instrument on site contamination would include the following: a clear statement of objectives, strong recommendations to undertake a national inventory of contaminated sites, a set of basic principles and procedures to guide the domestic regulation of site contamination throughout its entire life cycle, and further recommendations to specify, in domestic law, the scientific basis of decision-making and a system for allocating liability for site contamination. Any eventual treaty on site contamination, in addition to elaborating on these provisions and giving them binding status, would include: requirements to report regularly on national implementation measures to the relevant secretariat, enforcement and compliance procedures, and financial and technical assistance provisions, the last of which would be important in assisting developing countries to implement domestic measures.

Given the uncertain prospects of either a hard law or soft law instrument in addressing site contamination issues at the international level, it is necessary to explore other measures by which the development of national site contamination law may be promoted. The next chapter (Chap. 8) considers this question by examining the idea of legal 'harmonisation', whereby relatively consistent approaches to the regulation of environmental problems may be promoted through means other than an overarching international instrument.

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Chapter 8
Alternatives to International Law – Other Means of Promoting National Site Contamination Law

8.1 Introduction

At present, the international community favours the implementation of existing environmental treaties and the strengthening of 'synergies' between them, rather than the creation of any new multilateral environmental agreements (MEAs) (see, e.g., Stringer 2008: 138). Even in a favourable political climate, the negotiation and implementation of an MEA can be a lengthy process. In light of these realities, an alternative to a formal international agreement on site contamination may need to be considered, at least for the short to medium term (in relation to soil protection, see Hurni et al. 2006: 10).

The discussion of international soft law options in Chap. 7 above concluded that a high-level declaration or resolution on site contamination would be more feasible, and perhaps more effective, than an MEA in the medium term. However, it was also acknowledged that even an international soft law instrument would face challenges, including the low global profile of site contamination, the political sensitivity surrounding soil-related issues, and a lack of enforceability. The most difficult task may be persuading an organisation like the United Nations, or the UNEP Governing Council, to take up the cause of adopting a formal resolution or declaration.

For these reasons, it is necessary to consider what other options are available for promoting domestic site contamination law. As discussed in Chap. 6 above, promoting the use of a particular regulatory framework for site contamination involves processes of legal harmonisation, including in the specific context of site contamination law. The alternatives to international law were introduced in Chap. 7 and will be examined in more detail in this chapter. These alternatives would be pursued predominantly at the international level, and indeed they may be actively pursued alongside a medium-term international soft law initiative and longer-term MEA efforts to maximise the prospects of better site contamination law. However, action would be taken mainly outside the scope of international law. If an initiative were well crafted and widely promoted, it could provide immediate guidance on site

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contamination issues and, potentially, help to lay the foundations for a binding international agreement in the future.

The purpose of this chapter is to explore how methods outside of the international law framework may be used specifically to promote domestic site contamination law, and to identify the option or options which offer the best prospects for achieving that goal. Some initiatives on site contamination have already been developed (e.g., United Nations Industrial Development Organization 2010; Blacksmith Institute 2012), but they do not provide comprehensive guidance to countries considering new regulations or revisions to existing regimes. It will also be important to select an option that would complement, rather than undermine, a soft law initiative and possible MEA efforts relating to site contamination.

8.2 Outline of Alternatives

The purpose of the following review of alternative options for promoting domestic site contamination law and policy is to identify the strengths and weaknesses of each option and the actors involved. These options are also briefly referred to in Sect. 6.2 (Chap. 6) above, in the context of methods for achieving harmonisation.

8.2.1 Global and Regional Lending Institutions

Conditions imposed by global and regional lending institutions—such as the World Bank, International Monetary Fund, Global Environment Facility, Asian Development Bank, and European Bank for Reconstruction and Development—could include specific requirements on countries to evaluate the extent of their site contamination, prioritise the worst sites and take steps to address site contamination through regulation. If these were preconditions to a loan, funds may be withheld by the relevant institution until the borrowing country could show that adequate steps had been taken to fulfil the requirements.

As recipients of World Bank loans, countries are currently only required to prepare and implement quite general Environmental Action Plans (EAPs). Similarly, the European Bank for Reconstruction and Development (EBRD) requires its clients to have Environmental and Social Action Plans (ESAPs) in place, with no specific reference to site contamination. Performance Requirement 3 of the EBRD's 'Environmental and Social Policy' only imposes a general requirement for pollution prevention and abatement measures (European Bank for Reconstruction and Development 2008: 26). Clearly, detailed requirements on site contamination would extend the present scope of EAPs and ESAPs considerably. Site contamination measures would also be in keeping with the central purpose of EAPs, which is to identify the most serious environmental issues and take appropriate action.

The World Bank has been involved in several environmental remediation projects in the past decade, including the cleanup of heavy metals contamination in Azerbaijan (see Case Study 8.1 below), groundwater contamination in Kazakhstan (World Bank 2007: 11), pollution from a copper mine in Bulgaria (World Bank 2009), and a former uranium mine in Argentina (World Bank 2008b). Budgets for these projects have ranged from US$16million to more than US $150million. Remediation of a wide range of contaminated sites is evidently becoming a pressing need in developing countries and those with economies in transition.

The Global Environment Facility (GEF) specifically funds the implementation of persistent organic pollutants (POPs) measures in many countries, including projects which involve the strengthening and enforcement of relevant domestic legislation (GEF 2012). Agencies such as UNIDO, UNEP and United Nations Development Programme (UNDP) oversee the project work, which often involves international consultants undertaking inventories of POPs-contaminated sites and assessing current domestic regulatory frameworks prior to making recommendations (e.g., in Rwanda: GEF 2003). In addition, an important outcome of most projects is the preparation of the National Implementation Plan for the Stockholm Convention on POPs (e.g., in Sri Lanka: GEF 2002).

The European regional lending institution, the EBRD, is broadly committed to improving the 'harmonisation of environmental principles, practices and standards' associated with the financing of regional development projects (EBRD 2008). It funds projects such as the 'upgrading' of a hazardous waste site in Russia and the remediation of oilfields in Albania and Romania (EBRD 2009a, b), and such projects usually involve the implementation of EU environmental standards. The project in Russia included improving the relevant regulatory framework and enforcing environmental law (EBRD 2000). EBRD loans are commonly made to large oil companies for mitigation and remediation works, such as those in Russia (EBRD 2007).

The European Regional Development Fund (ERDF), which is tasked with stimulating economic development and regeneration in the least prosperous regions of the EU, is more explicitly committed to investing in the rehabilitation of contaminated sites (arts. 4(3) and 5(2)(a), Regulation on the European Regional Development Fund 2006).

The Asian Development Bank's 'Safeguard Policy Statement' acknowledges that rapid industrialisation and urbanisation has caused widespread environmental degradation in the Asian region, and emphasises that addressing this problem is essential to alleviating poverty (Asian Development Bank 2009: 2). The Safeguard Policy Statement specifies (at 15) that ADB loans will be conditional on compliance with the requirements of the Policy, as well as compliance with any applicable national environmental laws and standards. The Environmental Safeguards detailed in the Policy require (at 16) the preparation of environmental management plans, and the consideration of key concepts such as the polluter pays principle.

According to the Safeguard Policy Statement (at 5), the ADB should identify and address the adverse environmental impacts of its operations early in the project cycle, develop and implement plans to avoid, minimise, mitigate or compensate for any impacts caused, and monitor the ongoing effects of its projects. The ADB applies the standards and emission levels used by the World Bank for its own projects, with any necessary adaptation to local conditions (Asian Development Bank 2009: 16).

The ADB has funded at least two remediation projects in China to date, the Beijing Environmental Improvement Project and the Anhui Environmental Improvement Project for Industrial Pollution Abatement (Asian Development Bank 2005). Other recipients of aid for remediation projects in Asia have included the Philippines (Asian Development Bank 2007) and Micronesia (Asian Development Bank 2008), neither of which have involved regulatory reform. The projects in China generally involved remediation of large-scale contaminated areas, and regulatory reform played a minimal role, despite efforts by the Bank. ADB expressed frustration, in its completion report on the Anhui Project, that the 'successful example of the [ADB's reform of the] four most polluting industries was not effectively replicated among other enterprises' in the Chao Lake area of Anhui Province, causing increasing water contamination (Asian Development Bank 2004: 9).

The following case study (Case Study 8.1) on the funding by the World Bank of site remediation activities in Azerbaijan demonstrates the potentially far-reaching impact of multilateral aid on domestic site contamination law and policy. This case study was selected primarily because it offers a specific example of the World Bank

Case Study 8.1 World Bank Financing of Site Remediation in Azerbaijan

Azerbaijan joined the World Bank in 1992, and with the Bank's assistance, finalised its first national Environmental Action Plan (EAP) in 1997. Industrial pollution and heavy metal contamination of agricultural land were identified in the EAP as among the most urgent problems needing attention. An early response to the EAP was coordinated with the World Bank, and comprised four specific investment projects from 1998 to 2003. Two of these were related to site contamination, and involved the demonstration of mercury remediation technologies and procedures through the remediation of one site heavily contaminated by mercury; and the testing and demonstration of onshore oil field remediation methodologies at a site on the Absheron Peninsula.

The Absheron Rehabilitation Program has also been prepared in response to the EAP. Onshore oil production has been carried on for almost 150 years on the Absheron Peninsula, where there are also two major cities.

(continued)

Case Study 8.1 (continued)

Approximately 30,000 ha on the Peninsula, together with the Caspian Sea, have been affected by oil production and other industrial activities. For the first phase of the Absheron Rehabilitation Program, the World Bank agreed in 2008 to fund three further, large-scale rehabilitation projects for the area, at a total cost of $164 million (World Bank 2008c). The projects are directed at remediating the most urgent cases of contaminated land and are to be implemented during 2008–2013 (Ministry of Economic Development, Republic of Azerbaijan 2008). In relation to its involvement in the remediation projects, the World Bank (2008e: 4) has stated:

> Bank involvement will also help to ensure that international best practice is designed into the investments from the outset. These initial investments will yield lessons, by offering opportunities to test and streamline cleanup technologies, and to use the lessons learned to design scaled-up or more complex cleanup or environmental management investments.

The three newly approved projects include the 'Contaminated Sites Rehabilitation Project' ($74.5 m), the 'Large-Scale Oil Polluted Land Clean-up Project' ($60 m), and the 'Integrated Solid Waste Management Program' ($29.5 m). The Contaminated Sites Rehabilitation Project will remediate two former iodine production sites and develop, and partially implement, a plan to clean 1,000 hectares of land. The Large-Scale Project will assist the State Oil Company of Azerbaijan to carry out remediation works on oil-polluted land by providing soil-cleaning equipment (World Bank 2008c).

In documents relating to the Azerbaijan Contaminated Sites Remediation project, the World Bank (2008e: 3) stated that:

> The World Bank is a leading donor in implementing complex high-priority environmental remediation projects and can build upon its knowledge of environmental remediation approaches, hazardous waste management, and site redevelopment, all of which are required for the proposed Project. Bank participation in the sector and the proposed Project will provide the government with cost-effective financial support for a relatively expensive and complex program [. . ..] Bank support will provide the government access to state-of-the-art expertise, and extensive international experience for this large-scale project that cover the physical, social, institutional, and land-use aspects of site remediation programs.

The fact that the World Bank perceives itself as playing a role in promoting international 'best practice' on site contamination is also evident from the Azerbaijan project appraisal documents (World Bank 2008e: 4):

> The proposed Bank-supported technical assistance will help assist implementing agencies internalize good international environmental and safety practices. Added emphasis on data collection, independent monitoring, public outreach campaigns, adoption of clarified environmental standards and coordinated certification processes will benefit both existing operations and the design of new investments.

(continued)

Case Study 8.1 (continued)

A sub-component of the Contaminated Sites Remediation project, funded for US$4 million, is to develop policies, regulatory procedures and standards, in particular for soil contamination levels, site remediation and land redevelopment for sites affected by oil pollution (World Bank 2008e: 8). According to the World Bank, one of the three key performance indicators for assessing whether the project objectives have been fulfilled, is whether institutions fully adopt standards and develop policies and procedures for continued environmental site investigations, cleanup, rehabilitation, certification and redevelopment of contaminated sites (World Bank 2008e: 4). This project clearly demonstrates how the role of the World Bank extends beyond promoting international 'best practice', to actively encouraging countries to develop a regulatory approach to contaminated sites as part of Bank-funded projects.

seeking to change domestic law on this particular issue, and relevant documentation is easily accessible.

It is evident from the Absheron Project documentation in the above case study that the World Bank is beginning to appreciate the need not only for site remediation, but for better regulation of site contamination in developing countries, and is integrating specific measures into its projects accordingly. While it is still too early to know how legislation and policies for site contamination management will actually be developed under the Absheron Project, and the extent to which their development will be influenced by external factors, some early indicators can be found.

The World Bank has stated a preference for the use of international risk-based cleanup standards, 'adapted to Azeri conditions', in the Absheron Project (World Bank 2008a: 2). However, the relevant consulting firm, which was locally based, recommended that the use of European Union standards for evaluation and remediation of contaminated soil, and their adaptation to the Azerbaijan environment, would be 'more suitable' than applying international standards because Azerbaijan wishes to improve ties with the EU (IQLIM 2008: 10). In the World Bank's remediation project in Bulgaria, legislative reform was explicitly aimed at bringing Bulgarian national regulations into line with European Union law, for purposes of its accession to the EU (World Bank 2009: xi).

Despite the limited examples of Azerbaijan and Bulgaria, the World Bank does appear to more broadly favour an approach to contaminated sites management that is informed by 'international experience'. The 2007 report by the World Bank on its remediation project in Kazakhstan (World Bank 2007: 11) stated that:

> International experience in environmental remediation projects confirms the importance of a risk management approach. The objective to reduce risks of contamination to the environment, public health and the economy and keep risks at an acceptable level should prevail over policies that are merely based on fixed remediation standards.

Apart from the Azerbaijan example in the case study above, the World Bank has also earmarked funds for improving legislation on groundwater contamination in India and Nepal (World Bank 2004, 2006, 2008d). It is not yet clear whether the improvements to such legislation would include any reference to international standards or procedures, or who will be responsible for developing them.

The World Bank and its affiliated institutions (together known as the 'World Bank Group')[1] have taken some steps to implement broad operational policies and standards in relation to contaminated land management. For example, the World Bank Group's 'Environment, Health and Safety Guidelines' (2007) contain a section on contaminated land, which is based mainly on North American procedures and standards (sect. 1.8, World Bank Group 2007: 54). The Multilateral Investment Guarantee Agency (MIGA) has several 'performance standards' which clients may be required to apply, including some that are potentially relevant to site contamination: social and environmental assessment and management (PS1); pollution prevention and abatement (PS3); and community, health, safety and security (PS4) (MIGA 2007). These standards also refer to the environmental health and safety guidelines of MIGA's sister agency, the International Finance Corporation.

Dedicated funding for the reform of national legislation tends to comprise only a small part of the World Bank's overall funding of remediation projects. In the Azerbaijan project, US$4million out of a total of US$160million was set aside for the formulation of regulatory procedures and standards for soil contamination. While this is a relatively small proportion of the overall funding for the project, it is still a significant amount to commit to a law reform project. It is a positive sign that the World Bank considers the improvement of site contamination law to be an important goal, and necessary to the long-term success of some of its lending projects.

There have been other recent indications that the role of the World Bank in the promotion of national site contamination law and policy is growing. The Bank emphasised its commitment to addressing the contamination issue worldwide in its 'Environment Strategy 2012–2022' (World Bank Group 2012b: 55), and is a partner with the Blacksmith Institute in the Toxic Sites Identification Program (World Bank 2011). The World Bank (2010: 82) states that it is available to give 'nonlending assistance' to governments to help prepare 'policy and institutional reforms, [and] advise on environmental regulations and practices'. In addition, the World Bank has now developed guidance to support decision-making on pollution management, titled the 'Pollution Management Sourcebook' (World Bank Group 2012a). The main objective of the Pollution Management Sourcebook is to provide current information on pollution management tools and strategies to assist countries with tackling contamination (World Bank Group 2012a: 5). The term 'legacy pollution' is used in the Sourcebook, and refers (at 57) to "any pollution that

[1] The 'World Bank Group' is an umbrella term for the following institutions: the World Bank, International Finance Corporation, International Bank for Reconstruction and Development, Multilateral Investment Guarantee Agency, International Development Association and International Centre for the Settlement of Investment Disputes.

remains from past activities where there is no immediately responsible party who can be held liable for the pollution and compelled to carry out remediation".

The Pollution Management Sourcebook contains information on many different policy tools relevant to contamination, such as orphan site remediation funds, land use planning, environmental licensing, market-based instruments, information disclosure, environmental regulation and standards, and enforcement (World Bank Group 2012a: Part II, sect. 2.1). The information is based on the lessons learned by the World Bank and other stakeholders in addressing contamination problems over the past decade (World Bank Group 2012a: 5). It is intended to be a 'living document', and will be updated periodically to reflect relevant changes. Its target audience is governments, the judiciary, private actors, financial institutions, and civil society (World Bank Group 2012a: 6).

As can be seen from the World Bank Group's recent initiatives, other multilateral financial institutions have an opportunity to apply their wealth of technical expertise, practical experience and financial resources to assist developing countries with issues such as site contamination. Considering that regulatory reform could help prevent future site contamination from occurring elsewhere in recipient countries, thereby avoiding further substantial costs, this aspect of development aid deserves greater attention. In 2005, aid agencies and donor countries committed to harmonising and developing their capacity for environmental assessment and regulatory enforcement in the Paris Declaration on Aid Effectiveness (Organisation for Economic Cooperation and Development 2005: para 40–41).

It is interesting to note that recent global initiatives to address site contamination have been coordinated primarily by the Blacksmith Institute, but supported financially and in other practical ways by multilateral lending institutions such as the World Bank and international organisations such as the United Nations Industrial Development Organization (World Bank 2011; Blacksmith Institute 2012). In 2012, for example, the Blacksmith Institute launched the 'Global Alliance on Health and Pollution' (GAHP), a collaborative action plan for the next 3 years. It aims to 'build capacity, country by country, to identify, analyze and prioritize the cleanup of toxic hotspots' (Blacksmith Institute 2012). According to the Blacksmith Institute (2012),

> The GAHP is designed to help coordinate solutions, to assist countries to address the problem strategically at a national level, and in particular, to facilitate South-South knowledge exchange. GAHP will work with countries such as Senegal, the Philippines, Indonesia and others to raise awareness about the problem and promote it in country development strategies, define in-country strategic action plans to address the issue, and build capacity to identify toxic hotspots, conduct technical analysis, and implement remediation projects. The GAHP will also help countries build stakeholder support and political will, and provide guidance on technical issues, standards and methodologies

It is possible that the 'strategic action plans' at the national level that are envisaged by the GAHP would also involve assisting governments in preparing appropriate legislation for site contamination. However, this objective has not been specified, and it remains to be seen how the work of the GAHP evolves in practice.

8.2.2 Bilateral Aid Initiatives

The foreign aid agencies of some developed countries play a significant role in the formulation of environmental law and policy in other countries under bilateral aid arrangements. One example of regulatory influence through bilateral aid is the Regional Environmental Programme for Central America ('PROARCA'), an initiative of the United States aid agency, USAID (2007). One of the three main components of PROARCA is the harmonisation and enforcement of environmental laws and regulations. Work on this component falls under the auspices of a sub-program called PROLEGIS, which is implemented jointly by the Central American Commission on the Environment and Development (CCAD) and the United States Environmental Protection Agency (USEPA).

In the first PROARCA phase, from 1996 to 2001, PROLEGIS contributed to the elaboration and promulgation of environmental framework laws in five Central American countries (USAID 2004). The Swiss Government funded several PROLEGIS projects between 2003 and 2007 (PriceWaterhouseCoopers 2004). During this 5-year period, project funding totalled US$933,000, of which US $180,000 went to work on environmental legal frameworks and regional harmonisation (PriceWaterhouseCoopers 2004: 5). Projects were undertaken in Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama. Traditionally, USEPA and USAID have been closely involved in the technical aspects of the environmental law and policy projects through the jointly-coordinated Local Environmental Policy and Program Initiative (LEPPI).

The use of model laws is explicitly mentioned as one of the tools to be used by PROLEGIS in achieving harmonisation of environmental laws in the region. The goal of the sub-program is to 'harmonize environmental policies in the Central American region. The project develops model laws and regulations that each country can adapt to its own circumstances' (USAID 2007).

The USAID/PROARCA program demonstrates the potential for countries to use bilateral aid conditions to propose legislative changes in recipient countries, based on certain elements of their own national legislation as a 'model'. If the regulatory changes are effected, particularly by several bilateral aid recipients, the result would be a degree of harmonisation of site contamination law between the recipient countries and the donor country. It may be easier to achieve legal harmonisation in this way than through international law channels, not only because the consent of just two states is needed (as compared with many states), but also because precedents for legal harmonisation in particular recipient countries may already have been established in other areas of environmental law. It would not then be such a major step to persuade aid recipients to extend legislative reform to site contamination.

The USEPA and the World Bank have also collaborated to assist countries in other regions in developing legislation for contaminated sites. For example, China is in the process of completing an inventory of contaminated sites and has identified the need to fill a legislative gap in the area of site contamination (USEPA 2009a). In 2008, the Chinese Ministry of Environmental Protection and USEPA signed a Memorandum of Understanding on Scientific and Technical Cooperation in the

Field of the Environment. Annex 5 of that agreement sets out a work plan, which includes (among other goals) advancing the development of China's environmental laws. The USEPA (2009b) notes on its website that

> EPA's Office of General Counsel is particularly involved in the Environmental Law Project under Annex 5, which will focus initially on information exchange on U.S. law to help China develop legislation to fill gaps in its environmental law framework, especially with respect to remediation and redevelopment of contaminated sites.

In a 2009 meeting with USEPA officials (USEPA 2009a), Chinese environmental authorities at both the national and provincial levels

> sought information on approaches for funding, clean-up, how costs are apportioned, and ways in which a Brownfields-type approach might leverage funding for clean-up and redevelopment of some sites. Officials in China are actively engaged in developing legislation to address clean-up and redevelopment of contaminated sites.

It is quite likely that regulatory approaches used in the United States might continue to be actively promoted by the USEPA in countries across the world, and that they may subsequently be adopted—perhaps after some adaptation— as a convenient working model by countries such as China. It is also evident that other national governments, such as the Netherlands, are actively promoting the use of their own soil legislation and policy by other countries, although not necessarily as part of an aid agreement or program.

The case study below (Case Study 8.2) demonstrates the potential for one country to influence the domestic site contamination framework of another, based mainly on its depth of experience in that area and its links with government departments, academic institutions and industry groups. The Netherlands is one of very few countries that have had in the past, or are currently pursuing, a significant role in shaping the site contamination law or policy of other countries. A further reason for selecting the Netherlands for this case study was the ready availability of information on the work of Dutch agencies and organisations in other countries. It is often difficult to obtain specific information on the informal activities of foreign actors in relation to site contamination law and policy.

Although it is too early to see any tangible results of the collaboration between the Dutch authorities and their counterparts in China, it appears very likely that

Case Study 8.2 Promotion of Dutch Soil Policy for Use in Other Countries

Throughout the 1980s and 1990s, many developed countries, particularly in Europe, followed the Dutch example of using soil guideline values for the management of site contamination. In the past decade, however, most of these countries have abandoned the 'expensive' Dutch approach in favour of regulatory frameworks that are tailored to their own domestic soil conditions and needs.

Despite this recent trend in developed countries, the Netherlands continue to show a keenness to influence the development of a regulatory framework

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Case Study 8.2 (continued)

for site contamination in China and other countries. This role does not appear to form part of any bilateral aid agreements, but it is described as 'knowledge transfer' and is financed by the relevant Dutch government departments, the Dutch remediation industry, and their foreign counterparts. An initiative called the Netherlands Soil Partnership (NSP) was established in 2008, with the express goal of promoting the advantages of Dutch soil policy and remediation technologies to other countries (Netherlands Soil Partnership 2012a). According to a Dutch firm involved in the NSP work (Eijelkamp Agrisearch Equipment 2008; see also Dutch Ministry of Housing, Spatial Planning and the Environment 2008),

> The Ministry of Public Housing, Spatial Planning and the Environment would like the experience gained through the employment of the Dutch policy, including all of the knowledge, technology and risk assessments, to also be used elsewhere. The Netherlands should cooperate in a sustainable way with other countries in the area of policy related to contaminated soil and groundwater. By taking this approach, the Netherlands wants to show the outside world how and why we solve problems in the area of soil remediation. For this reason, the Netherlands Soil Partnership (NSP) has been established.

The NSP offers its foreign partners 'knowledge transfer' in the specific areas of soil management legislation, policy and standards; sampling and analysis of contamination and risks; and state of the art remediation technologies (Netherlands Soil Partnership 2012b). This is to be undertaken through seminars, workshops, training sessions and exchanges. China has already taken the NSP up on its offer, with the Chinese Ministry for Environmental Protection (MEP) establishing a 'cluster group' with the NSP and the Dutch Ministry of Housing, Spatial Planning and the Environment (VROM) to assist Chinese departments in setting up soil standards, together with collaborative work on other related issues. In addition, the NSP has established a cluster group in Canada, and is interested in working with other countries (e.g., Romania) in the future (Netherlands Soil Partnership 2012a: 1; Embassy of the Netherlands (Canada) 2007).

China's legislative approach to site contamination—when it eventuates—will be influenced by the Netherlands to some extent. It remains to be seen whether China also adopts the specific Dutch soil standards, or adapts them to its own conditions. It will also be insightful to observe how China compares the models promoted by the United States, the Netherlands and others (e.g., the United Kingdom: Luo et al. 2009) and makes its ultimate decision as to which model, if any, to follow.

In conclusion, it is evident that a small number of countries are deliberately seeking to influence the domestic site contamination policy of other countries on the basis of a bilateral relationship, whether through a formal aid agreement or through informal links with relevant government departments, professional bodies and industry groups. The intention of countries promoting their own regulatory approach is that it will be emulated by others. Countries which emulate a particular regulatory approach through informal bilateral links may choose to do so because it is considered innovative and cost-effective, or it may allow access to trading markets. They may also have been presented with the advantages of a particular regulatory model in the absence of any other comparable models.

Efforts to promote a particular approach to site contamination are likely to be driven to some extent by those in the remediation industry, who have a vested interest in expanding their operations to other countries. This interest is clearly demonstrated in detailed reports on the global remediation market, which have been prepared recently by industry groups (backed by government) in the United States, Canada and United Kingdom (United States International Trade Commission 2004; Industry Canada 2005; Department of Trade and Industry (UK) 2006). These reports have clearly been written with the aim of exploring opportunities for local remediation companies to extend their operations into other countries, particularly those in which the need for site remediation is only just being recognised and there are few existing remediation firms to compete with.

Despite the USAID and NSP initiatives, as yet there is little evidence of any widespread emulation of a particular regulatory approach to site contamination actually taking place. Moreover, there is no consensus as to whether one country in particular has the most innovative or comprehensive regulatory approach to site contamination. In fact, as the review of domestic site contamination laws in Chap. 4 shows, even the most highly developed site contamination laws that do exist are lacking in one or more essential aspects. However, if a comprehensive model law on site contamination could be developed and actively promoted by a country with strong bilateral links to other countries, it could assist developing countries in more effectively and expeditiously addressing site contamination issues.

8.2.3 ISO Standards

The International Organization for Standardization (ISO) develops internationally applicable, but non-binding, standards which specify the requirements for products, services, processes, materials, systems and organisational management. The standards are developed by consensus among a worldwide group of experts. There are two broad categories of ISO standards which are relevant to site contamination: the ISO 14000 set of standards, and the numerous, very specific standards which apply to soil and water quality. The ISO 14000 set of standards is seen by supporters as providing ‘recognizable, transparent and flexible models and tools for managing environmental issues’ (Connaughton 2002: 2).

If consistently and widely used, ISO standards could involve harmonisation of operations and practices rather than legal measures. The only way in which some degree of legal harmonisation could be achieved is if domestic legislation incorporates an ISO standard by reference, making its application mandatory for domestic companies or government agencies. This is a significant limitation to the utility of the ISO method for promoting domestic site contamination law, but there is some evidence that governments are willing to implement general ISO standards in this way. The use of the ISO 9000 and ISO 14000 series by local governments in China and federal agencies in the United States (respectively) is discussed further in Chap. 6 (Sect. 6.2.5) above.

A further limitation is that existing ISO standards relating to site contamination are very specific to sub-issues, such as soil sampling and analysis methods. Many more ISO standards would need to be formulated to cover the issue adequately, unless an overall management standard (comparable to the ISO 14001 standard for environmental management systems) was developed for site contamination. The ISO only takes action to develop a standard in response to a request from an industry sector or other stakeholder regarding an issue that is 'globally relevant' (International Organization for Standardization 2004). Such a request is unlikely to be made voluntarily by any industry sector due to the perceived financial and legal implications of a globally applicable standard for contaminated site management. Many companies may be reluctant to commit themselves to implementing more stringent standards than are already in place.

8.2.4 Voluntary Codes of Practice

Voluntary codes of practice for contaminated site management are frequently developed by individual multinational companies and occasionally also by industry sectors or professional networks. Rio Tinto and GlaxoSmithKline are examples of companies with global operations who have site management policies or codes in place (see Sect. 6.6, Chap. 6 above). The International Cyanide Management Code (2002) is an example of an industry-wide code of practice, and has been developed in cooperation with the gold mining industry, the United Nations Environment Programme and the International Cyanide Management Institute (United Nations Environment Programme/International Council on Metals and the Environment 2002). However, it is intended to be a complementary instrument, not to be used as a basis for reforming domestic legislation.

Such codes of practice or company policies are commonly worded in general terms and relate mainly to risk management, broadly applicable operation procedures, and occupational health and safety. In relation to corporate environmental performance generally, it has been observed (Angel and Rock 2005: 1904) that

> For growing numbers of multinational firms it is becoming more profitable to tailor production practices and attendant environmental outcomes to a single set of internal firm-based standards than to a diverse set of local and national regulatory conditions.

Widespread compliance with a code or policy can result in harmonisation of corporate practices, because there are financial and regulatory incentives for companies to comply and they have already demonstrated a willingness to do so.

However, voluntary codes of practice or company policies cannot result in harmonisation of laws unless they contribute indirectly to the development of local legislation. No example of such harmonisation in the area of site contamination has yet been found.

In any case, the method is less desirable because different types of contaminated sites may be managed inconsistently within countries, given that each multinational company or industry may have its own policy. In addition, such codes of practice reflect the self-interests of companies or industries and are unlikely to involve other stakeholders adequately. This is particularly so for local communities, but also environmental groups and governments.

8.2.5 A 'Model Law' on Site Contamination

A model law would contain procedural guidelines similar to those envisaged for a treaty annex, but it would be promoted on an opportunistic basis at the national level, outside the international legal framework. Its purpose would be to assist countries in developing appropriate measures for site contamination, or to revise their existing measures. A model law on site contamination would specify all of the essential elements for a comprehensive domestic regime on the issue, including every stage of the site management process. It would also contain provisions on national site registers, scientific and technical methods, and allocation of liability to responsible parties. To meet the needs of individual countries, the model law would be sufficiently flexible to allow for adaptation.

A model law would be broader in scope than industry or company codes of practice because it would be developed to take into account a wide range of issues, including social, environmental and public health. It is also likely to be more comprehensive because it will be drawn from the large pool of experience gained by many different countries, rather than from a much smaller source, such as an individual company or particular industry. A model law should facilitate public participation wherever possible, resulting in a more informed, inclusive decision-making process, and potentially, remediation that is better tailored to individual sites. Other important issues, such as the creation of a national contaminated sites register and allocation of liability, may not be adequately addressed under any other informal initiative.

A 'generic' or 'model' law on the management of site contamination is justified by the clear need to improve domestic regulatory approaches, in the absence of any international instrument to compel or guide the implementation of such measures. A similar justification has already been found for the creation of model legislation for sustainable soil use (see Case Study 8.3, below), given that there is also no comprehensive international agreement on soil. However, in contrast with soil protection, no high-level statement has yet been made specifically on the need for domestic site contamination law, although some indirect support can be drawn from the Amman Resolution on the Sustainable Use of Soils (International Union for the Conservation of Nature 2000), and the Montevideo Programme IV (United Nations

Environment Programme 2008). A clear mandate for taking action under the auspices of an international organisation is therefore lacking at present.

Clear parallels can be drawn between the model legal framework for soil management in the case study above, and a potential model law on site contamination. First, many of the reasons given by Hannam and Boer for formulating the

Case Study 8.3 Model Legislation for Sustainable Soil Use – IUCN

In 2004, the IUCN's Environmental Law Programme published a guide to drafting national legislation for sustainable soil use ('the Guide') (Hannam and Boer 2004). The Guide is intended for use 'as a resource document for States to draw on to reform existing legislation to protect and manage soil, to establish the direction for the drafting of new national legislation for the sustainable use of soil, and to assist in the establishment or reform of associated institutions to manage and protect the ecological integrity of soil' (Hannam and Boer 2004: x). Therefore it is intended that both developed and developing countries—but predominantly the latter—will benefit from the Guide.

At over 100 pages long, the document provides detailed guidelines on the necessary legal and institutional elements for regulating soil use (Hannam and Boer 2004: 6–7). Although it is not called a 'model law' as such, the Guide refers to the recommended legal and institutional elements as 'generic'. The Guide itself was compiled in response to a recommendation, made in a 2002 IUCN report (Hannam and Boer 2002: 87), for continued work on developing elements for a 'generic' national soil statute. The drafting guidelines were prepared alongside efforts to promote an international soils instrument. These two initiatives have been the focal points of the Specialist Group on the Sustainable Use of Soil and Desertification within the IUCN Environmental Law Programme since 2000.

The mandate for the work undertaken by the ELP on sustainable soil use is provided by one main document, the Amman Resolution on Sustainable Use of Soil (2000). However, the Guide also refers to the need to develop soil legislation as recognised in the Montevideo Programme III (United Nations Environment Programme 2001: objective 12). The Montevideo Programme III, which was in place from 2000 to 2009, recommended that actions be taken to 'promote the development and implementation of laws and policies for enhancing the conservation, sustainable use and, where appropriate, rehabilitation of soils' (objective 12). Specifically, the integration of soil conservation measures into relevant domestic laws was to be promoted.

The recently adopted Montevideo Programme IV (2010–2020) (United Nations Environment Programme 2008, 2009) continues this focus on sustainable soil use and rehabilitation. It also calls on countries to strengthen existing domestic laws on soil restoration and improve public awareness of soil issues. The potential application of the polluter pays principle to environmental damage is recognised, as is the need to improve liability regimes and remediation outcomes.

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Case Study 8.3 (continued)

As the Guide (Hannam and Boer 2004: 7) notes, the recommended elements may be spread across several individual laws in a national legal and institutional system, or they may be contained within one comprehensive piece of legislation. Among the compelling reasons for developing a set of guidelines for national soil law, Hannam and Boer (2004: 5) list the following:

- Some national legislation lacks mechanisms to link or coordinate several individual laws on specific soil issues, so implementation may not be effective;
- Most legislation fails to make the inherent ecological characteristics and limitations of soils a primary consideration in land-use decision-making;
- Legislation generally does not recognise the central role of soil in ecology and ecosystems, biodiversity conservation and land use;
- Existing soil legislation tends to reflect short-term private interests rather than the long-term public interest, because it is usually enacted in response to a specific political issue rather than with the general goal of effective soil management in mind;
- Many individual laws lack a clear statement of purpose, or substantive provisions that are able to carry out a clearly stated purpose;
- Many laws do not contain the range of provisions needed to manage a particular soil problem effectively; and
- There are inconsistencies in the use of standard scientific soil terminology, and definitions are sometimes either absent or poorly stated.

The IUCN guidelines for drafting soils legislation have already been used as a benchmark against which to measure the performance of at least one major developed country, the United States. The evaluation, presented by Futrell (2007), reveals the outdated foundations of existing soil laws, enforcement failures, and the fragmented nature of efforts by the United States to protect its soil. Futrell praises the high quality of the national soils agency, monitoring procedures and soils data, the level of public participation and funding, and the leading role of the USEPA. However, these attributes are significantly undermined by the weaknesses in the existing regulatory framework. The US analysis demonstrates the important role that an authoritative guide can play as a tool for assessing regulatory frameworks.

'Guide' also apply in the context of site contamination, primarily because the two issues of soil use and site contamination are closely linked and public awareness of both remains low. Second, as for soil, the elements of a model law on site contamination could be made sufficiently flexible to be implemented either through several regulatory instruments or contained within one comprehensive piece of legislation. Third, the basis for international action on site contamination could arguably be found in the same place as for soil: the Montevideo Programme IV, which specifically mentions that laws and policies for improving the ‘restoration of soils’ should be promoted ‘where appropriate’ (United Nations Environment Programme 2009).

While a significant amount of work still needs to be done to draw international attention to the issue of site contamination, and the necessity of improving domestic legislation in this area, the model legislation on soil use can provide some inspiration for those involved. Specifically, a detailed global review of existing domestic legislation and international measures relevant to site contamination, together with an analysis of their strengths and shortcomings, could be presented to the IUCN or a similar organisation in an effort to persuade its members of the need to expand their current work to include site contamination. Such a review has already been commenced by the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) in Australia. Surveys have been completed by CRC CARE for much of North America, Europe, Australasia and selected Asian countries, for the purposes of its Contaminated Sites Law and Policy Directory (CRC CARE 2012).

Once approval is obtained from the relevant international organisation for further work on the issue, the next step would be to prepare a document on the elements and principles of a model legal framework for site contamination—along similar lines to the ‘Guide’ on soil use—and present this to the relevant body for endorsement and subsequent dissemination. Proponents of the model law on site contamination could go even further than this and proactively lobby multilateral and regional lending institutions to adopt the model in future projects. Countries providing aid or knowledge transfer to others under bilateral arrangements could also be persuaded to apply the model, if they are not already promoting their own national approach to site contamination.

8.3 Comparative Evaluation of All Options

Lending conditions imposed by an international or regional development bank could promote site contamination law in a general sense if they are incorporated into an instrument such as the EAP. For example, an EAP may require the borrowing country to assess the extent of site contamination and identify sites requiring remediation and to take appropriate measures to achieve remediation. Specific regulations for site contamination may also be promoted by way of a requirement that the recipient country adopt a particular model law as a condition to a multilateral, regional or bilateral loan. Alternatively, specific requirements may be imposed on the agencies or consultants carrying out the project work, as to how assessment, identification and remediation are to be undertaken, the creation of contaminated site registers, and other issues such as allocation of liability. The costs involved in meeting these detailed requirements could be met by the relevant lending institution or donor country.

Voluntary codes of practice used by industry sectors or multinational companies could promote better site contamination practices within the relevant industry or company, but not legal harmonisation. While industries or companies may sometimes be involved in the drafting of domestic site contamination law in some developing countries, this does not necessarily follow on from a voluntary code of practice. The benefits of voluntary codes are that they require minimal government action, supervision or expenditure, so developing countries may be more willing to allow their use. In some developing countries, the company or industry standards may also exceed those set by the national or local government, so more contaminated sites may be remediated, and to a higher standard, than might otherwise be the case. A code of practice devised by an international organisation would also promote harmonisation of domestic site contamination practices, but not law. Unlike corporate or industry codes, however, this type of code is not restricted to particular development projects or industry sectors.

A model law would clearly promote site contamination law because it would provide a ready-made, comprehensive regulatory framework specific to the site contamination issue. Countries could choose to adopt it in full, adapt it to their own socioeconomic and environmental conditions, or use it as a benchmark for their actions on site contamination generally. Of all the options for promoting site contamination law, a model law would be the best designed to address all regulatory aspects of the issue, as well as advocating the use of a specific law instead of general legislation or policy. Moreover, a model law would not reflect the interests of a particular industry, but rather be drafted with all the different stakeholders in mind, and with reference to the protection of public, environmental and social health.

The key advantage of a model law over other options, regardless of who promotes them, is that it can provide everything necessary for a specific legislative approach to site contamination. This would be particularly useful and straightforward for lending institutions and national aid agencies, which could require that the model law be used as a basis for development of any new legislation in a recipient country. The relevant institution or aid agency could assist authorities in the recipient country with implementing the elements and principles of the model law, and provide funding for legal and technical training as well as requirements such as the compilation of national inventories of contaminated sites.

By its nature, a model law gives the message to decision-makers that specific legislation is the preferable approach when dealing with site contamination. Even if some adaptations are made to the model law before it is enacted in a domestic jurisdiction, those adaptations would need to remain consistent with the overall objectives of the model law. Once the provisions of the model law are incorporated into domestic law, they are more difficult to ignore or to apply inconsistently. By contrast, a set of guidelines would most likely retain their policy status rather than be formalised into regulations. They would continue to be ‘voluntary’ instruments, which governments, professions, industries or companies could choose not to follow at whim.

It may be easier to promote the use of a model law on site contamination on a relatively ad hoc basis, rather than lobby a large organisation like UNEP for more detailed guidelines on the issue. Given UNEP's multitude of responsibilities and disproportionate lack of funding, the prospects of success for achieving detailed UNEP guidelines may be slim. UNEP may not be persuaded that more detailed guidelines are necessary. By contrast, the model law could be proposed wherever the opportunity arose: at international conferences, on internet fora, as well as at meetings of international organisations. To get to this stage, the model law may need a high-profile 'champion', in the form of an international organisation or group with recognised credentials in either site contamination or environmental protection generally (e.g., the International Committee on Contaminated Land).

It is essential to ensure that the objectives and provisions of the model law on site contamination would complement, rather than undermine, any other efforts to address site contamination at the international level. As the model law is likely to be developed more quickly than either a high-level soft law instrument or a multilateral agreement on the issue, there may not be a problem. It would then be an issue for drafters of the later instruments as to whether, and how, provisions of the model law might be complemented. However, where any steps are being taken on site contamination at the international level—even if it is only discussion of an informal proposal—efforts should be made to liaise with the relevant parties and exchange information. Both the proponents of the model law, and those working on the other instrument, should try to avoid inconsistencies wherever possible.

8.4 Conclusions

There are a few options for promoting domestic site contamination law, outside the framework of international law. Some of them are already being pursued in a piecemeal, uncoordinated fashion by international organisations, professional networks, and multinational companies. The impact of these initiatives on domestic regimes to date appears to vary, but it is clear from earlier chapters of this book that there has been minimal harmonisation of domestic site contamination laws so far. It is also evident from the analysis above that some of the alternatives to international law would only promote particular site contamination practices, not lawmaking on the issue.

A comparison of all the options in this section reveals that a model law would be well placed to promote domestic site contamination law if it is developed by an international organisation. A model law on site contamination would also be the strongest candidate for promoting better domestic site contamination law because its provisions would be specifically drafted for the purpose of legal implementation. It would encompass a broad spectrum of issues that are unlikely to be adequately addressed through other avenues due to the complexity of the site contamination issue.

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Chapter 9
Recommended Features of a Model Law on Site Contamination

9.1 Introduction

This chapter begins by examining the potential scope of a model law on site contamination. The model law must achieve a difficult balance between having specific, comprehensive provisions to cover all aspects of site contamination, and allowing countries sufficient flexibility to adapt the model to their own conditions and circumstances. The discussion of this challenge looks at whether new rather than existing (amended) legislation should be used to introduce provisions of the model law, and the possibility of including a universal definition of site contamination.

The main features of a model law are then addressed, in accordance with the summary in Table 9.1 below. This section begins with a brief discussion of the type of domestic legislation recommended for use, as well as a universal definition for site contamination. Other major features are then discussed, including the allocation of responsibility for site cleanup (including enforcement provisions, definition of responsible parties, and government responsibility for orphan sites); provisions on private professionals; a regulatory process for site identification, investigation, assessment and remediation; voluntary remediation and brownfield measures; post-remediation measures and public participation provisions.

Finally, the chapter examines how a model law might be developed and promoted in a practical sense. In particular, observations are made as to how concerns over a lack of legitimacy might be overcome, and how to secure the uptake of the model law among the countries most in need of site contamination law. The logistical challenges of preparing the model law and promoting it effectively around the world, potentially using a variety of avenues, are then considered.

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Table 9.1 Recommended key elements for a model law on site contamination

1. Specific law on site contamination
Legislation that addresses specific procedural aspects of site contamination management
2. Definition of site contamination
Clearly defined, to include contamination of soil, groundwater, surface water and sediment
3. Responsibility for remediation
Government responsibility (remediation of orphan sites)
Private responsibility (wide range of clearly defined liable parties + enforcement mechanisms)
Strict, retrospective and joint & several liability
Transfer of liability
4. Role of private professionals
Certification and accreditation
Roles and functions
Monitoring and auditing
5. Regulatory process
Identification (proactive + reactive)
Investigation (preliminary + detailed)
Assessment (technical standards + risk assessment)
Remediation (remediation planning, technical standards, and regulatory ‘sign-off’)
6. Voluntary remediation/brownfield measures
Voluntary remediation measures (financial + legal incentives, supervision by regulatory authorities)
Immunity from future liability
Brownfield redevelopment programs and funding
7. Post-remediation measures
Institutional controls (land use restrictions, proprietary controls + financial assurance)
Responsibility for long-term monitoring
8. Public participation
Publicly accessible site register
Public consultation provisions

9.2 Scope of a Model Law on Site Contamination

It has been suggested by some that initial legislation on site contamination in developing countries should be in simplified form to enable ‘emergency measures’ to be introduced early, pending more comprehensive and detailed legislation (UNEP/ADEME 2005: 43; Boyd 1999: 5). The emergency measures would target immediate and significant hazards. The reason for this is that many developing countries may not have the funds to remediate all contaminated sites, but there is a need to ensure that immediate action is taken to protect human health if endangered (Boyd 1999: 5). The priority placed by UNEP on what it considers one of the most urgent types of site contamination caused by persistent organic pollutants—is evident from initiatives such as the Africa Stockpiles Programme and international efforts to promote POPs-related legislation and policy (United Nations Environment Programme 2005).

While there are clearly merits to addressing the worst contaminated sites first, this should not necessarily be done through provisional measures, such as decrees and ordinances. There is a risk that the provisional measures would become permanent by default, and that less contaminated but still harmful sites would be left untreated. There is also a risk that the provisional measures would not be comprehensive in scope, and would be insufficient to cover even the most heavily contaminated sites. The need to regulate every aspect of site contamination through a cohesive, systematic approach has become evident through the experiences of developed countries over the past 30 years.

It is contended here that governments should first identify and prioritise their contaminated sites, then prepare or adopt a regulatory response that reflects these priorities. A model law on site contamination could be adapted to the special circumstances, needs and priorities of individual countries, provided its essential elements are not compromised. To avoid any unnecessary delay, governments of developing countries and economies in transition could be assisted financially and practically, by either bilateral or multilateral donors, in compiling the national survey and undertaking site prioritisation. They could also be helped to tailor the provisions of a model law on site contamination to their own circumstances, a process which could otherwise prove costly, time-consuming, and overwhelming when resources are limited.

To address site contamination in a comprehensive manner, a model law must encompass all aspects of the issue, from the first steps of identifying and investigating suspected sites to the 'final' step of post-remediation monitoring, although in some cases, post-closure monitoring may be an ongoing requirement without a specified end date. Specifically, a model law on site contamination needs to clearly define the responsibilities, rights and obligations of key stakeholders. It also needs to define precisely the nature, content and objectives of the various elements of actions and procedures, such as the identification of suspected sites, national contaminated site registers, site investigations and assessments, remediation procedures and post-remediation monitoring (UNEP and ADEME 2005: 43; Page 1997: 194).

It is important that new legislation on site contamination is accompanied by the establishment of specialised administrative services with sufficient and qualified staff to help with implementation (UNEP and ADEME 2005: 43). Once again, professional and technical training would need to be provided to staff in some developing countries to enable them to do this. It is anticipated that the costs and transfer of knowledge associated with such capacity building would be mostly met by developed countries, either as part of their foreign aid policy or motivated by prospects of an expanded market for their remediation services.

9.2.1 New Legislation Versus Amended Legislation

Specific legislation on site contamination is generally seen as preferable to a reliance on broad legislative provisions, such as environmental protection laws or anti-pollution laws (Berveling 2005: 163; Cairney and Hobson 1998: 21–22). Page (1997: 109) observed well over a decade ago that 'developing countries must take action specifically designed to contend with their contamination and environmental cleanup problem.' It should be noted that developed countries benefit equally from specific site contamination measures, even though many do not have them in place. However, the exact method of introducing specific provisions is not vital to the outcome. It may take place through stand-alone legislation or through amendments to existing general laws, but the key objective is that the introduction of the new law results in a comprehensive regime for site contamination (UNEP and ADEME 2005: 42).

As the main purpose of a model law on site contamination is to promote domestic site contamination law, it must be made as relevant and useful as possible to domestic decision-makers. To this end, the model law should be drafted in terms that are flexible enough to be either adopted directly in new legislation or used as a basis for revising broader, existing laws. This was the aim of the guidelines for drafting legislation on sustainable soil use, produced by the IUCN (Hannam and Boer 2004: 17). It is realistic to assume that minor changes or additions may be made to the 'generic' provisions of the model law, to more accurately reflect local conditions and needs (Hannam and Boer 2004). This is likely to happen in response to the prior assessment that should, ideally, be undertaken before the model law on site contamination is implemented in a given domestic context. Any changes made to the model law by an adopting country should remain consistent with the overall objectives of the model law.

9.2.2 A Universal Definition of Site Contamination

One of the most striking features of an overview of domestic regulatory approaches to site contamination is the diversity of definitions for site contamination and the related terms, 'land contamination', 'contaminated land' and 'soil pollution'. Definitions have evolved differently in response to domestic circumstances, and due to the lack of any coordination at the regional or international level. As stated earlier, the term 'site contamination' is preferred here because it encompasses all of the above expressions. It is not confined to describing one geophysical element (such as soil or water), and it avoids the ambiguity invoked by the term 'land'. Unlike the term 'contaminated site', it does not distinguish between past or future contamination, or between confirmed or suspected contamination.

It is not only for ease of reference that it would be desirable to promote a universally applicable definition of site contamination (Berveling 2005: 157). At present, the differences in terminology make it difficult to analyse and compare domestic approaches to site contamination. For example, one country may record only those sites with (historically) contaminated soil, while another may record all sites with confirmed, suspected and potential contamination. The data given by these countries to external organisations will therefore present an inaccurate overall picture of the site contamination problem. Divergent definitions also complicate the task of coordinating domestic regimes, such as those of the EU Member States, because each Member State may have its own definition and be resistant to change.

The proposed model law on site contamination should contain a definition of 'site contamination' that is applicable in all domestic contexts. It is hoped that this will not only make implementation of the model law more consistent across countries, but that it will facilitate a more detailed evaluation of the global incidence of site contamination.

9.2.3 Allocation of Liability for Remediation

9.2.3.1 Nature of Liability

The legal scheme stipulated by the model law should, at a minimum, include two key components: provisions for imposing strict liability and a statement on retrospectivity. As discussed in Chap. 5 above, these elements are essential because they provide a foundation for the effective remediation of historical contamination. Strict liability allocates responsibility for site remediation to the parties involved in a contaminated site, based on their legal relationship to the site and regardless of whether they were actually 'at fault'. A retrospectivity clause ensures that liability extends to the cleanup of inactive and abandoned sites, as well as any newly discovered contamination that may have been caused over a long period.

A model law should also include two other important features of liability allocation, both of which should be sufficiently flexible to allow countries to adapt them to their own needs. There should be a clear description of the range of parties that can be made responsible for site contamination, and the mechanisms that can be used for imposing responsibility (such as assessment and remediation orders). Depending on the economic, social and political circumstances of the country adopting the model law, these two categories may be broadly or narrowly defined (see, e.g., Boyd 1999). A relevant factor is whether the potentially responsible parties are likely to be predominantly private or state-owned entities.

There should be a detailed process of consideration, involving consultation with a wide range of stakeholders wherever possible, prior to making any decisions on the allocation of responsibility for site contamination within an individual country. Relevant factors for consideration include, for example, the number of contaminated sites requiring immediate remediation, whether the relevant polluters are identifiable and have sufficient financial resources to pay for remediation, and if not, whether an industry fund or public fund would be economically and politically feasible (e.g., the Contaminated Sites Remediation Fund (New Zealand) 2012; Soil Pollution and Groundwater Pollution Remediation Fund (Taiwan); see also Boyd 1999: 15).

It is important to note that, in developing countries, the consultation process would be shaped by the constraints of scarce resources, limited technical expertise, and possibly a lack of tradition of public consultation. However, it is hoped that financial and technical assistance could be made available to such countries, for example under bilateral aid programs, to facilitate a more informed deliberative process.

The UNEP Draft Guidelines for the Development of National Legislation on Liability, Response Action and Compensation for Damage Caused by Activities Dangerous to the Environment (United Nations Environment Programme 2009) (Draft Guidelines) set out key elements for possible inclusion in any domestic regime for environmental liability and contain specific provisions that can be directly applied by legislative drafters.

Under the Draft Guidelines, strict liability for damage to the environment is imposed on operators, with only a few exceptions (guidelines 5–6). Where there are multiple operators, joint and several liability may be applied or liability may be apportioned between them, as appropriate (guideline 7). 'Damage' includes loss of life or personal injury, property damage or loss, pure economic loss, costs of reinstatement of the environment, costs of preventative measures, and environmental damage (guideline 3.2). 'Environmental damage' means measurable and significant damage (guideline 3.3).

The commentary to the draft guidelines provides further details on how domestic legislation should expand on these key definitions and take particular measures to ensure the effectiveness of the guidelines (United Nations Environment Programme 2009: 8). UNEP has noted (2009: 12) that the draft guidelines are to be regarded as 'minimum guidelines on which national legislation could be based and which would require tailoring to specific national circumstances.'

9.2.3.2 Mechanisms for Imposing Responsibility

One feature of the proposed model law on site contamination is that it would combine aspects of the traditional 'command and control' approach, favoured by developed countries in the 1980s–1990s, with elements of complementary measures such as land use planning provisions, which have been invoked increasingly in more recent years in some developed countries (see Holder and Lee 2007: 164; Woodward 2008: 255). These mechanisms are discussed in more detail in Chap. 5 above.

It is necessary to use a combination of the two mechanisms because in some cases, the traditional approach focuses on the worst contaminated sites, leaving many (particularly 'brownfield') sites outside the legislative ambit. Page (1997: 76) noted that 'if [contaminated land] policies are to be effective, they must include mechanisms that force private parties to pay for cleanup or that allow governments to raise sufficient funds for this purpose'. Planning authorities now play an important role in the identification, assessment and remediation of contaminated sites in some developed countries, and this role needs to be reflected in the content of the model law. In some countries, this is a supporting role, but in British Columbia and the United Kingdom, for example, remediation is most commonly undertaken through the planning system (see Sheehan and Firth 2008: 71).

Developing countries with little or no experience in this area face the challenge of weighing up the advantages and disadvantages of the different regulatory approaches to site contamination (see, e.g., in the context of Nigeria, Adelegan 2008: 115–116). Their selection of a particular approach, or combination of approaches, is also likely to be shaped significantly by both internal and external factors, such as financial and political circumstances. It is interesting to note that, according to Anderson (2002: 2; see also Sect. 8.1.1, Chap. 8 above), international lending institutions have increasing influence over the choice of domestic regulatory approach:

> Because of their limited resources and often-severe pollution problems, developing nations increasingly are being asked to consider and implement incentive-based regulations for managing the environment. These requests come from multilateral development organizations such as the World Bank and the Asian Development Bank, as well as individual donor agencies such as USAID.

Other commentators, such as Luo et al. (2009), also promote the adaptation and use of the incentive-based approach by developing countries, with a clearly recognised role for planning authorities. An approach that allows for 'problem sites' to be identified and remediated first, and that allows for considerable flexibility, is encouraged (Luo et al. 2009: 1131). This could also be achieved by combining both traditional and non-traditional mechanisms in a model law on site contamination.

9.2.3.3 Remediation of 'Orphan' Sites

National governments will have to decide whether an industry tax for remediation of orphan sites is politically and practically viable in their own domestic context, depending on their existing taxation arrangements (Luo et al. 2009). An industry tax or fund will not be a viable option for remediation of sites contaminated by state-owned companies. This was the case for the remediation of state-owned sites in the former East Germany, for which the federal, state (*Länder*) and local governments in Germany have provided shared funding (see Case Study 4.1, Chap. 4 above). Nor may it be possible to implement such a scheme in countries where industry actors are unable to pay or enforcement powers are lacking. In such cases, governments may need to take the initiative of redeveloping 'orphan' sites themselves, with considerable cost implications.

9.2.4 Role of Private Professionals

Where appropriate to the local conditions, the model law should provide scope for regulating the role of private professionals in managing site contamination. This would be appropriate, for example, in countries where government authorities have delegated, or intend to delegate, some management tasks to professionals. These may include tasks such as site investigations, assessments and remediation plans, although ultimate decision-making powers are generally retained by the authorities.

Any provisions relating to private professionals should clearly define their role and functions, requirements for their qualification and certification, and the degree of regulatory oversight by authorities (such as monitoring and auditing requirements). These provisions help to ensure that the standards and performance of professionals is sufficiently high, and that they are being adequately supervised in their work.

9.2.5 Regulatory Process for Remediation

9.2.5.1 Prevention of Site Contamination

The model law should recognise explicitly that the prevention of site contamination is of equal importance to its identification and remediation. To this end, the model law could impose an obligation on operators of sites where there is a potential for contamination, to adopt good environmental practices in their activities (UNEP and ADEME 2005: 41). Good environmental practices would be designed to identify and minimise any risks of harm to public and ecological health posed by the relevant activities.

In addition, where harm or damage has not yet occurred, but there is an imminent threat of it occurring, the site operator should be obliged by the model law to take necessary preventive measures without delay. This is similar to Article 5(1) of the European Environmental Liability Directive 2004. Where the preventive measures are ineffective, or the operator is unable to carry them out, the model law should require the operator to inform the relevant authority as soon as possible (see, e.g., art. 5(2), Environmental Liability Directive 2004). The relevant authority should have powers to either compel certain preventive actions or undertake preventive measures itself, at the expense of the operator (see, e.g., art. 5(3), Environmental Liability Directive 2004).

It should be noted that the preventative measures proposed above would only be relevant to the extent that any existing general environmental protection legislation within each country fails to provide adequately for them.

9.2.5.2 Identification of Potentially Contaminated Sites

Generally, there are two methods of preliminary identification of potentially contaminated sites—‘proactive’ and ‘reactive’ identification—both of which can be used in the model law. ‘Proactive’ identification is where local or regional authorities (planning, environmental or public health) are obliged to locate all possible contaminated sites within their boundaries (as is required, for example, under Part 2A of the Environmental Protection Act 1990, United Kingdom). This may be done by undertaking historical surveys, reviewing past land registers, and checking existing sites where potentially contaminating activities are occurring.

Examples of procedures and checklists for site identification have been produced by the United Nations Industrial Development Organization (2012), Blacksmith Institute (2012c) and the United Nations Environment Programme/French Environment and Energy Management Agency (ADEME) (2005: 11). Site owners or operators can also be required by relevant authorities to submit an initial assessment of current and past management of the site (e.g., under sect. 10, Contaminated Land Management Act 1997 (New South Wales); Environment Protection Authority (New South Wales) 2000).

'Reactive' identification takes place where site owners, developers, polluters, occupiers and environmental consultants have a duty to disclose the existence of site contamination to health or environmental authorities once they become aware of it (e.g., in New South Wales, Australia: Department of Environment and Climate Change (New South Wales) 2009). Disclosure may also be mandatory, for example, when planning approval is sought for a change in land use (e.g., in Ontario, Canada: Ministry of Municipal Affairs and Housing (Ontario) 2007). A compulsory notification scheme, whereby applicants and vendors of sites used for industrial or commercial purposes submit relevant information to authorities, is widely used in British Columbia (i.e., the 'site profile' system: see Case Study 4.4, Chap. 4 above). Where 'reactive' identification obligations such as these are in place, significant penalties should be imposed for non-disclosure.

In some developed countries, once potential, suspected and/or confirmed contaminated sites have been identified, they are listed on a dedicated site register and prioritised for action (e.g., United States, Austria and Switzerland). Two issues that are likely to arise for the model law in an individual domestic context are which sites to include on the site contamination register (potential, suspected and confirmed sites, or only the latter), and whether to make the register publicly accessible. As the experience of the United Kingdom shows, a publicly accessible site register can be highly controversial, given the perceived impact on property prices for sites listed on the register (see discussion in Sect. 2.1.3, Chap. 2 above).

UNEP recommends that all countries prepare both a general inventory and a detailed inventory (UNEP and ADEME 2005: 19). The European Union has also considered a 'double inventory' system at the member state-level (van-Camp et al. 2004: para 4.3.1). The general inventory would involve searching for all potentially contaminated sites based on surveys and questionnaires sent to industries and residents. The detailed inventory would be based on lists compiled from 'census' surveys carried out for sites actually known or suspected to be contaminated (UNEP and ADEME 2005: 19).

While it is not crucial whether there is one overall inventory or two separate ones dealing with different types of sites, there are clear benefits to keeping a centralised list of both potentially contaminated sites and confirmed sites. This allows for a more informed and consistent prioritisation of sites, and for preventive or mitigating action to be taken as soon as resources permit. The scope of the national register will be determined by the financial and technical capacity of developing countries to identify and investigate all potential sites within their borders. It may be that in developing countries, only sites that are confirmed to be contaminated, or suspected to have serious or large-scale contamination, would be included on the national register initially.

The Blacksmith Institute's Toxic Sites Identification Program is currently assisting many developing countries with the identification and screening of contaminated sites, and the creation of national site inventories (Blacksmith Institute 2012a). It uses a simplified numerical ranking system, known as the 'Blacksmith Scale', to determine the threat to public health posed by each site. Relevant site data is collected and used to calculate a score between 1 and 10, with the latter indicating the highest risk to human health from pollution (Blacksmith Institute 2012b). However, this approach primarily emphasises risks to public health, whereas a model national approach should also take environmental impacts into account.

It is recommended that the model law include provisions for both 'proactive' and 'reactive' identification, to ensure that all practicable steps are taken by government authorities and stakeholders to identify and respond to site contamination at the earliest opportunity (Berveling 2005: 157). This will help to mitigate environmental and health impacts and perhaps avoid unnecessary remediation. The model law should also require governments to compile a national site contamination register or inventory (Berveling 2005; Van-Camp et al. 2004: para 4.3.1). However, the scope of the register or inventory, and the extent of any public participation during the identification stage, are decisions that should be left to individual governments.

9.2.5.3 Investigation of Suspected Contaminated Sites

The model law should provide that, once potentially contaminated sites have been identified, they are prioritised by reference to the hazardous nature of the contaminating activity and the presence and vulnerability of targets (or 'receptors') (see Luo et al. 2009: 1129; UNEP and ADEME 2005: 12). The model law should empower the relevant authority to require the site owner, operator or other potentially responsible party to undertake the investigation and submit a report (e.g., provisions for investigation orders under sect. 4, Contaminated Sites Remediation Act 1996 (Manitoba); sect. 41, Environmental Management Act 2003 (British Columbia)). This could be achieved by creating mechanisms such as administrative orders. The range of parties that can be required to carry out an investigation should be clearly stipulated in the model law.

Where possible, and permitted by the political and legal conditions of the individual country, the model law could provide for an appeal to be made to a specialist environmental court by parties identified as potentially responsible (see, e.g., appeals to the Clean Environment Commission under the Contaminated Sites Remediation Act 1996, Manitoba, Canada). The authority should also be empowered to carry out its own investigation of the site in the event that a responsible party cannot be found, and to recover its costs from responsible parties in cases where they have failed to act.

The purpose of the investigation process is to enable a decision to be made as to whether a site poses sufficient risk of harm to human or ecological health that a more detailed assessment is required (see, e.g., Department for Environment, Food and Rural Affairs and Environment Agency (UK) 2004: 16). The investigation may be carried out through a 'desktop study' combined with sampling and other on-site testing methods, depending on the technical capacity of the individual country (see, e.g., UNEP and ADEME 2005: 12). The outcome will be one of three possible decisions by the relevant authority: to take no further action, to require a more detailed assessment, or (for the smaller, more 'routine' sites) to proceed immediately to remediation (see, e.g., Department for Environment, Food and Rural Affairs and Environment Agency (UK) 2004: 16). Numerical values can be used to assist the authority in making this decision, although each country should be permitted to determine the applicable values.

In some cases, the investigation process will reveal sites that require urgent action to prevent or minimise harm (Department of Environment and Conservation (Western Australia) 2006: 1, 10). Some commentators (e.g., Boyd 1999: 5) suggest that developing countries should implement emergency measures for these sites before any other contaminated sites are addressed. Situations requiring immediate action may arise, for example, where explosive, inflammable or toxic substances are present in an unprotected public place, or where water or plants likely to be consumed by humans are contaminated (e.g., Canadian Council of Ministers of the Environment 2008: 10). Emergency measures may comprise evacuating, securing, isolating and remediating the source of contamination; 'capturing' the contaminants before they reach their target and removing them; and stopping or limiting the affected activity (see, e.g., Nathanail and Bardos 2004: ch. 8; Vegter 2001: 97–98). The model law could provide for such measures, in accordance with the remediation techniques and technical expertise available in the adopting country.

Other aspects of the general investigation process will also need to be individually tailored to the conditions of each country. For example, screening values are commonly used in developed countries to determine which sites require further investigation. However, screening values used in one country should not be transplanted directly to developing countries, because their living conditions and therefore the underlying exposure assumptions may differ from developed countries, or even other developing countries. Screening values therefore need to be carefully designed to reflect the particular living conditions and circumstances of each country.

The model law should only provide for the designation of screening values for use during the investigation stage, rather than going further and stipulating the actual values to be used in the subsequent remediation. Screening values in developed countries are not typically part of legislation relating to site contamination, instead being contained in more flexible and non-binding documents such as guidelines, policies or technical bulletins. The details of the screening values to be used in a country adopting the model law should therefore be contained in a subsequent instrument, such as a policy document or regulations. Carlon (2007: 26–27 and 99–100) observes that soil screening values are defined by special contaminated sites legislation or other national legislation in some European countries, whereas in others they are merely the subject of guidelines or policy documents. The choice as to which type of instrument to use should be left to the relevant government.

As noted above, the availability of technical expertise and financial resources affects the investigation provisions of the model law. There should be sufficient expertise within the adopting country to carry out tasks such as soil sampling, and it will be necessary to develop procedures and methodologies for such technical tasks to ensure accuracy and consistency of data. Some international initiatives are already underway to assist developing countries in adopting technical procedures for soil management (see, e.g., the African Soil Information Service, AfSIS: European Commission (Joint Research Centre) 2009).

Such measures should not be formulated in the model law itself, but rather in subsequent technical documents or regulations. The model law in its adapted form should not be so stringent as to make implementation difficult because the technical know-how or funding is inadequate. This is a judgment that should be made during the prior assessment process. In addition, a procedure should be included in the model law, wherever possible, for the accreditation of laboratories carrying out soil testing and other technical analysis.

9.2.5.4 Risk Assessment

The current practice in most developed countries is to undertake a risk assessment once a decision has been made by the relevant authority, based on the initial site investigation, that a site is sufficiently contaminated to necessitate further assessment (see Nathanail and Bardos 2004: 96–97). The aim of the risk assessment process is to determine whether the level of contamination present at a site poses a sufficient threat to human or environmental health to make remediation necessary or advisable (Landcare Research 2012). Assuming remedial action is recommended, the process would then lead to an evaluation of the most appropriate remediation options for the site in question. In the UK, this process is called ‘options appraisal’ (Department for Environment, Food and Rural Affairs and Environment Agency (UK) 2004: 22). A clearly defined risk assessment procedure is an integral component of a model law on site contamination.

Risk assessment can be undertaken using one of two different methods, or a combination of both (Concerted Action on Risk Assessment for Contaminated Sites in the European Union (CARACAS) 1998: 15). One method of risk assessment is a relatively straightforward exercise involving the usage of generic numerical values to determine whether remediation is required. The level of contamination at the relevant site is compared with national or international recommended levels for safe exposure, and action is taken if acceptable levels are exceeded.

Some contend that the use of generic numerical values is limited by factors such as the exposure period, differences in land use, and the inherent uncertainties in dealing with contaminated land (CARACAS 1998: 15–16; Sheehan and Firth 2008: 72). However, in general, fewer technical and financial resources are needed to apply the numerical values approach, and this is likely to influence developing countries in their choice of risk assessment process.

The second method, site-based risk management (SBRM), uses numerical values to eliminate sites that are not sufficiently contaminated and then applies risk assessment procedures to the remaining contaminated sites (Contaminated Sites Management Working Group (Canada) 2002: ch. 2). SBRM involves a much more detailed process of collecting data both on-site and off-site to determine the condition of the site, the extent of contamination, the nature of the hazards it presents, current and future uses of the site, and any impacts on surrounding areas and populations (Contaminated Sites Management Working Group (Canada) 2005: 3.1.2; Department for Environment, Food and Rural Affairs and Environment Agency (UK) 2004: 20). A range of possible remediation options are then identified and their cost effectiveness discussed. Once all of the relevant information has been analysed, the data and conclusions should be compiled in a detailed technical report. UNEP (2005: 24) recommends that the remediation options and their associated costs should also be included in this technical report. It is generally accepted that site-based risk management offers the most flexibility for decision-making on contaminated sites, because it takes into account the particular conditions and uses of each site (Sunahara et al. 2002: 207; CARACAS 1998: 15–16).

The prior assessment process for the model law will enable each country to choose which risk assessment approach is appropriate for their needs and capacity. The model law could provide a broad test to help decision-makers determine whether remediation is required for a site, such as whether there is a ‘significant risk of harm to human health’ based on the information available. Efforts have already been made to compile decision-support systems for site contamination decision-makers, both generally (see Bardos et al. 2001; Critto et al. 2002) and in the specific context of persistent organic pollutants (United Nations Industrial Development Organization 2010).

If numerical values are to be used, they should be developed in accordance with the particular conditions of the relevant country. However, these numerical values should not be the same as those used during the identification and investigation stages (Kadūnas et al. 2006; Hong Kong Advisory Council on the Environment 2006: 1–3). They should not be imported directly from other countries, but should be considered in the light of local background levels and adjusted if necessary (CARACAS 1998: 15–16; UNEP and ADEME 2005: 29). In addition, the use of numerical values should be referred to in the model law as essential for decision-making at the risk assessment stage, to ensure that they are consistently and appropriately applied. This would help to avoid the tendency to invoke screening values as ‘de facto’ cleanup standards, which has already been a problem in

Australia and elsewhere (National Environment Protection Council (Australia) 2006: 3, 15; Nathanail and Earl 2001: 94–95).

Detailed risk assessment may be more difficult in some countries for several reasons (UNEP and ADEME 2005: 25; Blacksmith Institute 2009: 15). First, there may not be enough technical expertise available to analyse the potentially contaminating activity or its associated risks, particularly if there are many suspected sites (in the context of China, see Luo et al. 2009: 1125). Second, there may be no available data on a site, if documented records have not been consistently maintained or the previous site owner no longer exists (in the context of economies in transition, see Boyd 1999: 8). Third, verbal accounts of the history and operation of a site are often unreliable and need to be cross-checked, if possible, with other available information (Blacksmith Institute 2004: 15). Finally, financial constraints may limit the range of information sources used during the risk assessment (Luo et al. 2009: 1126). To help overcome these problems, the model law should be adapted to reflect the available technical and financial resources.

9.2.5.5 Risk Evaluation Process and Remediation Decision

The next procedural stage that should be included in the model law is that of risk evaluation. During the risk evaluation process, a decision-maker considers the technical information provided by the risk assessment in the context of a range of other factors, then makes a final decision on the most appropriate approach for managing the relevant risk (e.g., in Australia: National Environment Protection Council 1999: 7). The other factors that may be considered by the decision-maker during this process include social, economic and political factors (Vik et al. 2001: 121). The final decision is usually known as the ‘remediation decision’, although it may not necessarily involve actual remediation (e.g., it may involve removing the target of the contaminants, ceasing the activity causing the risk, or simply containing the contamination).

In some developed countries, much of the risk evaluation is undertaken by site contamination consultants, who then provide their information or assessment to the authority responsible for making the final decision (e.g., British Columbia: see Case Study 4.4, Chap. 4, above; however, there is also evidence of this occurring in Latin America: Marker et al. 2007: 3). Where consultants are used, the authority’s role is often limited to deciding which remediation option should be pursued. In making this decision, they must refer to the relevant legislation or policy to determine the applicable remediation goal or standard (see, e.g., Government of Victoria (Australia) 2002: Table 2 and para 23).

The practice of delegating the risk evaluation process to private individuals or firms (sometimes referred to as ‘environmental auditors’) has arisen partly because they have greater expertise and more technical resources. However, the need for professional accreditation and the procedure to be followed by such consultants is rarely specified in the relevant legislation, but may instead often be addressed through guidelines or policy (e.g., Department of Environment and Conservation (Western Australia) 2006).

This is a problem that should be rectified wherever possible in the model law, for example by requiring the accreditation of parties undertaking risk assessment work, and the certification and supervision of environmental auditors. For example, in British Columbia, a specialist independent panel oversees the licensing and performance of private professionals (see Case Study 4.4, Chap. 4 above). Given that risk assessments may often be carried out by private consultants and laboratories, with minimal supervision (if any) by government authorities, there should be some quality control procedures in place to ensure that personnel are adequately qualified and the correct methodologies are used (National Environment Protection Council (Australia) 2006: 53, 59). The inclusion of accreditation requirements and procedures in the model law, however, is reliant upon the expertise and facilities available in the relevant country.

It is recommended that for the model law, a flexible approach to the remediation decision is used, taking into account the particular features and dynamics of each site, current and likely future uses, and the cost-effectiveness of alternative remediation methods (UNEP and ADEME 2005: 29). If strict remediation goals are used, for example returning a site to pristine or background levels, or making it safe for residential use, then many sites may go untreated and remain disused because remediation is too costly (Boyd 1999: 5). This is particularly likely in developing countries, which may not have the considerable financial resources needed to remediate sites to such a high standard. Again, technical expertise must also exist within government departments, public authorities and the private sector (e.g., site contamination consultants) to allow the site-based risk assessment approach to succeed.

The model law needs to clearly define the appropriate criteria to be applied during this decision-making process (European Co-ordination Action for Demonstration of Efficient Soil and Groundwater Remediation (EURODEMO) 2005: 23–24, 29–30). If possible, it also needs to provide for community participation at this stage, because of the impact that various remediation options may have on local residents, the wider community and the environment (e.g., public participation provisions in British Columbia, Canada: see Case Study 4.4, Chap. 4 above). In general, the more involved the affected community is in the remedial decision-making process, the greater the likelihood that the eventual remediation decision will be accepted by it (EURODEMO 2005: 24). However, the level of public participation, if any, will ultimately be determined by political and cultural considerations. The model law should promote transparency for the final decision on which remediation option should be used.

There are additional provisions that could be considered by individual governments for optional inclusion in the adapted model law. In some developed countries, there are appeal rights for potentially responsible parties in relation to the remediation decision (e.g., sect. 61, Contaminated Land Management Act 1997, New South Wales, Australia). Appeals may be made, for example, to challenge the allocation of responsibility for remediation, or the cost effectiveness of the chosen remediation option. It would be advantageous to create a specialist environment court, if one does not already exist, with the knowledge and experience to hear the appeals.

If the circumstances of the individual country permit, the model law should include the requirement of a health and safety plan for each site, together with the minimum criteria to be addressed in each plan (e.g., Environment Canada (Ontario Region) 2012; National Environment Protection (Assessment of Site Contamination) Measure 1999 (Australia): sched. B(9)). The health and safety plan would be developed on a site-by-site basis and set out specific occupational health and safety requirements for workers involved in both the assessment and remediation of contaminated sites.

At a minimum, the health and safety plan should take into account the following matters: the nature of the work, the substances involved, and associated risks; training and information of staff based on identified risks; individual protection equipment; organisation and zoning of worksite, and procedures to be followed (National Environment Protection (Assessment of Site Contamination) Measure 1999 (Australia): sched. B(10); UNEP and ADEME 2005: 37). It should also refer to public health guidelines to be used at each site to protect local communities during site assessment and remediation works. These provisions would help to minimise health problems of workers and communities and consequently avoid extra costs in the short to longer term.

One further provision that countries could choose to include in the model law is the designation of responsibility, to either a public authority or an environmental auditor, for supervision and 'final' approval of the remediation works (see, e.g., Environment Agency (UK) 2010; Department for Environment, Food and Rural Affairs and Environment Agency (UK) 2004). 'Final' approval helps provide certainty regarding the remediation of a site when it is sold or transferred, although it may not remain effective if further contamination becomes apparent after the remediation works have been completed. As final approval may determine the legal status of the site, it is important that the role of the relevant authority or auditor is clearly defined in the model law. While this is not a mandatory provision for the model law, it is desirable for ensuring a comprehensive regulatory framework and minimising uncertainties and gaps.

9.2.5.6 Remediation Options

There are several options available for the remediation of contaminated sites. The model law should refer to the need to consider a range of available remediation options, although as is currently the practice in developed countries, details of these remediation options and the relevant criteria for selecting the most appropriate option should be left to subsequent policy or regulatory documents (Department for Environment, Food and Rural Affairs and Environment Agency (UK) 2004: 22–32). During the prior assessment process, before the model law is adopted, the list of remediation options should be devised in accordance with the technical and financial capacity, and the remediation goals, of the individual country.

The most common solution to site contamination in most developed countries has been to remove the contaminated soil and take it elsewhere, usually to a landfill site (Nathanail and Bardos 2004: 127; Randall 2007: 62). This is an expensive and short-term option, and it does not necessarily involve treating the contaminated soil, so the problem may merely be relocated (Luo et al. 2009: 1126; Nathanail and Bardos 2004: 128). The removal of contaminated soil may be more acceptable if appropriate treatment and disposal facilities exist (Nathanail and Bardos 2004: 129; UNEP/ADEME 2005: 30). Such facilities are more likely to exist in developed countries than developing countries, due to the cost and specialised technology required to build them. If these facilities are available, it is possible to treat the excavated contaminated soil at a separate location, using washing, thermal and microbiological methods (Morgan 2008: 39). The ‘cleaned’ soil can then be either returned to the original site or used for other purposes elsewhere.

Another option for remediation, which is commonly used in developed countries, is to secure or contain the contamination on-site (Nathanail and Bardos 2004: 130). Securing can be done using protective barriers to isolate the source of contamination, or to prevent or limit its migration into the natural environment. Containment can be effected by immobilising the contaminants in the soil, using stabilisation or solidification methods (Morgan 2008: 39). Phyto-remediation and bio-remediation are options for in situ treatment, whereby the contaminated soil or water is treated without being displaced (Rajakaruna et al. 2006: 25). The main implications of using the securing or containment approaches are that long-term monitoring and maintenance may be required, and that the future land use may be restricted (Morgan 2008: 40).

The need to pursue less expensive and less technically-demanding remediation options in some developing countries is recognised by Rajakaruna et al. (2006: 26). UNEP/ADEME (2005: 37) suggest, in relation to developing countries, that

> securing or rehabilitating of sites known to be contaminated should, as a rule, primarily and initially, involve the application of relatively simple and inexpensive techniques that can be implemented with local resources and expertise.

On this basis, UNEP/ADEME recommend that developing countries avoid costly soil washing and heat-treating methods wherever possible, in favour of isolation, stabilisation and solidification techniques. They also suggest (UNEP and ADEME 2005: 37) that, in countries that are still in the early stages of addressing contaminated sites, ‘technical expertise can be acquired either by developing local knowledge or through technology transfer via partnerships with experienced foreign companies or organizations.’

These observations should inform the prior assessment process for the model law on site contamination. They also reinforce the need for flexibility in drafting the initial provisions of the model law, so as to allow countries to formulate a remediation approach that best suits their needs and conditions.

9.2.6 Voluntary Remediation/Brownfield Measures

The word ‘brownfield’ is defined differently around the world. Tang and Nathanail (2012: 841) note that, despite the lack of a universal definition, the term ‘brownfield land’ is commonly used to refer to derelict or contaminated land that appears during de-industrialisation and suburbanisation. The World Bank (2010) uses the word ‘brownfields’ to describe ‘derelict or underused sites with real or perceived contamination problems that create an obstacle to their development potential’. It is also important to acknowledge that not all brownfield sites are contaminated, and not all contaminated sites are brownfields (Turvani et al. 2006: 2).

The term ‘brownfield site’ is defined in federal legislation in the United States as ‘real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant’ (Small Business Liability Relief and Brownfields Revitalization Act 2002). In the United Kingdom, brownfield land is generally understood to mean previously developed land, whether or not the land is currently being used (Department of Communities and Local Government (UK) 2011: Annex B).

However they are defined, brownfield sites have presented particular challenges to developed countries because they have persisted despite (and sometimes as a result of) the use of traditional regulatory tools to manage contaminated sites (Guignet and Alberini 2008: 2). Site owners and developers may be reluctant to redevelop brownfield sites in case they are held liable for any contamination found on the site (Smith 2008: 1). Legal uncertainty as to who might be identified as potentially responsible parties for site contamination has been one of the main obstacles to brownfield redevelopment. However, the benefits of redeveloping brownfield sites are well recognised: a reduction in risks to public health, the improvement of social wellbeing, and the reduction of urban sprawl (Smith 2008: 1). More generally, the reuse of brownfields also contributes to economic development and community revitalisation (World Bank 2010: 1).

A number of novel measures have emerged, particularly in the United States, for addressing brownfield sites (Smith 2008: 1). In a practice commonly referred to as ‘brownfields development’, remediation may be undertaken on a voluntary basis by developers, with government incentives in the form of accelerated planning approval, more development concessions, tax relief and assurances of no (or limited) future liability (Smith 2008; Guignet and Alberini 2008: 2). Economic incentives are viewed by some as the ‘best tools’ for promoting brownfield reuse (Infrastructure Canada 2008: 7). Regulatory conditions are also being eased in Canada to encourage brownfield development, and tax credits for remediation costs have been made available to developers in the United Kingdom and Australia (Smith 2008: 3–4).

The issue of residual or future liability may arise where further remediation is required at a site that has already been remediated. It is increasingly common to remediate a contaminated site by leaving the contaminants in situ, and either treating them and/or constructing a barrier to prevent them from having a negative impact on the surrounding site. While this tends to be a less expensive and more straightforward cleanup option than other methods, it leaves open the possibility that further contamination will be found in the future, or that changes to the site use may require more 'complete' remediation. This is a problem that needs to be addressed in any model law on site contamination, to ensure that all liability issues are adequately covered. It should contain clear stipulations as to how residual liability is to be considered throughout the decision-making process, the range of parties to whom it may be allocated, and the relevant factors to be considered when allocating liability.

There is evidence that brownfields policy is already being used to some extent in the more developed Asian countries (e.g., Hong Kong, see Smith 2008: 1, 4) and Latin American countries (e.g., Brazil, see Marker et al. 2007: 3). According to Smith (2008: 11),

> the urgent and effective application of brownfields policies to growing Asian and other cities, consistent with specific local national needs and policies, will contribute to minimising urban sprawl globally.

In some developing countries, incentives are being used to promote the broader goal of effective environmental management (Anderson 2002: 9; Adelegan 2008 115–116). It may be possible to extend these to brownfield redevelopment without much difficulty, if guidance is made available in the form of a general framework (e.g., World Bank 2010). Smith (2008: 4) contends that 'scientific and planning methodologies [for brownfields development] are readily available which may be adapted and applied in most countries'. He argues (2008: 7) that essential components of brownfield development include the availability of funding, accurate cleanup estimates, effective community involvement, successful negotiations with regulators, and cost-effective and efficient cleanup.

The imposition of land use controls at the local or regional level, involving the use of institutional and engineering controls, are seen as key to facilitating brownfield reuse (Smith 2008: 6; World Bank 2010: 9–10). In the United Kingdom, a strong liability regime acts as a powerful incentive for voluntary remediation, even where no site redevelopment is intended but the site is simply to be sold. The experience of the United States and elsewhere also shows that financial incentives for voluntary remediation should be facilitated in any model framework for site contamination. Some choices would need to be made by individual countries regarding which legal and financial incentives to use, such as whether sufficient funding could be made available, which sites would be prioritised, and how voluntary remediation would be supervised. A useful summary of the range of legal and financial incentives that are available is provided by the World Bank (2010: Table 3).

According to the World Bank (2010: 8), clear environmental objectives and a strong regulatory framework are needed to facilitate brownfields redevelopment in any country. It notes (2010: 8–9) that

> strong brownfields legislation may be warranted if the extent of the brownfields problem calls for it. Such legislation should set *clear national objectives and standards* to be followed by public and private actors and by public-private entities. Standards should

specify "how clean is clean" (that is, set remediation guidelines depending on types of contamination and types of end-uses), and should differentiate between brownfields that pose an immediate health hazard and those where contamination is contained.

[...] Ultimately, clear objectives and standards can eliminate confusion and diminish the possibility of relying on courts to decide who's liable for what. By the same token, flexibility of standards is key, not just for economic considerations, but also because of advances and innovation in assessment and remediation technologies.

These important considerations should inform the choice of specific brownfields provisions for inclusion within a model framework for site contamination, whilst retaining the flexibility of allowing individual governments to develop their own standards.

9.2.7 Post-remediation Measures

Post-remediation measures include institutional controls, engineering controls and any other tools that may be used to protect human health and the environment and ensure the long-term effectiveness of site remediation (United States Environmental Protection Agency 2005: 6). Institutional controls relating to post-remediation are primarily designed to ensure that clear and binding obligations are imposed on land-holders and their successors in title to prevent them from interfering with any contaminants retained on site. Such measures also ensure that any ongoing site monitoring requirements are made legally enforceable (Uniform Law Commission 2003).

Post-remediation measures are sometimes referred to as 'aftercare' or 'long-term stewardship'. The latter may be defined (World Federation of Scientists 2004: para v) as encompassing:

the establishment and maintenance of physical and non-physical controls, implementation entities, authorities, accountability mechanisms, information and data management systems and resources that are necessary to ensure that cleanup sites with residual contamination that does not allow for unrestricted use or with ongoing waste management responsibilities after completion of response action remain protective.

The USEPA defines long-term stewardship more succinctly as applying to 'sites and properties where long-term management of contaminated environmental media is necessary to protect human health and the environment' (United States Environmental Protection Agency 2005: 6).

In the United States, the Uniform Environmental Covenants Act (UECA) is an example of model legislation that has been widely adopted at the state level to provide effective post-remediation measures (Uniform Law Commission 2012). The purpose of the UECA is to provide clear rules for states and federal agencies to create, enforce and modify an 'environmental covenant' to restrict the use of contaminated sites. A wide range of potentially affected parties may be included in the scope of the environmental covenant by consent. The UECA is the subject of a more detailed case study in Chap. 6 above.

Given the growing preference for less stringent remediation goals, and for leaving contaminants in situ, it is likely that the remediation of many individual sites will need to be 'revisited' in the future (Patton and van Cleve 2003: 79). This may happen in both developed and developing countries, particularly if the latter take the 'least costly and least technical' approach to remediation that is recommended by UNEP. The need to revisit the remediation of a site may arise for one of a few reasons: the selected remediation method may not have been completely effective; a better scientific understanding of the contaminant(s) may be gained; health standards could change; and/or the future use of the site may be upgraded, for example from industrial use to residential use.

To cover all these possible eventualities, the model law should contain specific post-remediation measures. Most regulatory regimes lack such measures, even though the need for them is becoming clearer. Strasser and Breetz (2003: 31) comment that 'institutional controls can be effective only if they are legally and practically enforceable'. If inadequate post-remediation measures are in place, the prompt treatment of further contamination could be delayed by lack of monitoring data and by legal action to determine liability. In addition, if the local community is not kept informed any new remediation issues, public and environmental health may be put at risk unnecessarily (UNEP and ADEME 2005: 52).

The model law should contain requirements for the continued monitoring of sites following the conclusion of the remediation works, particularly where the contaminants remain in situ. This would help assess the long-term effectiveness of the chosen remediation method and detect any problems as they arise. The relevant authority should have the power to require responsible parties to provide monitoring data and reports. Further assessment and remediation can be required if the monitoring shows that remediation has not been completely effective and a potential risk remains to human or ecological health (see, e.g., sects. 103H and 103J, Environment Protection (Site Contamination) Amendment Act 2007*,* South Australia).

Throughout the entire post-remediation process, the local community and other stakeholders should be given access to monitoring data and any other relevant information, for example how they will be affected by any new remediation works. The importance of stakeholder access to site information is emphasised in the legislative notes to Uniform Environmental Covenants Act (Uniform Law Commission 2003: 5; see also Strasser and Breetz 2003: 36). Countries adopting the model law should also consider whether post-remediation provisions should include a requirement to keep a public record of the site remediation undertaken, possibly with details of the extent of remediation and any residual contamination (see, e.g., United States Environmental Protection Agency 2005: 19).

There are additional provisions for post-remediation that are recommended, but remain optional, for inclusion in the model law. First, where a site has been remediated only for a particular use, or other restrictions are in place, the model law could specify actual methods for officially recording these limitations or restrictions. The importance of keeping official records of land use restrictions is discussed by Schilling (2003: 291). Second, the model law could designate responsibility to identifiable parties for ensuring that the limitations and restrictions on site use are observed. Sanctions could be imposed on parties who fail to observe limitations or restrictions (see, e.g., Bellot 2003: 102). Third, the model law could contain a requirement for future remediation where new technology becomes available or knowledge of particular contaminants and their effects improves.

9.2.8 Public Participation

Communities, particularly in developed countries, are increasingly demanding access to information on contaminated sites, and participation in the relevant decision-making processes (see generally, Waite 2010: 362). For example, contaminated site registers in some jurisdictions are now publicly accessible (e.g., Switzerland and British Columbia, Canada). However, property owners and developers generally oppose any initial moves to make a site register public, as it can affect the value of a property. In the United Kingdom, for example, such concerns led to the abandonment of a proposal to create a register of contaminated sites (Syms and Simons 1999: 122). Allowing broad public participation offers benefits for the community and environmental health, and may play an important role in deciding the appropriate action for a particular site.

However, in developing countries, there may be little or no existing provision for public participation in any decision-making processes (see, e.g., Luo et al. 2009: 1132), and it may be difficult to persuade governments to change political and cultural traditions. This is one limitation of the model law on site contamination that must be recognised at the outset, and could affect every procedural stage of site management, from identification through to post-remediation. As a result, the degree and form of community involvement, if any, should be given careful consideration in the context of the particular cultural and political circumstances of the relevant country (International Association for Public Participation 2007).

9.3 How a Model Law on Site Contamination Might Be Developed

9.3.1 Achieving Legitimacy, Transparency and Sensitivity to Local Conditions – Prior Assessment and Consultation

While the controversy surrounding harmonisation in general has been discussed in Chap. 6 above, the specific issue of a model law has been mentioned only in brief. To recap, the main concerns regarding harmonisation generally are that the process—and subsequent outcome—lacks legitimacy, transparency, and sensitivity to local conditions. To critics, harmonisation specifically through a model law would display all of these objectionable attributes.

It is conceded that some harmonisation efforts in the past, including the introduction of model laws in developing countries, have warranted criticism. Where a model law or any other form of harmonisation has been imposed on a country with little or no prior consent, consultation or analysis, it most likely does not accurately reflect the needs, circumstances or wishes of the country it purports to help. It is both irresponsible and naive to assume that a model law can be transposed directly into the regulatory system of a country without adequate consideration of the needs and conditions of that country in advance (Pistor 2000: 2).

However, having learned from past experience, the problems traditionally associated with model laws can be overcome, and specifically in relation to a model law on site contamination. It is contended here that the potential benefits offered by the model law, and in particular the opportunity it presents to ‘leapfrog’ developed countries in the management of site contamination, outweigh the drawbacks. At the same time, the limitations of a model law on site contamination must be acknowledged. There are some aspects of the model law, such as particular liability provisions, that would work for some countries but not for others. These aspects must be kept flexible enough to allow for adaptation, or the use of alternative provisions, where needed.

The drafting guidelines prepared by the IUCN for sustainable soil legislation provide an interesting example of how a model law can be directed at improving domestic law at different levels, while remaining sensitive to local conditions. The guidelines are intended to be used as a ‘basis’ for the development and/or reform of soil legislation, policy and institutions (Hannam and Boer 2004: 30). They are designed to be used either to introduce specific new legislation, integrate specific new provisions into existing environmental law, or to frame a broad new environmental law (Hannam and Boer 2004: 6). The suggested legislative elements are open to adaptation by policy makers and legislative drafters. As the authors of the guidelines note, ‘different geographic, demographic and land use contexts will demand different approaches’ (Hannam and Boer 2004: 30).

The key factor in gaining acceptance for a model law will be in ensuring its adaptability to the circumstances of individual countries. This can be maximised through a detailed prior assessment and consultation process for each country in which the model law is to be applied (UNEP and ADEME 2005: 43). Once a decision has been made by a government ‘in principle’ to adopt legislation based on the model law, a staged process should be undertaken in accordance with a set timeline, with technical and financial support if available and required. Broad participation in this process is also desirable as far as possible as it would likely ensure greater public awareness of the issue, more legitimacy and transparency for the lawmaking process, and more effective implementation in the longer term.

To enable the legislative and policy regime to be appropriately tailored, the prior assessment process should clearly identify the main legal, physical, cultural, institutional and socioeconomic factors that need to be taken into consideration in the new regulatory approach (Hannam and Boer 2004: 28). In particular, it should consider the technical and financial resources available to the relevant country for dealing with site contamination (UNEP and ADEME 2005: 43). It should also evaluate the extent of the domestic site contamination problem, as far as is known, and identify the main parties and contaminants involved. Essentially, the prior assessment should paint a picture of the particular site contamination problems and needs of a country, set within their broader domestic context.

Any new site contamination legislation would need to be carefully coordinated with the existing legislative framework in the receiving country, especially legislation on environmental protection, land ownership and land use (UNEP and ADEME 2005: 43). If possible, it should be discussed in consultation with a wide range of stakeholders, including representatives of public authorities, land developers, property owners, site contamination professionals, lenders, insurers, scientists, community groups and environmental groups, to ensure that its provisions are balanced and effective (UNEP and ADEME 2005: 39). There may be reluctance on the part of governments to allow broad participation where there is no strong tradition of public involvement in decision-making (Kirkpatrick and Parker 2004: 336). However, this may change eventually, given the emerging presence and involvement of environmental organisations and community groups in many developing countries.

These preconditions to the adoption of a model law should help overcome most concerns regarding a lack of legitimacy, transparency and sensitivity. A model law that accurately reflects the circumstances of the country adopting it has much to offer for the effective resolution of site contamination problems, and would be far preferable to generalised or non-existent legal provisions on the issue. Instead of losing valuable time and resources dealing with site contamination on an ad hoc basis, through ‘trial and error’, the adopting country will have the tools to prioritise sites and address them effectively first time around. This could avoid significant health and safety risks and environmental damage in the immediate to longer term.

9.3.2 Securing the Uptake of Legislation Based on the Model Law

A model law also needs to be a viable option for both those promoting its use and countries considering its adoption. For developed countries intending to revise their existing legal regimes on the basis of the model law, viability is not likely to be in question as they will usually have sufficient funds and technical resources to do so. It may only involve drafting new legislation, shifting resources around and retraining professionals. For most developing countries, however, the adoption of a model law on site contamination would be a relatively costly exercise, which may be difficult to justify when financial and other resources are already stretched. It is understandable that a developing country with pressing social welfare and public health problems would want to prioritise these instead of environmental issues, particularly less visible ones such as site contamination.

Still, site contamination problems will not be resolved if left unaddressed, and in fact in some instances they will become much worse, with implications for humans and the environment. The adoption of a model law may become a much more desirable and attainable goal for developing countries if financial and technical assistance could be provided, at least partially, by an international organisation or via developed countries through their aid programs. For example, UNEP or a global or regional bank may provide some funding for the prior assessment and consultation process, while organisations such as the IUSS could provide international soil scientists and other professionals to assist their local counterparts. Expertise and training could be provided, both initially and on an ongoing basis, to make the new law workable, once again most likely through aid programs.

The work of not-for-profit organisations such as the Blacksmith Institute, with its Toxic Sites Identification Program (see Chap. 2 above), is facilitating a clearer understanding of the site contamination problem in developing countries and those with economies in transition. As awareness of the issue grows, the political momentum for regulatory measures to manage site contamination is also likely to build within these countries.

As mentioned earlier, the technical provisions of the model law can also be tailored to the capacity of the relevant country to manage site contamination. UNEP (2005: 43) contends that recommendations to adopt regulations that would be 'technically and economically unrealistic in a given national context' should be avoided, because these would merely result in a 'dig and dump' approach. There is also a contention that new site contamination legislation in developing countries should not impose 'unnecessarily stringent standards' in relation to assessment and remediation, otherwise many contaminated sites will be left unremediated, and any remediation that is undertaken will be costly (Boyd 1999: 5).

For these reasons, developing countries could choose to stipulate only the most basic and cost-effective methods of site identification, assessment and remediation in their version of the model law. However, it is conceivable that the technical capacity of the relevant country to address site contamination would grow over time and with adequate assistance. Therefore, the provisions of the model law should be sufficiently flexible to allow for more detailed or stringent requirements in the future. The supply of financial assistance and/or technical expertise by the relevant international organisation or aid donor could also be increased over time, as and when the more complex provisions are to be introduced.

9.3.3 The Mechanics of Developing and Promoting a Model Law

It is not sufficient to identify the benefits and recommended elements of a model law on site contamination; a strategy for preparing and promoting the model law is also essential. The development of a model law is no small undertaking, requiring considerable resources, consultation with a wide range of stakeholders, and a rigorous drafting and review process. A timeline needs to be devised for this process, and potential high-level proponents of the model law need to be identified and approached. Other avenues for promoting the model law need to be explored in the event that a high-level 'champion of the cause' cannot be found. These logistical aspects will be key to the uptake of the model law by individual countries.

9.3.4 Who Will Prepare and Promote the Model Law?

9.3.4.1 An International Organisation as 'Champion' of the Model Law

The best potential candidate organisations for developing the model law are likely to be those with the broadest expertise on site contamination, sufficient resources and funding, and a demonstrated interest in promoting improvements to national site contamination law. At least one research program has been initiated at the national level—in Australia—to formulate a model framework for domestic site contamination law that could be applied in other countries (e.g., the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE), Australia). However, it may be that an international organisation or network would be better placed to develop model measures, given that its membership and audience would potentially be broader. With this in mind, some possible contenders are identified and discussed briefly below.

The International Committee on Contaminated Land, which calls itself 'an informal forum for international exchange and cooperation' on contaminated land issues, has existed since 1993. It holds regular conferences, attended mostly by staff from government environment departments, environment protection agencies and planning authorities, academics and remediation industry representatives (International Committee on Contaminated Land 2007). It has members from countries all over the world (Kasamas 2007: 4). While it is evident that the ICCL has a global and diverse membership, however, it appears to operate more as a 'loose network' and 'discussion forum' rather than as an engine for promoting regulatory reform or harmonisation. Therefore it is unlikely to instigate a model law on site contamination of its own accord, although it might be persuaded to promote it.

Similar to the ICCL, but with a mainly European focus, is the EU Common Forum on Contaminated Land (the Common Forum). The Common Forum describes itself as 'a network of contaminated land policy makers and advisors from national ministries in EU member states and EFTA countries' (Common Forum on Contaminated Land in the European Union 2008). It was also created in the mid 1990s, and has its own Secretariat. It is intended to be a platform for 'exchange of knowledge and experiences', and for the discussion of 'policy, research, technical and managerial concepts of contaminated land'. The Common Forum has been actively involved in discussions regarding the European draft Directive on Soil Protection, although its remit is sufficiently broad to facilitate exchanges within the EU on any contaminated land issues.

The experience of the Common Forum with the European Soils Directive could be advantageous when it comes to developing and promoting a model law on site contamination. The organisation would already be familiar with the political issues surrounding regional legislation on soil contamination, and the need to ensure provisions that are workable at the national level. The main obstacle may be that a model law on site contamination is an 'international' project rather than a European one, and therefore beyond the scope of the Common Forum. However, the organisation's mission statement says that, among other things, the Common Forum is to be 'a platform for initiating and following up of [sic] international projects among members' (Common Forum on Contaminated Land in the European Union 2008).

One further option would be to have the secretariat of a multilateral environmental agreement undertake the task of preparing the model law on site contamination. For example, in the context of hazardous waste management, the Secretariat of the Basel Convention prepared and disseminated a model national law to assist countries in implementing their obligations under the Convention. The model legislation on hazardous waste management is considered in more detail in the case study below.

Case Study 9.1 Model National Legislation for the Management of Hazardous Wastes

The Secretariat of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and other Wastes and their Disposal (the Basel Convention) prepared model national legislation for hazardous waste management in the mid 1990s, to assist countries in their developing or updating their national legislation and thereby their implementation of the Convention (Secretariat for the Basel Convention 1996). The model legislation is in two parts, and includes elements for national legislation on environmentally sound management of hazardous wastes, and a model law on the control and disposal of transboundary hazardous wastes. The Basel Convention website also contains a 'checklist' for legislators responsible for drafting national implementing legislation (Secretariat for the Basel Convention 2012).

The model legislation was developed by the Legal Working Group of the Secretariat on the basis of existing national legislation and institutional arrangements in various countries. It was approved by the Second Meeting of the Conference of Parties to the Basel Convention in 1994, at which the Secretariat was also requested to update and revise the model legislation (COP Decision II/5 1994). The updated version was approved at the Third Meeting of the Conference of Parties in 1995 and the Secretariat was requested to disseminate it to all Parties (COP Decision III/6 1995). The introduction to the model legislation emphasises that it is intended 'solely as guidance' to States and does not impose binding obligations (Secretariat for the Basel Convention 1996).

(continued)

Case Study 9.1 (continued)

The elements for inclusion in national legislation on the management of hazardous wastes include the legislative aim, the responsible authority for the implementation of the law, the obligations of the authority, and control provisions. Civil liability, compensation and public participation provisions are not included, but were foreseen by the Secretariat as appropriate subjects for either future model legislation or general environmental legislation. It stated that the purpose of future model legislation would be 'to provide for a comprehensive regime for liability and for adequate and prompt compensation, including reinstatement of the environment' (Secretariat for the Basel Convention 1996).

At this stage it is not known how extensively the model legislation on hazardous wastes has been used by national legislators around the world. However, it appears to have been used by at least some countries to date. For example, Latvia's initial legislation on the management of hazardous waste was prepared in accordance with the model law, although it has since been superseded (Donina 2009: 4).

The Secretariat to the Basel Convention was the obvious contender for preparing and promoting a model law on the same subject matter as the Convention itself. However, as there are no international secretariats or multilateral agreements directly on the issue of site contamination, it is difficult or impossible to identify a secretariat that could be said to have the requisite mandate or willingness. The Secretariat to the Convention on Biological Diversity has issued 'voluntary guidelines' on biodiversity-inclusive impact assessment, with limited references to monitoring, compliance, enforcement and environmental auditing (COP Decision X/29 2010; see also, Subsidiary Body on Scientific, Technical and Technological Advice 2012). At a stretch, these guidelines might be extended to contaminated sites. However, the CBD Secretariat would have to be persuaded that a model framework for site contamination is necessary to protect biodiversity, an area on which little research has been done to date.

The Secretariat to the Desertification Convention (UNCCD) could provide a viable alternative. In recent years, parties to the Convention have recognised the limited application of the Convention to desertification and have sought to broaden its scope to improve its relevance and maximise its chances of global implementation. The resulting Ten-Year Strategy, endorsed by the Parties to the Convention at the COP 8 (Decision 3/COP.8, 2007: para 10), identifies its mission as:

> to provide a global framework to support the development and implementation of national and regional policies, programmes and measures to prevent, control and reverse desertification/land degradation [. . .] through scientific and technological excellence, raising public awareness, standard setting, advocacy and resource mobilization.

The UNCCD website claims that 'the UNCCD is the only international treaty addressing the need for sustainable management of the land' (Secretariat for the United Nations Convention to Combat Desertification 2008: 5). The expansion of the treaty to other aspects of land management would appear to be a good opportunity to address site contamination, although the Ten-Year Strategy does not identify this as a specific objective and a recent Conference of the Parties avoided the subject (see generally, International Institute for Sustainable Development 2009: 4). The problems historically faced by the UNCCD Secretariat in securing implementation of the Convention (see Boer and Hannam 2003: 152; Decision 3/COP.8 2007: para 2) may mean that any inclusion of site contamination may be futile in any event.

In recent years, the Organization for Security and Cooperation in Europe (OSCE) has held conferences and spearheaded projects on land degradation and soil contamination in OSCE countries. These have mainly taken place in Eastern Europe or Central Asia, with the objective of providing practical assistance to countries in resolving specific contamination issues, such as uranium waste or chemical stockpiles. The OSCE is also involved in a partnership with several other international organisations, called ENVSEC, to improve environmental security in Central Asia, Eastern and South-Eastern Europe, and the Southern Caucasus.

Other ENVSEC partner organisations include UNEP, the United Nations Development Programme (UNDP), NATO, the United Nations Economic Commission for Europe (UNECE) and the Regional Environmental Center for Central and Eastern Europe (REC). The aim of the partnership is to support countries in their efforts to manage environmental risks. As at 2006, ENVSEC had funded 50 different projects at a total cost of US$11.6 million, with funding provided by donors and partner organisations (Environment and Security Initiative 2006).

The OSCE's considerable experience in addressing aspects of site contamination, particularly in countries with limited or non-existent regulation of the issue, makes it well placed to promote a model law to its member countries. Together with ENVSEC, the OSCE is also likely to make funding available for member countries who are considering adoption of the model law. The only major limitation of this option is that many developing countries are neither members of the OSCE nor covered by ENVSEC, so support and funding for implementation of the model law in those countries would need to be sourced from a separate organisation.

One strategy may be to approach UNEP with a persuasive argument for replacing its existing Guide (UNEP/ADEME 2005) to contaminated site management with the more detailed provisions of the model law. As previously suggested, UNEP may lack the resources and political willingness to accept such a proposal. On the other hand, minimal input from UNEP would be required, and UNEP may accept the view that a more detailed 'model law' has a greater chance of influencing domestic regimes than relatively basic guidelines. If endorsed by UNEP, the model law would have greater legitimacy in the eyes of potential users, and may be more widely accepted for that reason.

The IUCN, UNIDO or FAO may also be prepared to endorse the model law on site contamination and promote it among their members. This could be done at conferences or meetings of the organisation, and possibly in a formal statement or resolution on the subject. One of these organisations may be willing to take 'ownership' of the model law initiative in return for the credit it would earn as a perceived global 'leader' on site contamination issues.

Arguably, the IUCN would have good credentials because of its broad membership base and the programs and projects already established under its auspices. According to the IUCN, it 'has an unparalleled leadership position for influencing the direction of conservation and sustainable development', and it comprises a global partnership of 11,000 scientific experts and more than 1,000 government and non-government organisations (International Union for the Conservation of Nature 2012). The IUCN has already had the benefit of developing and promoting a 'generic' law on sustainable soil use, so its experience in this regard is advantageous (Hannam and Boer 2004). However, the mandate of the IUCN's specialist group on soils may be limited to dealing with 'green' issues such as soil conservation, and any extension to 'brown' issues such as site contamination may not be favoured. In addition, is already actively engaged in promoting a draft protocol on sustainable soil use (Boer and Hannam 2011).

In light of this, it is possible that the IUCN's Academy of Environmental Law could instead become a 'champion' of the model law on site contamination. The 'vision' of the Academy of Environmental Law is 'to build sustained capacity in legal education and advance conceptual understanding and implementation of environmental law, particularly in developing countries'. It is possible that a model law on site contamination could be promoted through the Academy to assist developing countries and economies in transition, if a clear need for such law could be demonstrated. However, as yet there is no precedent for this in the activities of the Academy, and it is not clear whether such a role would fit within the ambit of the organisation.

9.3.4.2 The Process of Preparing and Promoting the Model Law

The process of preparing the model law should be as inclusive as resources allow. Although the initial draft model law would most likely be based on current research into comparative regulatory approaches to site contamination around the world, subsequent drafts will require external consultation. Once the proposed elements of a model law have been identified, they should be circulated to a wide range of stakeholders, including government decision-makers, non-government organisations, community groups, land developers and site contamination professionals, for their comment. The timeline for this consultation process should be approximately 1 year.

To make the consultation process manageable, and maximise its utility, comments could be sought from national stakeholder representatives in a handful of selected countries. For example, input should be sought from countries with the most innovative, 'advanced' approaches to site contamination, as well as from countries facing site contamination problems in the absence of dedicated legislation. Liaising directly with representatives of national stakeholder associations would serve the dual purpose of 'funnelling' stakeholder opinions through a single contact point, and distilling the relevant information into a digestible format.

Following the consultation process, and subsequent revisions to reflect the comments made, the draft model law could be presented to international conferences of site contamination-related organisations for their feedback. International networks of site contamination professionals could also be requested to provide position papers or discussion papers to reflect the views of their members regarding the draft model law. This strategy would encourage informal suggestions, as well as promote greater awareness of the model law initiative worldwide.

This second stage of informal consultation, including time spent revising the draft model law, could conceivably take 1–2 years, depending on the timing of conferences and the volume of internet submissions received. Some time could be saved by convening an international conference specifically on the model law at the earliest opportunity, although this would be an expensive option and would need to be well planned and well attended to be of most use to the model law initiative.

The end result of the consultation and revision process should be a refined model law, which reflects as much as possible the most innovative, feasible and effective approach to site contamination in every aspect, but with sufficient flexibility to allow countries to adapt it to their own circumstances. This means that excessive detail should be avoided, with a reliance placed instead on clearly stated principles and elements that can be easily transposed or elaborated in the domestic regulatory context.

It is likely that the same organisation which prepares the model law will also take on the responsibility of promoting it. It is important to have a strategy for this stage too, even if the model law is to be promoted on a largely ‘opportunistic’ basis. A strategy will identify key opportunities and how they will be maximised in practical terms. It will also allocate the resources needed to pursue them, and avoid any duplication of efforts. Several options could be pursued to encourage countries to consider using the model law, although not necessarily simultaneously.

9.3.4.3 Alternative Means for Promoting the Model Law

If a high-profile ‘champion’ cannot be found to promote the model law on site contamination at the international level, there are ways of promoting it more informally. One way is for the model law proponent to convene or attend international conferences on related topics and make a presentation on the model law. Another is to obtain permission to circulate a copy of the model law to members of an international network of site contamination or soil conservation professionals, for example by internet forum. Ideally, a network that had a high number of government decision-makers or legislators on its membership list would be selected, to maximise the potential influence of the model law on domestic regimes. Promotion of the model law in this way could take place via more than one network at the same time.

Alternatively, bilateral, regional and multilateral lenders and aid agencies could be actively encouraged to require adoption of the model law by recipient countries as part of loans or aid agreements. A strong case would need to be made to such institutions and domestic agencies regarding the advantages of using the model law, in comparison with the ad hoc approach to site contamination management that is currently permitted by most lenders and aid agencies. The need to provide dedicated financial and technical assistance to recipient countries for the adoption and implementation of the model law should also be highlighted during negotiations with relevant institutions. A lender or aid agency could be encouraged to envision itself as a global leader on this issue, on the basis that its action could lead to widespread adoption of the model law and a worldwide trend among other institutions.

A further informal means of promoting the model law would be to make a copy of it available on a dedicated website, together with background information and explanatory material. This could be done, for example, through organisations such as the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE), Australia which has already carried out preliminary work on the elements of a model law on site contamination. Details of the website and a brief summary of the model law could then be forwarded to the environment ministry and other relevant stakeholder groups in each country for their perusal. Recipients would be encouraged to contact the organisation promoting the model law with any questions.

Apart from a dedicated website, and targeted dissemination of the model law, informal meetings could be held with government representatives to discuss the model law, and in particular how it might be applied in their particular circumstances. Countries that have a known or potential site contamination problem, but which lack adequate legislation to address it, should be prioritised for this type of action. If the relevant government is supportive of the model law, further information sessions could be held to discuss the provisions and their potential application in more detail.

9.3.4.4 External Financial and Technical Support

As mentioned above, major sources of funding and technical expertise for adopting the model law on site contamination are likely to be bilateral, regional and multilateral aid agencies. Aid agencies in the United States, for example, already finance projects relating to environmental legislation and soil remediation in several countries, both in their own region and elsewhere (United States Agency for International Development 2004, 2007). Countries with long experience in dealing with site contamination are often happy to share their expertise, and forthcoming with funds for regulatory improvement.

It may be possible to secure limited funding for some developing countries, or those with economies in transition, to adopt the model law on site contamination. If a high-profile international organisation such as UNEP or the IUCN takes the lead role in promoting the model law, they may provide some initial financial support themselves. Other possible sources of funding include the European Union (for existing or proposed EU Member States) and regional organisations such as the OSCE or NATO. The latter have already demonstrated a willingness to fund individual projects and conferences relating to aspects of site contamination, as a way of improving regional security.

Financial support is unlikely to come from international networks of site contamination professionals or government decision-makers. However, such networks have an abundance of expertise in technical, legal and scientific matters, and if they are prepared to share it with countries adopting the model law, the benefits would be considerable. It may be that a country considering adoption of the model law could seek assistance, via the model law proponents, from professional networks about particularly challenging issues. These issues might range from how to adapt provisions of the model law to domestic soil conditions, to the feasibility of certain remediation methods in a given domestic context. Such specific issues are likely to fall outside the expertise of the model law proponents.

9.4 Conclusions

Although some aspects of the model law on site contamination would have their limitations for developing countries, it still offers many benefits to countries needing to develop new law, or revise existing law, in this area. The model law is more likely to accurately reflect the needs and conditions of a particular country if a prior assessment process is used before adoption. If no prior assessment process is used, countries using the model law should be advised to apply it with caution and, preferably, in consultation with those responsible for promoting the model law.

The model law is likely to be a viable option for developed countries, but developing countries may be reluctant to prioritise environmental needs over social welfare. To help overcome this, financial and technical assistance could be offered by a global or regional bank or fund, and the provisions of the model law could be tailored to the technical and financial capacity of the relevant country. In such cases, the model law could be adopted either as a condition to a loan or a requirement under a bilateral aid agreement. Consultant firms would then be tasked with implementation of the specifics of the model law, in cooperation with the relevant government departments.

Essential elements of the model law should encompass every stage of the site management process, including prevention, identification, investigation, risk assessment, risk evaluation, remediation, and post-remediation. At each relevant stage, the model law should refer to the numerical values or test to be applied during the decision-making process. Each country should devise its own numerical values or tests for this purpose, due to the variability of contaminants, soils and site uses. A clear system for the allocation of liability for contaminated sites should also be developed, and referred to in the model law. Finally, consideration should be given by adopting countries as to whether, and to what extent, public participation provisions are to be included in their version of the model law.

The model law on site contamination will have little impact on domestic site contamination problems unless it is well prepared and widely promoted. The model law must be carefully drafted to offer sufficient flexibility to meet the needs of different countries, without compromising its central aims and essential elements. The involvement of a selection of site contamination professionals, including lawmakers and decision-makers from around the world, in the process of drafting the model law would be highly beneficial.

Ideally, a high-profile international organisation would then be found to promote the model law to its members and the wider global community. If this is not feasible, the model law could be promoted on an opportunistic basis through international and national networks, conferences and seminars, and a dedicated website. The model law option can be pursued alongside efforts to secure a high-level declaration and multilateral agreement on site contamination in the medium to longer term respectively.

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Chapter 10
Conclusions and Recommendations

Over the past 30 years, site contamination has emerged as a major environmental issue in most Western countries. Developing countries, particularly those undergoing rapid industrialisation, are also encountering the challenge of site contamination. Site contamination affects basic physical elements such as soil and water, but it also impacts on less tangible issues, such as spatial planning, land redevelopment, property rights, manufacturing processes and costs, and the liabilities of individuals and companies. As a result, it is a complex issue requiring a comprehensive regulatory approach which adequately addresses all aspects and stages of the site contamination process. Yet even the dedicated regulatory frameworks that exist in developed countries can be lacking in some regard (see, e.g., the discussion of scientific standards in Sect. 4.4.4, Chap. 4 above), particularly in the light of gradual changes in the nature of site contamination and the solutions used to address it.

The extent of the site contamination problem on a global scale is still difficult to assess accurately. Some developed countries, such as the United States (United States Environmental Protection Agency 2012b), Canada (Treasury Board of Canada (Secretariat) 2012) and France (Bourgoin 2006: 206), have introduced national programs for the identification of contaminated sites in recent years, in an effort to both quantify the problem within their own borders and improve the coordination of a domestic response.

These programs, together with improvements in technology and government incentives to redevelop previously used land (‘brownfields’), are resulting in substantial increases in the number of potentially contaminated sites being identified (e.g., in the United Kingdom, United States and Canada). On the other hand, some countries that are well advanced in the identification and preliminary assessment of contaminated sites are making relatively slow progress in the actual remediation of those sites (e.g., in some parts of Europe: European Environment Agency 2007). This is most likely due to the high cost of remediation works and in some cases, uncertainty as to which parties should bear responsibility for remediation.

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At this stage, few developing countries have initiated a systematic site identification process, although some have prepared a national strategy on site contamination. Consequently, governments of most developing countries do not yet have a clear picture of the extent of domestic site contamination, meaning that, in turn, political motivation to regulate the issue is often lacking. The issue of site contamination must also compete with more immediate and visible environmental issues relating to poverty and health, such as food security, sewage treatment and waste disposal.

Contaminated sites can have long-lasting, even inter-generational, impacts on health and the environment, as well as negative socioeconomic effects (see, e.g., UNEP and ADEME 2005; Barnes et al. 2005: 278). A large range of industrial and other human activities cause site contamination, and among the most common are chemical production, mineral processing and petroleum storage (see Sect. 2.1, Chap. 2 above). Such activities often produce not only one contaminant, but a multitude of contaminants which, either alone or in combination, can present a major risk to nearby populations and ecosystems, as well as to those downstream in the case of water contamination.

In Europe alone, the number of contaminated sites is estimated to be anywhere between 1.5 million and 3.5 million (European Commission 2006b; cf European Environment Agency 2010: 21, fig. 2.3). Other developed countries each have contaminated sites numbering in their thousands (see, e.g., Commission for Environmental Cooperation 2008: 4; Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) 2005). Although it is difficult to estimate the scale of site contamination in the developing world, there are already clear indications of site contamination problems in some areas (Blacksmith Institute 2009: 15; Marker et al. 2007: 2).

10.1 Lack of International Law and Policy on Site Contamination

To date, there has been very little international dialogue on site contamination as a specific issue meriting concerted international action. Some initiatives are already underway to promote certain aspects of domestic site contamination law, although this is being done in an uncoordinated fashion (UNEP and ADEME 2005) so that their combined effect on the actual harmonisation of domestic site contamination laws has been minimal to date. Most of these alternatives only promote particular site contamination practices rather than actual legislation, or focus only on a limited aspect of the issue. Some insights into the international political context for site contamination may be gained by looking at the experience of global initiatives on related environmental issues, such as soil protection (see Sect. 3.1, Chap. 3 above for further discussion).

Moves have been made over the past decade towards better legal protection for soils at the global level, such as through an international treaty, but with little success. The idea of a global soil convention has made minimal progress since it was first mooted in 1998 by a group of soil scientists and academics (Held et al. 1998). The only broad regional initiative on soil protection, in Europe, has so far failed to overcome political opposition and is yet to become law (Proposed Soil Protection Directive, European Commission 2006a). Significantly, the proposed EU Directive contains specific provisions on site contamination, which have been strongly opposed by industry and agricultural sectors (Phillips 2010). This suggests that any proposal to put site contamination on the international law-making agenda could face even greater opposition.

There are existing international and regional treaties on other issues potentially related to site contamination, such as pollutants (see Sect. 3.1.2, Chap. 3 above). However, these tend to focus on one specific issue—such as persistent organic pollutants (POPs)—rather than regulating the contamination process as a whole. Therefore, their relevance to the management of domestic site contamination is very limited. Another example is the European liability regime for environmental damage, which addresses only some aspects of site contamination and is limited to post-2007 contamination (Environmental Liability Directive 2004).

At present, there is no international agreement on civil liability in relation to either environmental damage generally, or site contamination specifically. It is interesting to note that the European Environmental Liability Directive (2004) has prompted the United Nations Environment Programme to develop draft guidelines for domestic regulation of civil liability for environmental damage (United Nations Environment Programme 2009). UNEP/ADEME also updated their existing guide to the domestic management of contaminated sites in 2005 (UNEP and ADEME 2005). Both of these documents are primarily designed to assist developing countries. However, it is unclear whether any countries have actually used them as a basis for their own regulatory approach to the issue.

While a treaty on environmental damage was drawn up in 1993 (the Lugano Convention), concerns as to the breadth of its coverage and its impacts on state sovereignty have most likely prevented it from becoming formalised (Boyle 2005: 15–16). International law on state responsibility, and treaties espousing principles of general environmental protection, also have little to offer the regulation of site contamination. The former is confined to instances of transboundary site contamination, and the latter involve only aspirations or broad obligations, with no direct references to site contamination.

The lack of international law on site contamination may be explained in a number of ways. It appears to be a commonly-held belief that site contamination is an exclusively 'domestic' or 'local' issue, and as such is most appropriately addressed at the national or local level (see, e.g., in the European context, Layard 2006: 130). This assumption likely underpins much of the opposition to international and regional measures relating in some way to site contamination (usually as an aspect of soil protection or environmental liability).

High variability in soil types across countries and regions, together with the differences between existing regulatory approaches to soil, are seen by some as further justifications for regulation at the national, rather than regional or international, level. However, a survey of existing domestic legislation relating to site contamination in several developed countries reveals that most regulatory regimes are currently inadequate to address all the important aspects of the issue (Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) 2012).

Another explanation may be the lack of profile at the community and national level of site contamination as a pressing environmental and health problem. Site contamination often occurs gradually and its effects are almost invisible to the general public (in the context of soil degradation, see Wyatt 2008: 192). This fact contributes to a lack of public awareness, and subsequently to political inaction on the issue. It also means that the consequences of site contamination for human and environmental health tend to be underestimated.

In the past, concerted regulatory action has generally been taken only in response to a major contamination incident (see Sect. 4.3.1, Chap. 4 above). Some of the 'pioneers' in regulating site contamination, consisting of a handful of developed countries in the 1970s and early 1980s (e.g., the United States, Netherlands and Austria; see Sect. 4.3.1, Chap. 4 above), were responding to major contamination incidents at the time. Even in countries where public awareness of site contamination is relatively high, the complexity and expense of regulatory measures may make them politically unpopular and difficult to implement.

10.2 The Need for Specific National Regulatory Regimes on Site Contamination

An analysis of countries with existing national laws relating to site contamination reveals that countries most likely to have specific site contamination legislation are those which are heavily industrialised or highly urbanised (see Sect. 4.4.1, Chap. 4 above). By contrast, developing countries tend to rely on their existing environmental protection laws to address site contamination on an 'as needed' basis (see Sect. 4.3.3, Chap. 4 above). However, some developing countries are also starting to recognise the problems that arise from a failure to specifically regulate site contamination (UNEP and ADEME 2005: annex 3, 103). This may be due in part to the involvement of international organisations or to multinational companies in relation to particular industries within those countries (United States International Trade Commission 2004). This is discussed further in Chap. 2 above.

There are several justifications for having a specific, comprehensive domestic regulatory regime for site contamination (see Chap. 6 above, and Berveling 2005: 155). Specific legislation is more likely than broad, generic environmental laws to be effective in addressing all aspects of the site contamination issue, because its provisions do not need to serve several different purposes (Berveling 2005: 163).

Legislation that is dedicated to site contamination can also include specially designed enforcement mechanisms, such as remediation orders, that may be beyond the scope of more outdated legislation (Berveling 2005: 157). Having specific procedures in place to identify and prioritise contaminated sites helps to generate public awareness of the site contamination issue at the local and national levels (see, e.g., Marker et al. 2007: 2, with reference to the introduction of national and sub-national site contamination programs in some Latin American countries).

The lowering of remediation standards in recent years also justifies having a dedicated legislative regime for site contamination (see Chap. 6 above). Two decades ago, some developed countries set a high standard of ‘multifunctionality’ for site remediation, meaning that all sites, regardless of intended use, must be remediated so as to be capable of even the most sensitive use (e.g., the Netherlands: see Sect. 2.6.1, Chap. 2 above). Due to high costs and long delays, this approach was abandoned over time in favour of the current remediation standard of ‘fitness for current use’ (Layard 2006: 136). With recent improvements to technology, this approach can involve treating and leaving contaminants on site. As a result, more sites will need to be monitored, and for a longer period of time, following completion of remedial works. Specific legislation is needed to ensure that monitoring and further remediation are carried out properly and effectively.

Another justification for specific legislation on site contamination, of particular relevance to developed countries, is that common law does not generally provide an adequate solution to complex legal issues such as the allocation of responsibility for remediation. As Berveling (2005: 156) observes,

> Difficulties exist when seeking to use the common law for contamination issues. Whereas nuisance or negligence may be contemplated with respect to liability for contamination, the general locational stability of the contamination, and the frequent time difference between the act of contamination and its discovery render in practice these actions unsuitable in most cases when dealing with contaminated sites.

Consequently, other methods for dealing with these issues must be clearly set out in legislation specially designed for that purpose.

10.3 Lack of Consistent Approaches to Site Contamination Law and Policy at the National Level

Countries vary widely in their definition of site contamination, site management procedures, allocation of liability and scientific basis of decision-making (see Sect. 1.3, Chaps. 1 and 4 above). Some countries rely on broad environmental protection laws to regulate the issue, while others enact specific legislation. Despite growth in the regulation of site contamination over the past two decades, there has until recently been no discernible trends to adopt a particular regulatory approach to site contamination, although some countries appear to have picked up one or two regulatory tools used by another country. Furthermore, with a few exceptions (e.g., the International Committee on Contaminated Land, whose meetings are attended primarily by government representatives), governments of developed countries have not taken the opportunity to compare notes on regulating site contamination with their foreign counterparts or to formulate a set of common guiding principles to benefit the wider international community.

There have been recent signs of the emergence of new, common approaches across some countries or jurisdictions in regulating site contamination (see Sect. 4.4.3, Chap. 4 above). Although limited to one aspect of the issue, they are nonetheless significant. An increasingly common regulatory feature among developed countries is the preference for a 'polluter pays' approach to remediating contaminated sites (see Sect. 5.1, Chap. 5 above). This approach is politically popular because it places the burden on the parties causing the pollution, rather than the taxpayer. However, in practice the polluter pays approach may be difficult to enforce, particularly in countries where site contamination has mainly been caused by state-owned entities (Boyd 1999). In these cases, remediation costs are generally met through public funding. Alternatives to the polluter pays approach include the imposition of taxes on industries or products, or the creation of a voluntary industry fund.

There has also been a gradual shift in emphasis from a strict regulatory approach to a supervised voluntary approach to site contamination in a number of developed countries (see Sect. 4.4.2, Chap. 4 above). It is becoming common among countries with extensive specific site contamination law to address the problem predominantly outside the regulatory framework in practice, for example by negotiating voluntary cleanups (Guignet and Alberini 2008). A significant and related factor is the growing trend in developed countries of encouraging the redevelopment of brownfields by offering financial and legal incentives (Luo et al. 2009: 1127; Environmental Law Institute 2001: 9, 39).

However, unless voluntary remediation is adequately supervised, some contaminated sites may require further remediation in the future. This may involve unforeseen costs and risks to public and environmental health. Measures have already been introduced in the United States to address this eventuality, and deal with specific aspects of site aftercare and responsibility for future remediation (see, e.g., United States Environmental Protection Agency 2005; Uniform Law Commission 2003).

10.4 The Case for Harmonisation of Site Contamination Law

One method of assisting governments to adopt a specific regulatory framework for site contamination is that of harmonisation. A broad view of harmonisation, which is taken in this book, encompasses both mandatory and voluntary measures to increase certain similarities between national laws and policies over time (see Sect. 6.1, Chap. 6 above; Twining 2004). Harmonisation of domestic site contamination laws offers the advantages of ensuring a comprehensive approach to site contamination, with adequate provisions for all aspects and stages of contaminated site management, particularly in countries which may otherwise have no existing measures in place.

Harmonisation also includes both ‘top-down’ and ‘bottom-up’ harmonisation processes which involve respectively the downward influence of international measures and the upward influence of domestic measures (Twining 2004). Little research appears to have been carried out on the ‘bottom-up’ type of harmonisation, with greater focus instead on the downward impact of international agreements. However, the increasingly widespread emulation of the Uniform Environmental Covenants Act, from one state to several across the United States, reveals that bottom-up harmonisation can also be effective at spreading a model domestic law. Therefore, the potential for a particular model of domestic site contamination law to be emulated by other jurisdictions should not be overlooked.

The various processes of harmonisation are no longer dominated by their traditional advocates, international organisations. They are now accompanied by a diverse group of other international actors, such as networks of professionals and industry representatives, and multinational companies, all of whom desire to harmonise laws and policies for their own particular reasons (see, e.g., Raustiala 2002). However, controversy continues to surround some harmonisation processes due to a perceived lack of legitimacy, transparency and accountability (e.g., Stone 2001; Pistor 2002). It is contended in this book that such concerns can potentially be overcome with increased public awareness and adequate public consultation (see Sect. 6.5, Chap. 6 above).

It is further asserted that the advantages of harmonising domestic site contamination laws outweigh the concerns associated with the harmonisation processes. Countries in the midst of rapid industrialisation will soon face the issue of site contamination, with its major environmental, economic and social implications, yet without harmonisation there will be little or no guidance as to how they can best address that issue. Developed countries with existing site contamination measures would also benefit from an internationally recognised set of ‘best practice’ guidelines or treaty provisions on the issue, so that any gaps and weaknesses in their existing measures can be remedied. A harmonised approach to site contamination offers the reassurance that comes from decades of combined experience in dealing with the issue and fine-tuning the appropriate regulatory tools.

10.4.1 Top-Down Harmonisation – The Prospects of an International Instrument on Site Contamination

The site contamination issue must be recognised by the international community as warranting global action before it is even considered as a possible subject for an international treaty. A key indicator of this recognition would be a widespread acceptance of site contamination as a ‘common concern’, either on its own merits or as part of another environmental issue, such as soil (see Sect. 7.2, Chap. 7 above). This level of global recognition is currently lacking. Not only is there very little public awareness of site contamination at the domestic level, but apart from the Blacksmith Institute there have been few moves by international actors to even put the issue on the global agenda. Standing alone, the issue cannot compete with other, high-profile environmental and public health issues, and this situation is unlikely to change soon.

In theory it may be possible to achieve global action on site contamination by linking it with another issue with better prospects. Site contamination is a complex issue that affects all three essential natural elements: soil, water and air. The protection of essential natural elements is seen as a 'common concern' in the context of biological diversity and climate change, and the international community may eventually accept soil protection specifically as a common concern beyond those contexts (Knowler 2004: 543; Fazio 2007: 6). In the event that soil protection is universally accepted as a 'common concern', one option would be to identify site contamination as an aspect of the soil protection issue that needs to be addressed. It is questionable whether linking site contamination issue with the very different issue of soil protection is appropriate, although a pragmatic view would hold that global action by this indirect means is preferable to inaction (see Sect. 7.2, Chap. 7 above).

A few factors put in doubt the prospect of soil protection (and thus site contamination) becoming an internationally recognised issue of 'common concern' in the near future, sufficient for either a binding treaty or a soft law instrument. These factors include the principle of state sovereignty, the critical lack of public awareness of the functions and importance of soil, and the fact that soil damage is mostly confined within domestic borders. There are exceptions to the latter, such as desertification and erosion, both of which sometimes involve soil being displaced across political borders.

From time to time, public awareness of soil may also be raised, such as when a major pollution incident occurs. However, even if soil is accepted as an issue requiring attention, it may ultimately be perceived primarily as a 'local' issue. Having said this, it is important not to underestimate the impact of the work of the IUCN in promoting a draft protocol on sustainable soil use (Boer and Hannam 2011). The draft soil protocol has generated significant discussion within the international soil science and environmental law communities in recent years. If sufficient support is garnered in coming years, it may well result in a soil protocol to the UN Convention to Combat Desertification. This could significantly raise hopes for a similar protocol on site contamination, although the prevailing political climate does not yet favour the making of any new international treaties (see, e.g., Stringer 2008: 138).

While it is possible that specific provisions on site contamination could be incorporated into such a soil protocol, there are clear signs that any efforts to introduce binding provisions on site contamination as part of soil protection at the international level could face strong opposition. The draft European Soil Directive, first proposed in 2006, has made minimal progress to date, with its site contamination measures among the most controversial (see Sect. 3.2.1.2, Chap. 3 above).

A soft law instrument, such as a high-level declaration or resolution, is a more feasible option for promoting national measures on site contamination in the medium term. Essential features of an international soft law instrument on site contamination would comprise clearly stated objectives, recommendations on a national inventory of contaminated sites, basic principles and procedures to guide all stages of site management, and further recommendations on transparency of decision-making and allocation of liability. The objective would be to use the soft law instrument as a foundation for an eventual international treaty on site contamination, in whatever form that may take. A prospective binding instrument would elaborate on the basic principles and procedures contained in the soft law document, turn recommendations into obligations, and include additional provisions on national reporting, enforcement and compliance, and financial and technical assistance.

However, even the more modest goal of achieving a soft law instrument relies on greater recognition of the problem at the local, regional and international levels. A soft law instrument on site contamination could be actively pursued over the medium term, and a binding treaty over the longer term, as and when global recognition of the issue improves. For the moment, however, it must be acknowledged that their prospects are slim.

10.4.2 Bottom-Up Approaches – A Model Law on Site Contamination

Given the unpromising outlook for either a hard law or soft law instrument in addressing site contamination issues at the international level in the short term, other ways of promoting the development of national site contamination law must be considered. An evaluation of all the options for promoting action on site contamination at the global level demonstrates that both guidelines and a model law would be well placed to promote domestic site contamination law if they were put forward by an international organisation.

The distinction between guidelines and a model law lies in the intent of their respective drafters: guidelines tend to be broadly drafted and are most likely to retain their policy status, whereas a carefully prepared model law has greater prospects of becoming formalised into legislation without any further changes (see Chap. 8 for further discussion). However, either a set of guidelines or a model law could be comprehensive and focus on all aspects of site contamination, rather than being limited to a particular industry or issue. Either of these two options would also benefit from the experience and cultural diversity that are characteristic of an international organisation. Such an organisation would lend added credibility and gravity to any proposed initiative.

To minimise the risk of inconsistencies, it is not recommended that more than one bottom-up strategy for promoting site contamination law be pursued at the same time. On this basis, the preferred option is a model law on site contamination, rather than guidelines, because the former offers the advantage of provisions that have been specifically drafted for implementation into law. The model law could also go further than a set of guidelines by stipulating legislative requirements for transparent decision-making on contaminated sites, and for the allocation of liability. However, the model law option can be pursued alongside efforts to secure a high-level declaration in the medium term and, eventually, a possible multilateral agreement on site contamination in the longer term. These instruments would need to promote measures that are consistent with, and complementary to, the provisions of the model law.

Although some of the model law provisions may need to be adapted to different domestic conditions, as a whole the instrument should ideally be capable of being transposed smoothly into the relevant regulatory regime. The model law could be designed to be more sensitive to the conditions of developing countries in particular. For example, a prior assessment process could be used to assess the needs of each country prior to adoption (see Sect. 9.2.1, Chap. 9 above). This process could involve the various stakeholders that would be affected by the proposed adoption of the model law. In addition, to make it economically and politically viable for developing countries to adopt the model law, financial and technical assistance could be offered (e.g., by international and regional development aid agencies, such as the World Bank, the Asian Development Bank and the European Bank for Reconstruction and Development, or international organisations such as the Health and Pollution Fund) and the provisions of the model law tailored to the technical and financial capacity of the relevant country.

Key elements of the model law should include every stage of the site contamination management process, from prevention to identification, investigation, risk assessment, risk evaluation, remediation and post-remediation (see Chap. 9 above). It would not be appropriate for the model law to stipulate the numerical values or standards to be used in decision-making on site contamination. Each country should develop its own scientific basis for decision-making, due to the variability of contaminants, soils and site uses between countries. A clear system for the allocation of liability for contaminated sites should also be developed by individual countries, and referred to in the adapted model law. Consideration should be given by each country as to whether, and to what extent, public participation provisions should be included in their version of the model law.

The model law on site contamination will have little impact on domestic site contamination problems unless it is well prepared and widely promoted. The model law must be carefully drafted to offer sufficient flexibility to meet the needs of different countries, without compromising its central aims and essential elements. It would be advantageous to involve a range of site contamination professionals from around the world, including lawmakers and decision-makers, in the drafting process for the model law.

Ideally, a prominent international organisation would then be selected and approached to promote the model law to its members and the wider global community. Given the leading role of the IUCN in international soil conservation efforts, it may be the most appropriate organisation to promote either hard law or soft law options. In particular, the issue of site contamination could fit within the recently expanded role of the IUCN Commission on Environmental Law in dealing with sustainable soil law and policy, although this is somewhat questionable (see Chap. 9 above). Either or both UNEP and the FAO could also be considered possible avenues for pursuing initiatives on site contamination. However, if a high-profile international 'champion' for the model law cannot be found, it could alternatively be promoted on an opportunistic basis through international and national networks.

10.5 Summary

In sum, there is a genuine and urgent need for guidance on a comprehensive approach to domestic management of site contamination. The need exists not only in developed countries seeking to improve fragmented and inadequate laws, but increasingly also in developing countries and economies in transition which are encountering site contamination problems for the first time. The latter face two choices: either to try to forge their own approach to site contamination, at the risk of repeating mistakes already made by others, or to look for external guidance. In the absence of any international agreements or influential guidelines, countries are likely to emulate approaches taken in other countries, such as the Netherlands (see, e.g., Netherlands Soil Partnership 2012) or the United States (United States Environmental Protection Agency 2012a). The main disadvantage of this practice is that one country's regulatory model may be ill-suited to the domestic conditions of another, particularly if it is adopted without any prior changes.

To remedy the lack of international leadership on the site contamination issue, a concerted effort will need to be made to place it on the international political agenda. The main conclusions to be drawn in this regard are based on prevailing political realities. First, an international agreement on site contamination is, at best, a long term goal, whether as part of a broad instrument on soil protection, a protocol to an existing treaty, or as a new treaty in its own right. Second, a soft law instrument on site contamination can currently be viewed only as a medium-term goal. Although it would be easier and less time-consuming to negotiate, it also relies on a greater level of public awareness of the site contamination issue than exists at present. Key to both the hard law and soft law options is the active support of a major international organisation in proposing and promoting them, another prerequisite that is presently lacking.

The third major conclusion is that, given the challenges of achieving either an international treaty or a soft law instrument, another means must be found for promoting a sound domestic regulatory approach to site contamination in the short term. A credible, comprehensive model law on site contamination could provide relatively immediate benefits if it is widely promoted by the appropriate institutions. It would draw on the combined experience of developed countries over the past 30 years, and could be made available for use by any country needing to introduce or improve its own regulatory approach. A key feature of the model law would be its versatility in terms of reflecting the domestic conditions of individual countries.

With the appropriate procedures in place prior to adoption, a model law would facilitate prompt domestic lawmaking on an important—and in some countries, urgent—environmental and socioeconomic issue. Although a model law would be most effectively promoted by a prominent international organisation such as the IUCN, it could alternatively be promoted on an opportunistic basis among transnational networks of professionals, academics and lawmakers (e.g., the International Union of Soil Sciences or the International Committee on Contaminated Land). Work could begin immediately on such a project, with the groundwork having already been laid by organisations such as the International Committee on Contaminated Land and the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE). Given the current political climate, promoting a comprehensive model law on site contamination is the best means of addressing the issue globally in the immediate future.

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