
CERCLA IN A GLOBAL CONTEXT

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Many features of U.S. environmental law have been highly influential in shaping environmental policy in other countries. Environment impact assessment and the creation of national protected areas originated in the United States and now have been widely adopted throughout the world.¹ By creating a national program to remediate releases of hazardous substances and to impose strict, joint and several liability on broad classes of parties associated with those releases, the Comprehensive Environmental Response, Compensation and Liability Act (“CERCLA”)² represents one of the most significant innovations in U.S. law. However, in the more than three decades since CERCLA was enacted by Congress, few other countries have adopted similar liability programs for remediating environmental contamination. Yet as countries increasingly borrow environmental law from one another, a phenomenon that has been described as contributing to the emergence of a kind of “global environmental law,”³ many are developing programs to remediate contamination. This article compares CERCLA’s approach with the approaches other countries use to address releases of hazardous substances.

The article first reviews the essential features of CERCLA and how they have evolved over time through legislative amendments and judicial interpretations. The article then compares CERCLA’s approach to that embodied in the European Union’s 2004 Directive on Environmental Liability with Regard to the Prevention and Remedying of Environmental

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1. William H. Rodgers, Jr., *The Seven Statutory Wonders of U.S. Environmental Law: Origins and Morphology*, 27 LOY. L.A. L. REV. 1009, 1011 (1994).

2. Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601-9675 (2006).

3. See Tseming Yang & Robert V. Percival, *The Emergence of Global Environmental Law*, 36 ECOLOGY L.Q. 615, 616-17 (2009).

Damage (“ELD”). It then reviews the laws adopted by various countries, including EU members, to respond to releases of hazardous substances. The article then discusses several case studies of how different countries handled incidents of environmental contamination. It concludes by summarizing the comparative law of environmental remediation and its implications for the continued evolution of global law.

I. CERCLA

During the 1970s the U.S. Congress responded to growing environmental concern by adopting landmark legislation creating federal programs to control air and water pollution, protect endangered species, ensure safe drinking water, control pesticide risks, and to regulate toxic substances and hazardous waste.⁴ By 1976 Congress thought it had closed the “last remaining loophole”⁵ in environmental law. Two years later the Love Canal disaster⁶ demonstrated that this assessment had been far too optimistic.

Following heavy rains, a chemical soup began bubbling up into basements of homes built on the former site of the Hooker Chemical and Plastics Corporation.⁷ More than 80 chemical compounds, including many carcinogens, were identified in the contaminants that spread throughout the neighborhood.⁸ Ultimately more than 1,000 families had to be relocated and their homes demolished.⁹ Love Canal became a national media event that highlighted the consequences of decades of poor waste management.¹⁰ It provoked an emotional response from the public as it was revealed that billions of tons of hazardous waste had been dumped on the ground throughout America with little regard for the long-term environmental consequences.¹¹

The public response contributed to a political climate that produced the Comprehensive Environmental Response, Compensation and Liability Act,¹² a marked departure from the comprehensive regulatory legislation adopted by Congress in the previous decade. By establishing a

4. See ROBERT V. PERCIVAL, ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE & POLICY 91-94 (6th ed. 2009).

5. *Id.* at 393.

6. *Id.*

7. *Id.*

8. *Id.*

9. *Id.*

10. *Id.*

11. *Id.*

12. 42 U.S.C. §§9601-9675.

comprehensive liability scheme for releases of hazardous substances, CERCLA represents an extension of common law principles of strict liability for abnormally dangerous activities. It was modeled on a prior extension of those principles in § 311 of the Clean Water Act that created an oil spill liability program.¹³

To help fund its response and remediation costs, the federal government created the Superfund, which was funded initially through a tax on chemical feedstocks, and later amended to include a small tax on petroleum.¹⁴ “This tax expired in 1995 and has not been reauthorized,”¹⁵ slowly starving the program for funds for cleanups that are not paid for by potentially responsible parties.¹⁶

Section 107 of CERCLA identifies four classes of potentially responsible parties who bear cleanup liability under Superfund’s cost recovery provisions: “current owners and operators, owners and operators at the time waste was disposed of at the facility, generators of the waste, and persons who transported waste to the facility.”¹⁷ These liability provisions are at the heart of CERCLA and they provide substantial incentives for companies to reduce the volume of hazardous substances they generate and to manage these substances more carefully.¹⁸

Congress has amended CERCLA repeatedly, most recently to make it more flexible and fairer to responsible parties who may now seek equitable contribution from other such parties. Amendments were added to CERCLA in 1996 by the Asset Conservation, Lender Liability and Deposit Insurance Protection Act (“ACLLDIPA”),¹⁹ in 1999 by the Superfund Recycling Equity Act,²⁰ and in 2002 by the Small Business Liability Relief and Brownfields Revitalization Act (“SBLRBRA”).²¹

13. PERCIVAL, *supra* note 4, at 393-94.

14. *Id.* at 394.

15. *Id.*

16. *Id.*

17. *Id.*

18. “By holding the factually responsible person liable, [the bill] encourages that person—whether a generator, transporter, or disposer of hazardous substances—to eliminate as many risks as possible.” S. REP. NO. 96-848, at 33 (1980).

19. *See* Omnibus Consolidated Appropriations Act of 1997, Pub. L. No. 104-208, 115 Stat 3009 (1996) (codified at 42 U.S.C. §§ 9601(20), 9607(n), 6991b(h)(9)).

20. *See* 42 U.S.C. § 9627.

21. *See* Small Business Liability Relief and Brownfield Revitalization Act of 2002, Pub. L. No. 107-118, 115 Stat 2356 (2002) (codified at 42 U.S.C. §§ 9601, 9604, 9605, 9607, 9622, 9628).

II. THE EUROPEAN UNION'S ENVIRONMENTAL LIABILITY DIRECTIVE

In April 2004 the European Union adopted a directive on Environmental Liability with Regard to the Prevention and Remedying of Environmental Damage ("ELD").²² The "fundamental principle" embodied in the ELD is "that an operator whose activity has caused environmental damage or the imminent threat of such damage is to be held financially liable, in order to induce operators to adopt measures and develop practices to minimize the risks of environmental damage so that their exposure to financial liabilities is reduced."²³

The ELD was published in the Official Journal on 30 April 2004 and was adopted on the publication date.²⁴ Like CERCLA, the ELD seeks "to establish a framework of environmental liability based on the 'polluter pays' principle, to prevent and remedy environmental damage."²⁵ An operator that causes environmental damage or creates an imminent threat of damage should "bear the cost of the necessary preventative or remedial measures"²⁶ that are taken in accordance with the Directive.²⁷ Under the ELD, where a member state's competent authority acts instead of the operator, the authority should ensure that any costs incurred are recovered from the operator "via security over property or other appropriate guarantees from the operator."²⁸ The operator "should ultimately bear the cost of assessing environmental damage" or "assessing an imminent threat of such damage."²⁹

Although CERCLA is broad in its reach, imposing liability on a potentially responsible party who falls into one of four categories (present owners and operators of a site, past owners at the time of disposal, those who arrange for disposal at the site, and transporters involved in site selection),³⁰ the ELD says that a liable person is the operator of an occupational activity or the person "whom has economic power over the

22. Directive 2004/35, of the European Parliament and of the Council of April 21 2004 on Environmental Liability with Regard to the Prevention and Remedying of Environmental Damage, pmb. 2, 2004 O.J. (L 143) 56 (EC), available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:143:0056:0075:en:PDF> [hereinafter 2004 Directive].

23. *Id.*, pmb., at 56.

24. *Id.*, art. 20, at 65 ("This Directive shall enter into force on the day of its publication in the *Official Journal of the European Union*.").

25. *Id.*, art. 1, at 59.

26. *See id.*, art. 6, at 61-62.

27. *Id.*, art. 8, at 62.

28. *Id.*

29. *Id.*, pmb. 18, at 57-58.

30. *See* 42 U.S.C § 9607.

technical functioning of” an occupational activity.³¹ However, the ELD allows member states to extend the definition of “operator;” all but one of the member states opted to broaden the scope of the definition, with a few significantly broadening the scope (Estonia, Finland, Hungary, Lithuania, Poland, and Sweden).³²

An amendment to the ELD is included in the proposal for a regulation on safety of offshore oil and gas prospection, exploration, and production activities, which was adopted by the Commission on October 27, 2011.³³ Currently, the reach of the ELD with regards to water damage is limited to the coastal strip and territorial sea.³⁴ The Proposal’s aim is to expand the applicability of the ELD “to cover also all marine waters under the jurisdiction of the Member States.”³⁵ The Proposal will hold a licensee liable for environmental damage caused by offshore oil and gas activities,³⁶ and will broaden the scope of “operator” by clarifying that a person holding an authorization for offshore activities under Directive 94/22/EC³⁷ is considered a potentially liable operator within the meaning of the ELD.³⁸

Unlike CERCLA, which applies strict liability to all releases of hazardous substances,³⁹ the ELD establishes two liability schemes whose

31. 2004 Directive, *supra* note 22, art. 2, at 60.

32. *Report From the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, Under Article 14(2) of Directive 2004/35/CE on the Environmental Liability with Regard to the Prevention and Remedying of Environmental Damage*, (COM) 581 final, 3-4 (Dec. 10, 2010), available at <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0581:FIN:EN:PDF> [hereinafter 2010 Report].

33. European Commission, *Environmental Liability*, <http://ec.europa.eu/environment/legal/liability/index.htm>.

34. Proposal for a Regulation of the European Parliament and of the Council on Safety of Offshore Oil and Gas Prospection, Exploration and Production Activities, EUR. PARL. DOC. (COM 688) at 3, available at <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0688:FIN:EN:PDF> [hereinafter Proposed Regulation].

35. *Id.*, art. 37, at 39-40 (“Article 2(1)(b) of that Directive shall be replaced by the following: ‘(b) water damage, which is any damage that significantly adversely affects (i) the ecological, chemical and/or quantitative status and/or ecological potential, as defined in Directive 2000/60/EC, of the waters concerned, with the exception of adverse effects where Article 4(7) of that Directive applies, or (ii) the environmental status of the marine waters concerned, as defined in Directive 2008/56/EC, in so far as particular aspects of the environmental status of the marine environment are not already addressed through Directive 2000/60/EC.”).

36. *Id.*, art. 7, at 25.

37. Directive 94/22 of the European Parliament and of the Council on the Conditions for Granting and Using Authorizations for the Prospection, Exploration and Production of Hydrocarbons, 1994 O.J. (L 164) 3, available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1994:164:0003:0008:EN:PDF>.

38. Proposed Regulation, *supra* note 34, art. 2 ¶ 22, at 22.

39. 42 U.S.C. § 9607(b).

application depends on the nature of the activity associated with the release. The first is a *strict liability* scheme, similar to CERCLA liability, that applies to specific economic activities listed in Annex III of the ELD.⁴⁰ Operators who engage in these activities may be held liable regardless of fault.⁴¹ A directive adopted in 2006 amended Annex III of the ELD to include the management of extractive waste.⁴² In 2009 a directive amended Annex III to cover the operation of storage sites pursuant to that new directive.⁴³ The second is a *fault-based liability* scheme that applies to all occupational activities that are not listed in Annex III of the ELD.⁴⁴ It only applies, however, where the damage (or imminent threat of damage) is to species or natural habitats protected by Community legislation.⁴⁵ The operator is liable only if he is at fault or negligent.⁴⁶

In either scheme, “the operator shall bear the costs for the preventive and remedial actions taken pursuant to this Directive.”⁴⁷ Should transboundary damage occur, member states are directed to cooperate and to communicate with one another in order effectively to achieve the purpose of the ELD, allowing affected member states to recover costs for preventive or remedial actions.⁴⁸

Unlike CERCLA, the ELD does not require member states to impose joint and several liability.⁴⁹ The ELD does not specify how costs should be allocated where more than one operator has been identified. Thus, the cost of remediating the environmental damage will be allocated among operators

40. See 2004 Directive, *supra* note 22, at 70.

41. *Id.*, art. 3 ¶ 1(a), at 60.

42. Directive 2006/21 of the European Parliament and of the Council on the Management of Waste from Extractive Industries and Amending Directive 2004/35/EC, 2006 O.J. (L 102) 15, 27 (“The management of extractive waste pursuant to Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries”), available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:102:0015:0033:EN:PDF>.

43. Directive 2009/31/EC of the European Parliament and of the Council on the Geological Storage of Carbon Dioxide and Amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulations (EC) No 1013/2006 2009, O.J. (L 140) 114, 129 (“The operation of storage sites pursuant to Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide”), available at, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0114:0135:EN:PDF>.

44. 2004 Directive, *supra* note 22, art. 3, at 60.

45. *Id.*

46. *Id.*

47. *Id.*, art. 8, at 62.

48. *Id.*, pmbl. 28, art. 15, at 58, 64.

49. *Id.*, pmbl. 22, art. 9, 16, at 58, 63.

in accordance with each member state's domestic laws.⁵⁰ It is for the member states to decide whether to impose either joint and several liability or proportionate liability on responsible operators.⁵¹ The majority of member states chose a joint and several liability system, like CERCLA's. However, a few states—including Denmark, Finland, France, Slovakia, and Slovenia—selected the alternate scheme of proportionate liability.⁵²

Another important difference between CERCLA and the ELD is that the ELD does not require member states to impose retroactive liability. The ELD applies only to environmental damage that occurred after its adoption in 2004.⁵³ Efforts to persuade U.S. courts not to interpret CERCLA to apply retroactively were consistently rejected.⁵⁴

In sharp contrast to CERCLA, the ELD does not require EU member states to establish any sort of fund or financial security system to cover cleanup costs when the liable party cannot be located or is incapable of paying them. A member state's competent authority is permitted to help cover the costs of prevention and clean-up but "only as a means of last resort."⁵⁵ Under the ELD in the event that an "operator cannot be identified," "the competent authority may decide not to recover the full costs" it incurred in relation to actions taken pursuant to the ELD. Although the ELD instructs member states to "encourage the development of financial security instruments and markets . . . with the aim of enabling operators to use financial guarantees to cover their responsibilities,"⁵⁶ it includes no provision mandating financial security or establishing a Superfund-like trust. Thus, any provision for mandatory financial security is left up to the member states, and they have taken only limited action on this issue.⁵⁷ Eight member states (Bulgaria, Portugal, Spain, Greece, Hungary, Slovakia, Czech Republic, and Romania) have adopted mandatory financial security provisions that take effect at various dates up

50. *Id.*, pmb. 22, art. 9, 16, at 58, 63.

51. *Id.* art. 9, at 58; ANJA SCHIRMEISEN, IS THERE OR IF NOT COULD THERE BE A EUROPEAN SUPERFUND OF SOME KIND OR OTHER? 29 (2005).

52. 2010 Report, *supra* note 32, at 4.

53. 2004 Directive, *supra* note 22, art. 17, 19, at 64-65 (The date referred to in Article 19(1) is "30 April 2007."); CERCLA is retroactive. See EHS SUPPORT, http://www.ehs-support.com/pdf/EU_Environmental_Liability.pdf (last visited Mar. 13, 2012).

54. See, e.g., *United States v. Olin Corp.*, 107 F.3d 1506, 1512-13, 1515 (11th Cir. 1997) (rejecting statutory and constitutional challenges to retroactive application of CERCLA).

55. *Environmental Liability: Applying the 'Polluter Pays' Principle*, EURACTIV.COM (Nov. 23, 2010), <http://www.euractiv.com/en/climate-environment/environmental-liability-applying-polluter-pays-principle-links dossier-499899>.

56. *Id.* art. 14, at 64.

57. 2010 Report, *supra* note 32, at 7.

to 2014.⁵⁸

The other EU “Member States rely on voluntary financial security.”⁵⁹ Most do not have national liability schemes that include financing and insurance. However, Denmark has such a scheme that is applicable to soil contamination and Finland has one for damage caused by oil spills.⁶⁰

Although a few member states are implementing some form of financial security requirements, the 2010 Report concluded that further study would be required before the feasibility of an EU-wide mandatory financial security mechanism forcing companies to pay for environmental damage could be assessed.⁶¹ Debate about a mandatory financial security requirement has continued, though many believe that it cannot work under the current ELD.⁶² Thus, no EU-wide fund or financial security scheme is in place now and the ELD does not answer who pays for cleanup when the operator/polluter cannot be identified or when the operator/polluter is insolvent.

At this point it is difficult to assess the consequences of the ELD. Poland reports 306 cases of environmental damage or imminent environmental damage during the 2007-2010 period.⁶³ In 2009, there were 84 cases in which the obligation to take preventive or remediate measures was imposed; in 2010 there were 65 such cases.⁶⁴ Scant data is available for other EU countries. A number of member states are monitoring the performance of the ELD and trying to establish “guidelines, tools, and methods to [facilitate a better] functioning ELD.”⁶⁵

58. *Id.* at 4.

59. *Id.*

60. *Environmental Liability: Applying the ‘Polluter Pays’ Principle*, *supra* note 55.

61. 2010 Report, *supra* note 32, at 9-10; *Environmental Liability: Applying the ‘Polluter Pays’ Principle*, *supra* note 55.

62. DG ENV, *Stakeholder & Practitioner Workshop Implementation of the ELD in the EU Report* (Nov. 8, 2011), available at <http://ec.europa.eu/environment/legal/liability/pdf/workshop/report.pdf>.

63. EDYTA POMICHOWSKA, PREVENTION AND REMEDYING ENVIRONMENTAL DAMAGE IN POLAND 19 (2011), available at http://ec.europa.eu/environment/legal/liability/pdf/ELD_implementation_poland.pdf.

64. *Id.* at 20-21.

65. *Environmental Liability*, EUROPEAN COMMISSION, <http://ec.europa.eu/environment/legal/liability/index.htm> (last updated July 30, 2012); *See, e.g.*, Edward Lockhart-Mummery, *Monitoring and Evaluating the ELD in the UK*, EC.EUROPA.EU 15-18 (Nov. 7, 2012), http://ec.europa.eu/environment/legal/liability/pdf/ELD_implementation_uk.pdf.

III. ENVIRONMENTAL REMEDIATION LAWS IN VARIOUS COUNTRIES

Even if it is too early to assess the results of the ELD with any degree of confidence, the ELD undoubtedly has helped spur EU members to upgrade their environmental laws pertaining to remediation of environmental contamination. Some of the more distinctive features of national, regional or local legislation in EU member states and other countries are discussed below.

A. Europe

1. Belgium

The Belgian government is divided into two separate regional governments the Flemish region and the Walloon Region. Both the Flemish and Walloon regions have established national inventories of polluted soils.⁶⁶ Land remediation in the Flemish region is governed by the Flemish Soil Clean-up Decree of 1995.⁶⁷ If historic contamination poses a risk to human health or to groundwater⁶⁸ supplies, it has to be cleaned up.⁶⁸ Historic contamination includes any contamination that took place before the decree was passed.⁶⁹ Post-decree “[n]ew contamination has to be remediated immediately.”⁷⁰ The degree of soil remediation depends upon the nature of the land use.⁷¹ Liability standards are slightly different for each kind of contamination. For historic contamination the liability standard is fault-based.⁷² An innocent owner’s liability is limited to the cost of preventing further spread of pollution or the cost to keep it from becoming “an immediate hazard.”⁷³

For new contamination in the Flemish region, the liability standard is strict liability for the source of soil pollution caused by an emission.⁷⁴ If the emission comes from an establishment for which an environmental license

66. EU FORUM OF JUDGES FOR THE ENVIRONMENT, *Soil Pollution – Belgian Report 7* (Oct. 7-8, 2008), available at <http://www.eufje.org/uploads/documentenbank/197bc8f71459a2fcdc4004b49861f4ba.pdf>.

67. *Data on Aspects of Impact of Flemish Soil Remediation Decree*, COMMONFORUM.EU (2006), http://www.commonforum.eu/Documents/Meetings/2011/Nottingham/Data_impact_flemish_decree_dd_2006.pdf.

68. *Id.*

69. *Id.*

70. *Id.*

71. *Id.*

72. *Soil Pollution – Belgian Report*, *supra* note 66, at 7.

73. *Id.* at 9.

74. *Id.* at 7-8.

is required, the operator of the establishment is liable.⁷⁵ The Flemish soil remediation laws make a distinction between who has to remediate and who is liable for the soil remediation.⁷⁶ Often this is the same person, but sometimes one person is required to pay for soil remediation even though they did not cause the damage.⁷⁷ This individual is then able to recover the costs incurred from the person who is actually liable for the damage to the soil.⁷⁸ “The 1995 Soil Remediation Decree imposes the remediation obligation on the person who is in actual control of the land where the pollution occurred” for new pollution.⁷⁹ In practice, this often means the operator, if the pollution occurs on land that is a site where “an environment license . . . is required,” the owner, if the “land [is] where the pollution originated” and the owner “has not show[n] that another [third party] is in actual control of the land,” or a third party, if the owner can show that the third party “is in actual control” of the owner’s land.⁸⁰ For historic pollution, the obligation is the same as for new pollution.⁸¹ However, qualifying as an innocent owner is much easier for historic pollution than for new pollution.⁸²

Article 14 of the 2006 Soil Decree has a novel “financial sustainability settlement” provision.⁸³ This provision allows a person, who is required to remediate but has insufficient funding to pre-finance the remediation, to apply for funding help from the Flemish government.⁸⁴ The settlement plan allows the party to spread the cost over a longer period of time with a possibility for some financing from the Flemish government if certain conditions are met.⁸⁵ An innocent owner is only liable for the amount of the costs required to prevent any soil pollution from spreading further or from being an immediate hazard to others.⁸⁶ The Flemish region also has criminal penalties to deal with soil pollution.⁸⁷ However, very few cases have been brought before criminal courts.⁸⁸

75. *Id.* at 7.

76. *Id.* at 8.

77. *Id.*

78. *Id.*

79. *Id.* at 12.

80. *Id.*

81. *Id.* at 13.

82. *Id.*

83. *Id.* at 8.

84. *Id.*

85. *Id.*

86. *Id.* at 9.

87. *Id.* at 10.

88. *Id.*

In the Walloon region no specific liability rules are in place; therefore, general liability rules apply.⁸⁹ These require there to be evidence of fault, damage, and causation for an individual to be held responsible for soil damage.⁹⁰ Remediation can be carried out by anyone who volunteers, anyone who caused the pollution, or the owner of the polluted land.⁹¹

2. Denmark

Denmark has laws that regulate the contamination of soils. The main law is the 1999 Contaminated Soil Act (370/99) (“CSA”), which was designed “to give the public authorities stronger powers to order liable parties to clean up polluted sites.”⁹² Before the Contaminated Soil Act went into effect on January 1, 2001, the government relied heavily on the threat of strict liability under the 1994 Environmental Damage Compensation Act to persuade parties to voluntarily clean up.⁹³

The CSA is similar in breadth to CERCLA. It covers “identification and mapping of contaminated sites, restrictions on use, investigation and remediation, and soil disposal.”⁹⁴ The CSA covers basically all activities that may cause contamination with an exception for agricultural spreading of sludges, fertilizers, and pesticides.⁹⁵ “The scope of damage covered is defined in terms of ‘soil which due to human impact may harm groundwater, human health and the general environment.’”⁹⁶ However, this does not appear to cover natural resources or biodiversity.⁹⁷

The CSA only applies strict liability to pre-2001 contamination if it continued and a substantial part of it came after 2001.⁹⁸ However, a strict liability scheme for contamination from July of 1994 to 2001 is still covered under the 1994 Act.⁹⁹ Prior to 1994, there is no strict liability, and authorities would have to prove that the polluters acted negligently.¹⁰⁰ Liability is assigned to the “polluter,” which is defined as “any party who,

89. *Id.* at 8.

90. *Id.* at 9.

91. *Id.* at 13-14.

92. CHRIS CLARKE, UPDATE COMPARATIVE LEGAL STUDY 30 (2001), available at http://ec.europa.eu/environment/legal/liability/pdf/legalstudy_full.pdf.

93. *Id.*

94. *Id.*

95. *Id.*

96. *Id.*

97. *Id.*

98. *Id.* at 31.

99. *Id.*

100. Lotte Eskesen & Uffe Jensen, *Denmark*, INTERNATIONAL COMPARATIVE LEGAL GUIDE, http://www.iclg.co.uk/books/el/page3.php?page=country_de.htm.

at the time when the contamination occurred, operated the enterprise or used the plant from which the contamination originated; or any other party who caused contamination where that involved reckless conduct or conduct subject to stricter liability rules under other legislation.”¹⁰¹ Where multiple parties are involved, “apportionment is based on proportionate sharing, or equal shares where the authorities are not able to assess the parties’ respective contributions.”¹⁰² Orphan shares (shares where there is no identifiable responsible party) are split up amongst identifiable parties where their relative respective shares are not identifiable, but where the shares are identifiable the orphan shares are not allocated.¹⁰³ A subsequent owner can be held liable if he or she knew “at the time of acquisition that an enforcement notice had been, or was due to be, served.”¹⁰⁴

There is no “Superfund” in Denmark. If the polluter cannot be identified then the authorities pay for the remediation.¹⁰⁵ Under the CSA public authorities can recover for costs associated with “investigation, clean-up, other remedial action, acquisition, or compensation for expropriation pertaining to a property” only from “any party against whom an enforcement notice pertaining to said property has been or could be issued.”¹⁰⁶ If the party cannot be found, the government is stuck with the bill, and there is no tax dedicated to funding remediation.¹⁰⁷

3. Finland

Finland has legislation that is slightly similar to CERCLA. Chapter 12 of the Environmental Protection Act introduced a new public law regime for contaminated soil and groundwater that went into force March 1, 2000.¹⁰⁸ The chapter holds parties who cause contamination of soil or groundwater responsible to restore it to a state where there is no further harm to human health or the environment.¹⁰⁹ The hierarchy of responsible parties starts with the party that caused the contamination.¹¹⁰ If that party cannot be found or identified, the holder of the contaminated land can be

101. CLARKE, *supra* note 92, at 31.

102. *Id.* at viii.

103. *Id.* at 31.

104. *Id.* at 32.

105. See Contaminated Soil Act (Act No. 370), Part IX, ¶ 73, available at <http://www.lexadin.nl/wlg/legis/nofr/eur/lxweden.htm>.

106. *Id.*

107. See *id.*

108. CLARKE, *supra* note 92, at 34.

109. Environmental Protection Act (86/2000), Ch. 12, § 75, ¶ 1, available at <http://www.finlex.fi/fi/laki/kaannokset/2000/en20000086.pdf>.

110. See *id.* at ¶ 2.

held responsible if he or she knew or should have known of the condition of the land when it was acquired or the contamination occurred with the holder's permission.¹¹¹ If the holder of the land cannot be held responsible either, the local authority is responsible for performing the remediation and it is later allowed to pursue cost recovery from the responsible parties.¹¹²

Finland also has the Environmental Damage Compensation Act (737/1994), which sets strict liability for damages that occur because of pollution.¹¹³ It is not retroactive and does not apply to damage covered under other liability legislation.¹¹⁴ The hierarchy of responsible parties is very similar to the other act. Where multiple parties are involved, liability is assigned jointly and severally.¹¹⁵ Responsible parties can be required to pay the costs of investigation, mitigation, or restoration resulting from the damage, and to purchase polluted land from an owner that requests the remediation.¹¹⁶

Finally, Finland has the Environmental Damage Insurance Act with the goal to guarantee full compensation for orphaned liabilities under the 1994 Act.¹¹⁷ Coming into force on January 1, 1999, the Environmental Damage Insurance Act "establishes a compensation fund, run by commercial insurance companies and financed out of compulsory insurance premiums paid by companies whose activities are subject to an environmental operating permit."¹¹⁸ The fund seeks to raise 3.4 to 5 million euro annually, and 5 million euro is the maximum compensation allowable per incident.¹¹⁹ The Act only applies to damage occurring after the Act's entry into force.¹²⁰ It covers not just the cost to individuals harmed by environmental damage but also the costs of preventive and restoration efforts.¹²¹

4. France

France does not have a comprehensive law governing remediation of contaminated soils, but the French Ministry for Environment and other

111. *Id.*

112. CLARKE, *supra* note 92, at 35.

113. *Id.* at 36.

114. *Id.* at 36.

115. *Id.*

116. *Id.* at 37.

117. *Id.*

118. *Id.*

119. *Id.*

120. *Id.*

121. Ministry of the Environment, *Environmental Damage Legislation*, WWW.ENVIRONMENT.FI, (September 22, 2008), <http://www.ymparisto.fi/default.asp?node=17875&lan=en>.

environmental authorities have established public registers of polluted industrial sites.¹²² Legal actions can be brought under French law against known polluters and the “polluter pays” principle is followed.¹²³ Liability is strict.¹²⁴ The chain of liability starts with “the last industry that is responsible under the law on Environmental Permits for industrial sites” and then “by default, the last owner.”¹²⁵

In 1992, French industries created a fund for remediating contaminated sites and signed an agreement with the French Agency for Environment and Energy Control (“ADEME”).¹²⁶ The ADEME was given an annual budget of 2.3 million euro for remediation projects where the responsible parties were unidentifiable or were bankrupt.¹²⁷ The system worked fairly efficiently until the end of 1994, when it became obvious that the budget was insufficient to cover actual needs.¹²⁸

As a result, an Industrial Waste tax was introduced in February 1995.¹²⁹ This tax was originally set at 3.8 euros per ton of waste. It generated about 10.5 million euros a year. After it was increased in 1998 to 6.1 euros per ton, it generated 15.3 million euros per year.¹³⁰ A National Committee was put together to manage the fund and allocate the resources for investigations and remediation of orphaned sites.¹³¹ By 2001, the National Committee had approved 37 interventions at a cost of 30.5 million euros.¹³²

Starting in 1999, the general tax on pollutant activities also included the Industrial Waste tax.¹³³ Public entities, private persons, natural persons, and legal persons are eligible to receive aid from the fund to help clean up brownfields.¹³⁴ However, they are only able to receive aid up to a certain

122. Frédéric Bourgoïn, *Soil Protection in French Environmental Law*, 3 J. EUR. ENVTL. & PLAN. L. 204 (2006).

123. D. DARMENDRAIL, MINISTÈRE DE L'AMÉNAGEMENT DU TERRITOIRE ET DE L'ENVIRONNEMENT, *THE FRENCH APPROACH TO CONTAMINATED-LAND MANAGEMENT*, 35 (2001), available at http://www.sanaterre.com/guidelines/pdf/Darmendrail_2001.pdf.

124. CLARKE, *supra* note 92, at 38.

125. DARMENDRAIL, *supra* note 123.

126. *Id.*

127. *Id.*

128. *id.*

129. *Id.*

130. *Id.*

131. *Id.*

132. *Id.*

133. *Id.*

134. *France Funding*, EUGRIS PORTAL FOR SOIL AND WATER MANAGEMENT IN EUROPE, <http://www.eugris.info/FurtherDescription.asp?Ca=1&Cy=3&DocID=D&DocTitle=Funding&T=France&e=183>.

point. Case law on remediation in France establishes that “liability may fall on unauthorized as well as authorized operators.”¹³⁵ Where there are successive operators, liability usually falls on the last operator. Site owners can be held liable where the responsible operator is bankrupt, and natural resources damages are often included in remediation orders.¹³⁶

5. Germany

In March of 1998, Germany adopted the Federal Soil Protection Act (“BSG”), which creates uniform national rules for soil protection and remediation of contaminated sites.¹³⁷ Prior to adoption of this legislation, environmental remediation was primarily the responsibility of the German Länder (states of Germany).¹³⁸ Under the BSG’s strict liability regime, responsible parties have prevention, remediation, and other duties.¹³⁹ Like CERCLA, Germany’s BSG extends the liability net to include not only the party causing the harm and his successor but also current or past owners or occupiers of the contaminated site.¹⁴⁰ Past owners are allowed an innocent owner defense if “they were convinced at the time when they bought the property that no harm was present, and that belief is worthy of protection given the circumstances.”¹⁴¹ In a provision similar to CERCLA’s brownfields provisions,¹⁴² current owners of land are required to compensate authorities for increases in the value of their land when the clean-up is publicly-funded.¹⁴³ Before the BSG, Germany had a program of finding and registering contaminated sites and this program continued under the new law.¹⁴⁴

The normal standard of remediation is full removal or elimination of pollutants or harmful soil changes, where reasonable.¹⁴⁵ The BSG, however, allows “the remediation objective to be reduced from full elimination to less onerous measures, such as containment, where (a) at the time the pollution was caused, the defendant did not expect harm to occur because his actions were within the legal requirements and (b) his good

135. CLARKE, *supra* note 92, at 39.

136. *Id.*

137. *Id.* at 41.

138. *Id.*

139. *Id.*

140. *Id.* at 42.

141. *Id.*

142. 42 U.S.C. § 9607(r).

143. CLARKE, *supra* note 92, at 42.

144. *Id.* at 43.

145. *Id.* at 42.

faith is worthy of protection, taking account of the circumstances of the case.”¹⁴⁶ Both the soil, “other elements of the land” and subsequent damage to water resources (both surface and groundwater) are covered by the Act.¹⁴⁷

Under the BSG, contribution actions may be brought, but claims against another party are limited to three years from either: “(a) cost recovery by a public authority which has conducted the remedial work itself; or (b) completion of the work by a responsible party and discovery . . . being subject to a long-step limitation of 30 years from completion of the work.”¹⁴⁸ Before enactment of the BSG there was no statutory guarantee that one party would be able to recover anything from another responsible party.¹⁴⁹

In addition to the BSG, Germany also has the 1990 Environmental Liability Act (“UHG”), which “covers harm to persons and property as a result of pollution from industrial and commercial installations” up to 81.8 million euros for personal injury and another 81.8 million for property damage.¹⁵⁰ However, UHG only applies to a list of specified dangerous activities, and certain high-risk industries are required to hold insurance up to the specified limits.¹⁵¹

6. Italy

Italy has a public law regime for dealing with contaminated sites called the “Ronchi Decree” or Waste Management Act.¹⁵² The Ronchi Decree went into effect in December 1999 following a Ministerial Decree in October that set out specific provisions for the law. The key provisions are in Article 17 of the Ronchi Decree, which states that when statutory contamination limits are exceeded for land or water the responsible party is required to pay for all remedial action including making the site safe, cleaning up pollutants, and restoring the environment.¹⁵³ There also is a mandatory notification requirement, and responsible parties have to submit

146. *Id.*

147. *Id.* at 41.

148. *Id.* at 42.

149. *See id.* (“[U]nder previous law in this field the public authorities were entitled to require one of the responsible parties to do the work, without that party having a statutory right to reclaim costs from other responsible parties.”).

150. *Id.* at 43.

151. *Id.*

152. *Id.* at 45.

153. *Id.*

a remedial plan within 30 days.¹⁵⁴ The Ronchi Decree requires that the environment be fully restored where possible using the best available technologies at an affordable price, but when that is not possible, “various forms of containment, institutional controls and land use restrictions are allowed as an alternative.”¹⁵⁵

Local or regional authorities are required to take action where responsible parties are not, or cannot be, identified.¹⁵⁶ These authorities have the option of setting up contingency funds for this purpose. Authorities also can put a lien on the land that takes precedence over all other liens, including mortgages, and that passes with all future land transfers.¹⁵⁷ Criminal liability also can be imposed for non-compliance by responsible parties.¹⁵⁸ Like several other countries, the polluter is the primary liable party followed by the site owner if the polluter cannot be found or made to pay.¹⁵⁹ Maintaining inventories of contaminated sites, determining cleanup priorities, and approving remediation plans are responsibilities of regional, provincial, and local authorities.¹⁶⁰

In 2006 a new law, Environmental Code (Law 152/2006), came into effect.¹⁶¹ This law makes the owner or occupier of a site liable if they are shown to have been at fault, but fault must be proven rather than presumed.¹⁶² The law allows authorities to cover remediation costs only if they can show that the polluter was unidentifiable or that legal action was impossible or unsuccessful.¹⁶³ It also states that the owner’s liability cannot exceed the market value of the site after cleanup, and an owner that takes care of clean-up on his or her own has a right to bring an action against the polluter for expenses and further damages incurred.¹⁶⁴

7. Netherlands

The Dutch first passed the Soil Clean-up (Interim) Act of 1982,¹⁶⁵

154. *Id.*

155. *Id.*

156. *id.*

157. *Id.* at 45-46.

158. *Id.* at 46.

159. *Id.*

160. *Id.*

161. *New Environmental Code: Can Innocent Owners Keep Their Hands Clean?*, INT’L. L. OFF. (Jun. 12, 2006), www.internationallawoffice.com/newsletters/detail.aspx?g=b41625c1-9bf4-da11-8a10-00065bfd3168 [hereinafter *New Environmental*].

162. *Id.*

163. *Id.*

164. *Id.*

165. *See* CLARKE, *supra* note 92, at 50.

which was passed rather hurriedly after serious contamination problems were revealed around the country especially in Lekkerkerk in the early 1980s.¹⁶⁶ The government felt there were major loopholes in the law and in 1994 passed the Soil Protection Act (“WBB”).¹⁶⁷

Under the 1982 Act, there was a question of “whether a polluter had to know at the time he was causing harm to the environment that his actions would trigger government response costs.”¹⁶⁸ The Dutch Supreme Court found in 1992 that the government in cost-recovery actions had to prove that the defendant did know, and the Court set January 1, 1975 as a cutoff date for which defendants should have been aware that the government would respond to pollution.¹⁶⁹ The government hoped to dispense with this requirement when it passed the updated WBB.¹⁷⁰ However, case law indicates that defendants are still prevailing in government actions for environmental damage brought before 1975.¹⁷¹

As a result, the Environmental Ministry has shifted the kind of actions it is bringing from cost recovery to enforcement, using administrative order powers under a separate part of the WBB.¹⁷² These actions provide strict liability against those who cause soil contamination, whether owners or occupiers, regardless of the type of activity that caused the contamination. This strategy has been effective and most cases have been settled.

The Dutch have also had the long running environmental insurance pool, MAS, which was renamed Nederlandse Milieupool when it was relaunched in 1998 with an integrated environmental insurance package.¹⁷³ In the past, liability and property coverage were sold separately. Now there is a “choice of policies to both fixed and mobile operations, based on property insurance, rather than liability, but covering both First Party and Third Party damage.”¹⁷⁴

8. Poland

Poland addresses liability for polluted lands in the Environmental

166. *Id.*

167. *Id.*

168. *Id.*

169. *Id.*

170. *Id.* at 50-51.

171. *Id.* at 51.

172. *Id.* at 50-51.

173. *Id.*

174. *Id.* Some revisions took place in 2005. Act No. 680 of 2005 amending the Soil Protection Act and some other Acts in relation with modifications in the policy regarding soil restructuring. See also Decree No. 681 of 2005 implementing financial provision of the Soil Protection Act in relation with soil restructuring.

Protection Law of 2001 and the Act on Preventing and Remedying Damage to the Environment of 2007.¹⁷⁵ Adopting the polluter pays principle and implementing the ELD, the 2007 Act came into force on April 30, 2007 and “applies to harm or an imminent risk of harm.”¹⁷⁶ Similar to other laws modeled on the polluter pays principle, the 2007 Act imposes on the acting party a duty to remediate activities that are thought to pose a threat to the environment, have caused environmental damage, or have created an imminent risk of harm.¹⁷⁷

Three categories of persons can be held potentially liable under the 2007 Act: 1) those who conduct the activity posing a risk of harm to the environment; 2) those who conduct activity relating to protected species or habitats; and 3) the actual holders of the land.¹⁷⁸ Persons falling within the first category of potentially liable parties are subject to strict liability.¹⁷⁹ The second category of individuals is liable only where there is an element of fault.¹⁸⁰ Holders of land are subject to harsh liability when “the damage occurred with their consent or with their knowledge.”¹⁸¹ The 2007 Act is not retroactive.¹⁸² However, it provides for an exemption where buyers of land may avoid or limit liability if they can prove contamination happened before April 30, 2007.¹⁸³ The exemption is difficult to prove.¹⁸⁴

Liability for soil contamination that occurred prior to the implementation date or does not meet the exemption requirements discussed above is covered by the 2001 Act.¹⁸⁵ Under the 2001 Act, the responsibility to clean up contaminated land usually rests with the holder of the land since the critical factor is who holds the legal title to the land.¹⁸⁶

175. Izabela Zielinska-Barlozek & Jared O. Taylor II, *Who pays for soil contamination?*, 2010 AM. INVESTOR 34, available at http://www.lexmundi.com/images/lexmundi/PracticeGroups/Environmental/Who_pays_for_soil_contamination_AmericanInvestor.pdf.

176. *Id.* at 34-35; see also Christian Schmidt, *Poland*, in THE INTERNATIONAL COMPARATIVE LEGAL GUIDE TO ENVIRONMENT & CLIMATE CHANGE LAW 2011: A PRACTICAL CROSS-BORDER INSIGHT INTO ENVIRONMENT AND CLIMATE CHANGE LAW 305 (Global Legal Group), available at <http://www.iclg.co.uk/khadmin/Publications/pdf/4420.pdf>.

177. Zielinska-Barlozek & Taylor, *supra* note 175, at 35.

178. Schmidt, *supra* note 176, at 309.

179. *Id.*

180. *Id.*

181. *Id.*

182. See Zielinska-Barlozek & Taylor, *supra* note 175, at 34-35; see also Schmidt, *supra* note 176, at 309.

183. Zielinska-Barlozek & Taylor, *supra* note 175, at 35.

184. *Id.*

185. See Zielinska-Barlozek & Taylor, *supra* note 175, at 35; see also Schmidt, *supra* note 176, at 307-08.

186. See Zielinska-Barlozek & Taylor, *supra* note 175, at 35; see also Schmidt, *supra* note 176, at 307.

This is typically the land owner, but it can also be the “perpetual usufruct holder,” such as tenants or lessees.¹⁸⁷ Concern with the liable party provisions of the 2001 Act centered on the fact that persons owning property on October 1, 2001, the effective date of the Act, faced the possibility of being liable for damage that they did not cause or knew nothing about.¹⁸⁸ However, if the holder as of October 1, 2001 proves that contamination occurred pre-1980, the person is only required to make sure that there is no threat to life or health and no possibility of spreading the contamination.¹⁸⁹ Although the protections of this provision are only available to holders of land as of the 2001 Act’s effective date,¹⁹⁰ any holder may pass the obligation to cleanup environmental damage to the actual polluter, so long as the holder proves to local officials that contamination was caused by the identified third-party individual.¹⁹¹

The Polish laws charge the local authorities with cleaning up any sites where the holder or the actual polluter cannot be found and forced to pay.¹⁹² The government authority may recover from an identified party the expenses incurred for the remediation effort.¹⁹³ Should more than one party be responsible for the environmental contamination, the Polish laws adopt the joint and several liability system.¹⁹⁴ Joint liability is possible between the actual polluter and the holder provided the holder had knowledge of the contamination or consented to the damage.¹⁹⁵

9. Spain

In April 1998 Spain passed the Wastes Law (10/1998). Title V of this legislation deals with contaminated soils.¹⁹⁶ The Regional governments are charged with creating an inventory of contaminated sites and evaluating the

187. Schmidt, *supra* note 176, at 309.

188. Paul Bardos, *Financial Aspects of Site Restoration with an Emphasis on Central and Eastern Europe*, REPORT OF THE NICOLE WORKSHOP 15 (November 6-7, 2002), available at <http://www.nicole.org/nicole2/news/ann239b.PDF>.

189. *See Id.* at 14-15 (This provision is included in the *Act on the Entry into Force of the Environmental Protection Act and the Waste Act of 2001* (aka, the “Transitional Act”), which was enacted simultaneously with the *Environmental Protection Act of 2001*.); *see also* Jakub Kutzmann, *Property Law: Land Contamination Polish and EU Legislation*, WARSAW BUS. J., April 10, 2007.

190. *See* Bardos, *supra* note 188, at 15.

191. Schmidt, *supra* note 176, at 309.

192. *See* Zielinska-Barlozek & Taylor, *supra* note 175, at 35; *see also* Schmidt, *supra* note 176, at 309.

193. *See* Zielinska-Barlozek & Taylor, *supra* note 175, at 35.

194. Schmidt, *supra* note 176, at 309.

195. *Id.*

196. Clarke, *supra* note 92, at 52.

risk at these sites.¹⁹⁷ The hierarchy of cleanup responsibility for these sites begins with those who caused the contamination, followed by the possessors, and finally non-occupying owners.¹⁹⁸ The date of origin of the contamination does not matter, and liability is strict as well as joint and several where multiple parties are involved.¹⁹⁹ Responsible parties are free to negotiate voluntary clean-up agreements with authorities.²⁰⁰ However, “any failure to carry out the clean-up obligations or associated agreements is treated as a ‘very serious’ breach of the law,” carrying a potential fine of up to 1.2 million euros.²⁰¹ Remediation must fully remedy the contamination including restoration of aesthetic values.²⁰²

10. Sweden

Sweden has had administrative rules governing contaminated lands since the passage of the country’s Environmental Protection Act of 1969. The administrative rules regarding contaminated land were updated in 1998 with the passage of a new Environmental Code.²⁰³ The code imposes strict liability on “any activities which cause the relevant damage.”²⁰⁴

Like in most other countries, the responsibility for remediation in Sweden falls first on the operators whose actions have caused the harm and then if no operator is able to pay for remediation, it falls on landowners.²⁰⁵ However, some conditions are attached to landowner liability.²⁰⁶ Owners are liable only if they knew or should have known of the pollution at the time of acquisition and if they bought the property after December 31, 1998.²⁰⁷ Residential owners are liable only if they had actual knowledge and banks cannot be held liable when they are only protecting a security interest.²⁰⁸ Even if an owner is not held liable, he or she may still be required to pay costs equal to any rise in the value of the property being

197. *Id.*

198. *Id.*

199. *Id.*

200. *Id.*

201. *Id.*

202. Ignacio Santabaya & Christian Castellá, *International Comparative Legal Guide to: Environmental Law 2008, Spain*, GLOBAL L. GROUP 380, 386 (2008), available at http://www.freshfields.com/publications/pdfs/2008/may08/ENV08_Chapter_53_Spain.pdf.

203. See CLARKE, *supra* note 92, at 54.

204. *Id.* at 55.

205. *Id.*

206. See *id.* (explaining certain factors that may limit a land owner’s liability such as an actual knowledge requirement of the pollution).

207. *Id.*

208. *Id.*

remediated.²⁰⁹ The remediation duty involves “measures that are necessary to prevent or combat subsequent damage or detriment to health or the environment.”²¹⁰ There is no statute of limitations period, a provision that has been upheld in Swedish courts.²¹¹

Sweden also has a civil liability side to remediation of environmental damage. It is different in that there is no hierarchy for responsible parties and joint and several liability applies equally across the administrative hierarchy.²¹² There is also a mandatory insurance system that was created to “finance compensation payments in cases of orphaned civil liabilities arising from hazardous activities, where the liable party is unable to pay.”²¹³ This is funded by contributions from hazardous activities that are subject to permit and notice requirements.²¹⁴

11. United Kingdom

The United Kingdom (“UK”) has one of the most intricate and rigid liability regimes for contaminated land east of the Atlantic.²¹⁵ The regime is part of the Environmental Protection Act of 1990.²¹⁶ This legislation imposed several duties on local authorities including inspecting and identifying any contaminated land, establishing responsibilities for remediation of the land, ensuring that appropriate remediation takes place, and keeping a public register of the ongoing regulatory actions.²¹⁷ “Remedial action is to be secured by means of remediation notices served on specified liable parties, by voluntary agreements accompanied by remediation statements outlining what is to be done, or as a last resort, by cost recovery from the responsible parties following action undertaken by the public authorities.”²¹⁸ The clean-up standard is to ensure that the property will be suitable for its current use.²¹⁹ Remedial actions are to use the best practicable techniques taking into account reasonableness, practicability, effectiveness, and durability.²²⁰

209. *Id.*

210. *Id.*

211. *Id.* at 55.

212. *Id.* at 56.

213. *Id.*

214. *Id.*

215. *Id.* at 57.

216. *Id.* (noting that the liability regime did not go into effect until April 1, 2000).

217. *Id.* at 58.

218. *Id.*

219. *Id.*

220. *Id.* at 59.

Liability is strict and fully retroactive, applying regardless of when the harm took place or when it was discovered.²²¹ There is no set list of activities to which liability attaches, but there are two classes of potentially liable persons.²²² The first is a person who caused or knowingly permitted the presence of any of the contaminants in, on or under the land (Class A), or the owner or occupier of the land (Class B).²²³ The principal difference between Class B owners and someone who “knowingly permitted” the contaminants is that if no Class A person can be found then Class B parties become liable.²²⁴ Orphan shares are borne by the remaining parties.²²⁵

B. Australia

In Australia liability for remediating contaminated property is governed by state rather than federal law.²²⁶ Australia does have a few relevant federal laws such as the National Environment Protection Council Act of 1994, which establishes a system of National Environmental Protection Measures including a National Pollutant Inventory (“NPI”).²²⁷ The Act encourages, but does not require, states to set up the Measures.²²⁸ One successful Measure is the assessment of site contamination adopted in December 1999.²²⁹ The public consultation and risk communication guideline recommends that communities be “informed of possible risk even before a site has been investigated and the risks assessed.”²³⁰ This, however, is the full extent of any federal law on contaminated sites in Australia. Everything else is left to state law.

New South Wales is considered a leader in the field.²³¹ The main law on the subject is the Contaminated Land Management Act 1997 (“CLMA”), which gives the state Environmental Protection Authority (“EPA”) “a duty

221. *Id.*

222. *Id.*

223. *Id.*

224. *Id.* (“[K]nowingly permitting the *continued presence* of a pollutant, although different from causing or knowingly permitting its *entry* into the environment, is sufficient to qualify the relevant person as a Class A liable party, unless he did not have adequate means and opportunity to deal with the pollutant . . . To be a mere owner or occupier (Class B person) therefore requires a lack of knowledge of the contamination (possibly despite efforts to find out) or a lack of means and opportunity, and in many cases probably both.”).

225. *Id.* at 61.

226. *Id.* at 85.

227. *Id.* at 86.

228. *Id.*

229. *Id.*

230. *Id.*

231. *Id.*

to investigate actual or possible contamination, address any significant risk that it presents and record what has been done.”²³² Parties who fail to notify the EPA as soon as practicable whenever there is a risk of harm are subject to substantial fines.²³³ Once a significant risk is established, EPA may require an investigation or remediation.²³⁴

There is a hierarchy of responsible parties that the EPA can require to perform these tasks. It starts with “a person who had principal responsibility for the contamination; or, if that is not practicable, an owner of the land (whether or not they were responsible for the contamination); or, if that is not practicable, a notional owner of the land.”²³⁵ If the public authority has to carry out the investigation or remediation itself, it can recover from any of the appropriate persons all reasonable costs.²³⁶ The public authorities can recover their costs from a landowner by placing a lien on the property which has a higher priority than all other holders of security over the land.²³⁷ Individuals also can sue for cost recovery if they perform the cleanup and are not themselves responsible.²³⁸ Liability is strict, joint and several and also retroactive, applying to contamination no matter when it occurred.²³⁹ There is a right to appeal an order from the EPA to the NSW Land and Environment Court.²⁴⁰ The Court can hold directors or officers liable if a company has been wound up or has sold the land within the past two years, or has simply failed to carry out the remediation order.²⁴¹ There are substantial fines for noncompliance.²⁴²

Western Australia has a slightly different liability scheme for contaminated land. The Contaminated Sites Act of 2003 is the main law governing liability for contamination.²⁴³ The hierarchy of responsibility for remediation of contaminated land starts with the person who has caused or contributed to the contamination, then the person who is an owner or occupier of the site who has changed, or proposes to change, the use to which land is put, then if the person is an owner of the site or of a source

232. *Id.* at 87.

233. *Id.*

234. *Id.*

235. *Id.*

236. *Id.* at 88.

237. *Id.*

238. *Id.*

239. *Id.*

240. *Id.*

241. *Id.*

242. *Id.*

243. *Contaminated Sites Act 2003* (W. Austl.).

site.²⁴⁴ For contamination that occurred before the passage of the law, the responsible party can only be held liable if the actions violated the law.²⁴⁵ The owner is only responsible if he or she “knew, or suspected, or had reasonable grounds to know or suspect, that the site was contaminated.”²⁴⁶ If an owner becomes an owner after the beginning of the act and does not know about the contamination, they can still be held liable. An owner is not responsible for a site that is affected by another source site contamination.²⁴⁷ Corporate officers can be held personally responsible for damage.²⁴⁸ The state government becomes responsible for cleaning up any contamination where “no other person is responsible for remediation of the site” or the responsible party is insolvent.²⁴⁹

C. Asia

1. China

China does not have any national system for remediating contaminated sites. When the Songhua River benzene spill occurred in November 2005, China had no national requirement for reporting releases of hazardous substances. A regulation requiring reporting of spills was issued soon after the Songhua contamination. In 2006 the State Environmental Protection Administration (“SEPA”) launched a national survey on land contamination jointly with the Ministry of Land and Resources.²⁵⁰

Local authorities have borne the primary responsibility for environmental remediation in China. In April 2004 three workers on a Beijing construction site were overcome by fumes from soil contaminated by DDT and benzene hexachloride on land owned by the Beijing Hoghshi Coatings Factory.²⁵¹ Beijing authorities adopted an ad hoc approach to liability by seeking cleanup costs from anyone able and willing to pay.²⁵² In 2007 they required bidders to develop the site to submit remediation proposals.²⁵³

244. *Id.* § 24.

245. *Id.* § 25.

246. *Id.* § 27.

247. *Id.*

248. *Id.* § 28.

249. *Id.* § 30.

250. Zhao Yuhong, *Land Contamination in Urban China – Developing a National Cleanup Regime*, 39 HONG KONG L.J. 627, 628 (2009).

251. *Id.* at 630.

252. *Id.*

253. *Id.*

2. Japan

Prior to 2002, Japan had no national law governing liability and remediation of contaminated land.²⁵⁴ Enforcement actions to remediate contaminated soils were only taken if there was a risk to human health through groundwater pollution.²⁵⁵ Many prefectural and municipal governments had their own ordinances that did require investigation and cleanup when contamination was discovered.²⁵⁶ Hadano City and Kanaqawa Prefecture were leaders in this area, but several other authorities across the country had some kind of similar provisions.²⁵⁷

In 2002, Japan enacted the Soil Contamination Countermeasures Law. This law holds site owners primarily responsible for the assessment and remediation of contaminated soils.²⁵⁸ The “polluter pays” principle also applies.²⁵⁹ When industrial facilities are closed or changing uses, site owners have to conduct site assessments.²⁶⁰ There also are requirements that disclosures about whether land is contaminated be made whenever land transactions take place.²⁶¹ The Japanese do not have federal brownfields redevelopment incentives like those offered in the U.S.²⁶²

There is some assignment of liability for actual cleanup of contaminated lands in the act.²⁶³ The prefectural governor may order responsible parties to take remedial action that is necessary to prevent the spread of contamination.²⁶⁴ An owner who is issued a cleanup order by the government may seek contribution for “an Action for Removal, etc. against the person who engages in an act that has caused the soil contamination.”²⁶⁵ The owner, however, only has three years to bring the action.²⁶⁶

254. Miki Mitsunari, *Japan's Rising Phase I Market*, MIZUHO INFORMATION & RESEARCH INSTITUTE, Aug. 2006, <http://www.mizuho-ir.co.jp/english/knowledge/contribute/esa0608.html>.

255. *Id.*

256. CLARKE, *supra* note 92, at 95.

257. *Id.*

258. Mitsunari, *supra* note 254.

259. *Id.*

260. *Id.*

261. *Id.*

262. *Id.*

263. See Dōjōū osen taisakuhōū [Soil Contamination Countermeasures Act], Law No. 53 of 2002, art. 7, para. 1 (Hōrei teikyō dēta shisutemu [Hōrei DB]), <http://www.japaneselawtranslation.go.jp/law/detail/?printID=&ft=1&re=02&dn=1&x=0&y=0&co=01&ky=soil+contamination&page=2&vm=02> (Japan).

264. *Id.* at art. 7, ¶ 2.

265. *Id.* at art. 8, ¶ 1.

266. *Id.* at art. 8, ¶ 2.

D. South America

1. Argentina

Although Argentina has a federal law governing hazardous waste management, it does not have a national law governing remediation of contamination. Argentina does impose strict liability for harm caused by hazardous waste under its Hazardous Waste Law (1991).²⁶⁷

In 2002, Argentina's National Congress passed the General Environmental Act No. 25,675 ("GEA").²⁶⁸ The GEA establishes a general policy for protection of the environment. Section 27 of the GEA defines the "environmental damage" that will result in environmental liability.²⁶⁹ Section 28 of "[t]he Act stipulates strict liability for anyone who causes environmental damage; they will be under an obligation to restore the environment to its previous condition."²⁷⁰ In a case where it is not technically feasible to restore the environment, the polluter is mandated to pay compensation into the Environment Compensation Fund.²⁷¹

In addition to imposing strict liability, the GEA stipulates that multiple polluters will be held jointly and severally liable for remediation.²⁷² This provision is without prejudice to each party's right to seek repayment from the other parties.²⁷³

The GEA does not specifically state that its application is retroactive for historical pollution. However, "the trend is for courts to force companies to take remediation steps where the impact of pollution extends over time and continues to the present date."²⁷⁴ In a number of cases courts have decided that a statute of limitations is not appropriate for environmental damage.²⁷⁵

267. Juan Carlos Urquidi Fell, *Environmental Issues in Commercial Transactions Involving Companies Doing Business in Latin America*, SUSTENTARSE, <http://www.sustentarse.cl/publicaciones/ambiente-issues.pdf> (last visited Mar. 16, 2012); see also *Penalties for Violation of Argentina's Hazardous Waste Law*, UNITED NATIONS ENVIRONMENT PROGRAMME, <http://www.unep.org/dec/onlinemanual/Enforcement/NationalLawsRegulations/AppropriatePenalties/Resource/tabid/802/Default.aspx> (last visited Mar. 16, 2012).

268. Gabriel R. Macchiavello & María Carolina Quinteros, *Chapter 3: Argentina, The International Comparative Legal Guide to: Environment Law 2010: A Practical Cross-Border Insight into Environment Law*, GLOBAL LEGAL GRP. 11, <http://www.iclg.co.uk/khadmin/Publications/pdf/3589.pdf> (last visited Mar. 16, 2012).

269. *Id.* at 13.

270. *Id.*

271. *Id.*

272. *Id.* at 15.

273. *Id.*

274. *Id.* at 14.

275. *Id.*

Argentina does not currently have a superfund to pay for remediation. However, the GEA requires companies to have insurance to cover the costs of cleanup and restoration of environmental damage.²⁷⁶ The Environmental Law did establish an Environmental Compensation Fund for the prevention and mitigation of harmful or hazardous effects on the environment.²⁷⁷ The money in this fund comes not from taxes on the industry, but from payments from responsible parties who cause damage to the environment and then provide compensation for the damage when remediation is not feasible.²⁷⁸

2. Brazil

Brazil does not have federal legislation similar to CERCLA. However, Brazil's 1981 National Environmental Policy Act holds polluters strictly liable for environmental injury they may cause.²⁷⁹ Additionally, where multiple parties are responsible for contamination, joint and several liability is imposed.²⁸⁰

3. El Salvador

In 1998, El Salvador passed the Environment Law (sometimes called "The Environment Act"), a comprehensive environmental statute.²⁸¹ Like CERCLA, the Environment Act establishes a strict liability standard.²⁸² It seeks to ascertain the economic value of restoring the natural environment, without making a distinction between damage caused to the land, air, water, or wildlife.²⁸³ Article 100 of the Environment Law orders joint liability for

276. Katrina Grazina, Hilary Burke, & Gary Hill, *Argentina Makes Environmental Insurance a Must*, REUTERS (Oct. 16, 2008, 9:15 PM), <http://www.reuters.com/article/2008/10/17/us-argentina-insurance-environment-idUSTRE49G0AG20081017>; see also *International Alert: Argentina Requires Environmental*, WILLIS INT'L 1 (Nov. 2008), http://www.willis.com/documents/publications/Services/International/2008/Intl_Alert_Argentina_Environmental.pdf.

277. Macchiavello & Quinteros, *supra* note 268, at 14.

278. See *General Environmental Law*, CANOSA, <http://canosa.com.ar/english/publications/2011/06/a.php> (last visited Mar. 17, 2012).

279. Caio Mario da Silva Pereira Neto & Luis Felipe Valerim Pinheiro, *Chapter 9: Brazil, The International Comparative Legal Guide to: Environment & Climate Change Law 2011: A Practical Cross-Border Insight into Environment and Climate Change Law*, GLOBAL LEGAL GRP. 64, <http://www.iclg.co.uk/khadmin/Publications/pdf/4402.pdf> (last visited Mar. 17, 2012).

280. *Id.* at 65.

281. Jose Pablo Sánchez & Luis Alonso Medina Lopez, *Chapter 15: El Salvador, The International Comparative Legal Guide to: Environment Law 2010: A Practical Cross-Border Insight into Environment Law*, GLOBAL LEGAL GRP. 115, <http://www.iclg.co.uk/khadmin/Publications/pdf/3601.pdf> (last visited Mar. 17, 2012).

282. *Id.* at 117.

283. *Id.*

contamination caused by multiple parties.²⁸⁴ Corporations, contractors, subcontractors, and employees can be jointly responsible for contamination causing environmental damage.²⁸⁵ Public authorities can be held liable for their actions or omissions.²⁸⁶ El Salvador does not have a system like the superfund in place to help finance remediation.

4. Mexico

Mexico passed the General Law for Prevention and Integral Management of Wastes (“Mexican Waste Law”) in 2004.²⁸⁷ Regulations implementing the law were adopted in 2006.²⁸⁸ Like CERCLA, the Mexican Waste Law imposes strict liability for contamination of a site; it is not necessary to have caused the contamination to be held liable for the cleanup.²⁸⁹

Although the polluter is the party primarily obligated to remediate, owners, possessors, and concessionaires (including the operator) of contaminated sites are jointly responsible with the primary polluter for remediating contamination.²⁹⁰ Authorities may mandate that any of the above parties remediate, but no specific procedure for liability allocation is in place.²⁹¹ Under Mexican law, identifying the responsible party requires the determination of when the pollution was caused.²⁹² If polluting parties cannot be identified, the State absorbs the responsibility for remediation.²⁹³

5. Venezuela

Like El Salvador, Venezuela has a more general environmental statute aimed specifically at protecting the environment that contains provisions seemingly similar to CERCLA, though it does not focus on the cleanup and

284. *Id.*

285. *Id.*

286. *Id.*

287. Anthony J. Maggio, *Mexico: Environmental Due Diligence and the Mexican Waste Law*, EHS JOURNAL (Nov. 13, 2010), <http://ehsjournal.org/http://ehsjournal.org/anthony-j-maggio/mexico-environmental-due-diligence-and-the-mexican-waste-law/2010/>.

288. *Id.*

289. *Id.*

290. Mauricio Emilio Llamas Chavez & Martha Elena Barajas Guevara, *Chapter 31: Mexico, The International Comparative Legal Guide to: Environment Law 2010: A Practical Cross-Border Insight into Environment Law*, GLOBAL LEGAL GRP. 252, <http://www.iclg.co.uk/khadmin/Publications/pdf/3617.pdf> (last visited Mar. 17, 2012).

291. *Id.*

292. *Id.*

293. *Id.*

remediation of contaminated sites. Venezuela's Organic Environmental Statute ("OES") was enacted in 1976²⁹⁴ and was the first environmental statute of its kind in Latin America. "According to the new OES, damages caused to the environment will give rise to strict liability ('*responsabilidad objetiva*')."²⁹⁵ Venezuela's laws do not specifically address the issue of liability for historic contamination, but polluters will be held liable for environmental damage irrespective of whether the polluting activity was done with permits in place.²⁹⁶ Additionally, all responsible persons will be jointly and severally liable for repairing any damage caused.²⁹⁷ Venezuela does not require companies to provide financial assurances or to hold insurance for environmental liability.²⁹⁸ It also does not have anything similar to the superfund.²⁹⁹

E. South Africa

In 1998, South Africa enacted National Water Act 36 of 1998 ("NWA") and the National Environmental Management Act ("NEMA").³⁰⁰ Section 19 of the NWA imposes strict liability for contamination caused by a corporation's activities.³⁰¹ The NWA further provides for unlimited fines, cleanup costs, and damages if a case is successfully prosecuted under the Act.³⁰² NEMA also requires polluters to remove pollution and remediate contaminated sites.³⁰³ Unlike NWA, NEMA does not specifically impose strict liability on polluters. However, the High Court in *Chief Pule Shadrack VII Bareki and Others v. Gencor Limited and Others* concluded that NEMA does in fact create strict liability for contamination caused by an activity or process on the polluter's land.³⁰⁴

294. See Ramón A. Azpúrua Núñez & Rafael A. Saggese Vegas, *Chapter 50: Venezuela, The International Comparative Legal Guide to: Environment Law 2010: A Practical Cross-Border Insight into Environment Law*, GLOBAL LEGAL GRP. 381, <http://www.iclg.co.uk/khadmin/Publications/pdf/3637.pdf> (last visited Mar. 17, 2012).

295. *Id.* at 384.

296. *Id.*

297. *Id.*

298. *See id.* at 386.

299. *See id.* at 384.

300. Ricus Grimbeek, *Health, Safety and Environmental Legislation in South African Mining and Minerals Industry*, INT'L MANGANESE INST. 5-6, http://www.manganese.org/_data/assets/pdf_file/0004/81499/Grimbeek.pdf (last visited Mar. 17, 2012).

301. *Id.* at 5.

302. *Id.*

303. *See id.* at 6.

304. Tim De Wet, *South Africa: What Does "Polluter Pays" Mean In South Africa*, MONDAQ (Sept. 15, 2008), <http://www.mondaq.com/article.asp?articleid=66202>.

Currently, South Africa does not have a Superfund to help fund remediation when a polluter is incapable of paying. In a situation where the polluter fails to rectify the effects of the polluting activity, the relevant government authority may take actions itself and later recover costs from the responsible party.³⁰⁵

IV. ENVIRONMENTAL REMEDIATION CASE STUDIES

Review of the environmental remediation laws of different countries is an important part of any comparative analysis. But it is also crucial to examine how remediation is conducted in practice by examining case studies of how different countries handled significant contamination incidents.

A. *Western Europe*

1. United Kingdom

As the birthplace of the Industrial Revolution, the United Kingdom has had to grapple with some of the worst cases of brownfields – sites contaminated by former industrial activity. Along the Carmarthenshire coastline near the town of Llanelli in South Wales are industrial waste dumps near multiple factories that produced copper, steel, and tin.³⁰⁶ The factories were closed in the 1950s and 1960s, but the contaminated wasteland remained hazardous. It was unclear what was going to be done with the area.³⁰⁷ Ultimately, the Carmarthenshire County Council acquired the land from industrial landowners, and decided to create a 14-mile wide greenspace, called the Millennium Coastal Park.³⁰⁸ Following an environmental cleanup, the park now serves as a great green tourism spot and as the locus of rare habitat that attracts wildlife.³⁰⁹

At a site in Northwest England that had produced rubber automotive components for over 50 years, the historic practice had been to dump any and all waste into a shallow valley near the factory.³¹⁰ The valley

305. Claire Tucker & Sandra Gore, *Chapter 44: South Africa, The International Comparative Legal Guide to: Environment Law 2010: A Practical Cross-Border Insight into Environment Law*, GLOBAL LEGAL GRP. 343, <http://www.iclg.co.uk/khadmin/Publications/pdf/3630.pdf> (last visited Mar. 17, 2012).

306. Sian Griffiths, *Welsh Industrial Wasteland is Reborn as a Popular Park*, DEUTSCHE WELLE (Apr. 26, 2011), <http://www.dw.de/dw/article/0,,15030730,00.html>.

307. *Id.*

308. *Id.*

309. *Id.*

310. *Land Remediation Case Studies*, ENVIROLINK NW. 5, <http://www.envirolinknorthwest>.

eventually filled redirecting a small brook. After repeated rains, the waste mobilized and contaminants reached groundwater.³¹¹ The waste was so toxic that the brook would run white from the high dissolved metal content.³¹² By using a stabilization/solidification technology, the remediation saved two million pounds and 38,500 tons of soil were reclaimed without the need to be sent to a landfill.³¹³

Homeowners in Lennox Mews, Worthing discovered in July 2010 that their homes had been built on a plot that had previously served as a gas station and MOT car garage.³¹⁴ “[L]ow-level” contamination was discovered, but no remediation was carried out before the homes were built.³¹⁵ The contamination was discovered when one property owner tried to sell his land.³¹⁶ The area Housing Association plans to absorb the cost of remediation because the developer had recently gone into liquidation, and residents are still awaiting details of when remedial work was to begin.³¹⁷

2. Italy – The Seveso Disaster

“The Seveso dioxin disaster was a major industrial accident that, besides having public health implications, has had an impact on Italian torts law as well as on the European legal framework for managing industrial accidents.”³¹⁸ For thirty years, Industrie Chimiche Meda Societa Azionaria (“ICMESA”), a Swiss-owned company, operated a pesticide and herbicide manufacturing chemical plant a few miles outside of Milan, Italy in the small town of Seveso.³¹⁹ On Saturday, July 10, 1976, a chemical reactor ruptured at the plant.³²⁰ At approximately 12:37 PM,³²¹ a dense vapor cloud

co.uk/media/1491/land_remediation_case_studies_2008.pdf (last visited Mar. 17, 2012).

311. *Id.*

312. *Id.*

313. *Id.* at 6.

314. *Contaminated Land Case Study – Lennox Mews, Worthing*, COUNTRYWIDE LEGAL INDEMS., <http://www.cli.co.uk/Contaminated-Land-Case-Study/Lennox%20Mews.aspx> (last visited Mar. 17, 2012).

315. *Id.*

316. *Id.*

317. *Id.*

318. ENCYCLOPEDIA OF WHITE-COLLAR CRIME 259 (Jurg Gerber & Eric L. Jensen eds., 2007).

319. See LUCIANO MANGIAFICO, ITALY’S MOST WANTED 266 (2007); European Commission, *Chemical Accidents (Seveso II) – Prevention, Preparedness and Response*, <http://ec.europa.eu/environment/seveso/index.htm> (last updated Mar. 6, 2012).

320. MANGIAFICO, *supra* note 319, at 266; Health and Safety Executive, *Accident Summary: Icmesa Chemical Company, Seveso, Italy. 10th July 1976*, <http://www.hse.gov.uk/comah/sragtech/caseseveso76.htm> (last visited Jan. 23, 2012); Gavin Davids, *Seveso: Italian Dioxin Crisis*, MSN News (Feb. 12, 2009), <http://news.in.msn.com/gallery.aspx?cp-documentid=>

containing approximately 3,000 kilograms³²² of chemicals, among them tetrachlorodibenzoparadioxin (TCDD, or dioxin),³²³ was witnessed by maintenance staff after they heard a whistling sound.³²⁴ The vapor cloud drifted offsite before the release subsided after twenty minutes.³²⁵ The company attempted to cover up the accident, leading to a substantial delay in public awareness of it.³²⁶ After finally being made aware of the accident and acknowledging the consequences of the vapor contents, the competent authority evacuated more than 600 local residents to reduce exposure.³²⁷ But, in the end, contamination of land and vegetation affected an area of fifteen square kilometers where at least 37,000 people lived;³²⁸ thousands required treatment for dioxin poisoning.³²⁹

Dioxin is a known carcinogen that can cause reproductive and developmental problems, damage the immune system, interfere with hormones, and cause cancer.³³⁰ Although no immediate human fatalities were reported,³³¹ many exposed inhabitants displayed immediate symptoms of boils, headaches, dizziness and diarrhea, have suffered long-lasting liver problems, have experienced reproductive effects, and continue to suffer from a serious skin disease, chloracne.³³²

Criminal investigations following the disaster determined that an ICMESA employee had stopped the flow of crucial refrigerating water causing excessive pressure in the system and resulting in the failure of a safety valve.³³³ After a trial where prosecutors showed that ICMESA's poor management facilitated the employee's negligence, five ICMESA

3460600&page=3.

321. Health and Safety Executive, *supra* note 320.

322. Mick Corliss, *Dioxin: Seveso Disaster Testament to Effects of Dioxin*, JAPAN TIMES, May 6, 1999, available at <http://www.japantimes.co.jp/text/nn19990506a4.html>.

323. European Commission, *Chemical Accidents*, *supra* note 319.

324. Health and Safety Executive, *supra* note 320.

325. See European Commission, *Chemical Accidents*, *supra* note 319; Health and Safety Executive, *supra* note 320.

326. See ENCYCLOPEDIA OF WHITE-COLLAR CRIME, *supra* note 318, at 260.

327. See *id.*; European Commission, *Chemical Accidents*, *supra* note 319.

328. European Commission, *Chemical Accidents*, *supra* note 319; WHO Media Centre, *Fact Sheet 225: Dioxins and Their Effects on Human Health*, WORLD HEALTH ORG. (May 2010), <http://www.who.int/mediacentre/factsheets/fs225/en/>.

329. See European Commission, *Chemical Accidents*, *supra* note 319.

330. WHO Media Centre, *supra* note 328.

331. European Commission, *Chemical Accidents*, *supra* note 319.

332. See ENCYCLOPEDIA OF WHITE-COLLAR CRIME, *supra* note 318, at 260; Corliss, *supra* note 322.

333. ENCYCLOPEDIA OF WHITE-COLLAR CRIME, *supra* note 318, at 260.

managers were convicted on May 23, 1983 for “negligently causing . . . a disaster’ and for omitting to put safety measures in place.”³³⁴ No managers of the Swiss parent company were convicted because Italian criminal law at that time did not extend liability in cases like this beyond those who were in a position to implement safety programs.³³⁵ However, the parent company agreed “to compensate all pecuniary damages arising out of the dioxin leak to all victims and, later on, to a number of local municipalities and to the Italian Government.”³³⁶ In the end, the parent company paid more than ten billion dollars in cleanup costs and compensation.³³⁷ Non-pecuniary damages were not included in the abovementioned agreement; therefore, a number of victims filed civil claims to “recover [from] pain and suffering cause[d] by the anxiety of getting impaired as a consequence of dioxin exposure.”³³⁸ In February 2002, a plaintiff received damages for emotional distress; this decision by the highest Italian court has opened the door to other Seveso residents wishing to file similar claims.³³⁹

Remediation at the site through treatment of contaminated soils has been somewhat successful. Dioxin levels in the soil are below the normal amount found in similar soils and the whole site is currently a public park, Seveso Oak Forest Park.³⁴⁰

The Seveso disaster helped spur the EU to adopt legislation to prevent and control industrial accidents. The so-called Seveso Directive – *Council Directive 82/501/EEC on the Major-Accident Hazards of Certain Industrial Activities* – was adopted in 1982, amended in 1987 and 1998, and replaced in 1996 by the Seveso II Directive – *Council Directive 96/82/EC on the Control of Major-Accident Hazards* – which was amended in 2003.³⁴¹ Generally, the purpose of these directives is to prevent major industrial accidents and to limit the consequences of major accidents should they take place.

3. Germany

In Germany, starting in the 1970s, concerns grew that contaminated sites might pose a threat to human health. The government in its strategy “laid down the principle that illegal dumps should be cleaned up as rapidly

334. *Id.* (citation omitted).

335. *Id.*

336. *Id.*

337. *Id.*

338. *Id.* at 260-61.

339. *Id.* at 261.

340. Corliss, *supra* note 322.

341. European Commission, *Chemical Accidents*, *supra* note 319.

as possible, and preferably closed down and their sites recultivated.”³⁴² By 1974 efforts were under way to catalogue all of the sites and to begin preventing or eliminating earlier inappropriate dumping. In 1978, the term *Alllasten* (“legacy burdens”) was used for contaminated sites to indicate the unknown risk that comes with more than 50,000 former landfills or waste dumps.³⁴³

By the 1980s several severe cases of environmental contamination were discovered in Germany. In “Bielefeld, Barsbüttel and Hamburg, entire housing developments built on top of landfills or contaminated dredged material had to be vacated and demolished. Large landfills in Georgswerder (Hamburg), Gerolsheim (Rhineland-Palatinate) and Münchehagen (Lower Saxony) had to be made safe at great expense due to problems such as dioxin emissions.”³⁴⁴ In 1984, the Länder Working Group on Waste (“LAGA”) drew up proposals for “cataloguing, monitoring, investigation and assessing the risks of contaminated sites.”³⁴⁵ LAGA then appointed a committee on former waste disposal sites and other contaminated sites.³⁴⁶

In 1989, the committee published an information document, *Cataloguing, Risk Assessment and Remediation of Contaminated Sites*.³⁴⁷ In the same year, the Council of Environmental Advisors published *Alllasten*, a special report on contaminated sites that identified areas for action now and in the future.³⁴⁸ “The Council called for greater urgency in cataloguing and assessing the risks of former industrial and waste disposal facilities nationwide so that all contaminated sites could be reliably identified and quickly cleaned up.”³⁴⁹ By the 1990s the Federal Soil Protection Act and Ordinance had been passed, establishing how the cost of remediation should be divided.³⁵⁰

4. Spain – The Doñana Disaster

Boliden-Aprisa, a subsidiary of the Toronto-based Boliden Ltd., owned the Los Frailes mine near Aznalcollar, Seville Province in Andalusia,

342. Fed. Ministry for the Env’t, Nature Conservation and Nuclear Safety, Soil Protection Report, Bundestag Drucksachen [BR] 14/9566 (Ger.), at 31-33 (June 2002).

343. *Id.*

344. *Id.*

345. *Id.*

346. *Id.*

347. *Id.*

348. *Id.*

349. *Id.*

350. *Id.* at 31-34.

southern Spain.³⁵¹ Beginning operations in 1997, the mine produced 180,000 tons of zinc, lead, copper, and silver from four million tons of ore in its first year.³⁵² Then, on April 25, 1998, the industrial accident known as the Doñana Disaster³⁵³ occurred when a holding dam burst at the mine and released four to five million cubic meters of acidic mine tailings containing hazardous levels of several heavy metals.³⁵⁴ The toxic waste travelled approximately one kilometer per hour along the River Agrio and River Guadiamar killing everything in its path³⁵⁵ and eventually reaching the Doñana National Park and the Natural Park of the Environment of Doñana, a wetland of international importance under the Ramsar Convention and part of UNESCO's global network of Biosphere Reserves.³⁵⁶ Investigations determined that defects in original and subsequent construction projects of the dam were likely the cause of the rupture.³⁵⁷

The central government and local governments put aside political struggles in order to work together to minimize the damage.³⁵⁸ The governments built dams in order to divert polluted waters from Doñana, removed and cleaned contaminated soils, and then worked hard to environmentally and economically regenerate the area.³⁵⁹ The cleanup, which took three years to finish and cost the government an estimated 240 million Euros, resulted in the old mine property being turned into the Environmental Activities Park of Andalusia, a concentration of companies participating in environment related projects on a national scale.³⁶⁰ The Spanish and Andalusian governments tried to recover the costs of the cleanup from Boliden, but the company avoided payments for over a decade.³⁶¹ Then, in December of 2011, the Tribunal Supremo, the Supreme

351. *The Los Frailes Tailings Dam Failure (Aznalcóllar, Spain)*, WISE URANIUM PROJECT, <http://www.wise-uranium.org/mdaflf.html> (last updated Jan. 26, 2012); Vicky Short, *World Scientists Meet to Discuss Coto de Doñana Disaster*, WORLD SOCIALIST WEB SITE (Jan. 19, 1999), <http://wsws.org/articles/1999/jan1999/span-j19.shtml>.

352. Short, *supra* note 351.

353. *El desastre que amenazó Doñana*, EL PAÍS (Spain), Oct. 6, 2010 at 33. The disaster is also known as the Aznacóllar Disaster or Guadiamar Disaster. *Id.*

354. WISE URANIUM PROJECT, *supra* note 351.

355. Short, *supra* note 351.

356. *Disaster for Doñana – A Spanish World Heritage Site*, WORLD HERITAGE CENTRE, U.N. EDUC., SCI. & CULTURAL ORG. (Apr 27, 1998), <http://whc.unesco.org/en/news/144>.

357. *See* WISE URANIUM PROJECT, *supra* note 351.

358. *See El desastre que amenazó Doñana*, *supra* note 353.

359. *Id.*

360. *See id.*; *Toxic Spills in Europe*, EURONEWS (Oct. 6, 2010), <http://www.euronews.com/2010/10/06/toxic-spills-in-europe/>.

361. *See* WISE URANIUM PROJECT, *supra* note 351.

Court of Spain, exempted Boliden from the payment of nearly ninety million Euros in reimbursement costs due to Boliden's inability to pay.³⁶² The same court a few weeks later held Boliden responsible for the accident, but the company still does not have to pay.³⁶³

The European Commission views the Doñana Disaster as a reminder of the importance of the 2004 EU Environmental Liability Directive's goal of preventing and remedying environmental damage based on the polluter pays principle.³⁶⁴

B. Eastern Europe

1. Hungary – The 2010 Ajka Toxic Sludge Spill

On October 4, 2010 an industrial accident occurred at the MAL Hungarian Aluminum owned Ajka Timföldgyár alumina plant when a portion of the dam of a caustic waste reservoir ruptured and released thirty-five million cubic feet of toxic sludge in western Hungary.³⁶⁵ Reportedly powerful enough to suck cars from their garages, the wave of toxic industrial waste – which was found to be slightly radioactive, highly corrosive, and laden with toxic heavy metals – flooded seven villages and spread across more than fifteen square miles.³⁶⁶ After three days, the waste reached the Danube River, prompting downriver countries (i.e., Slovakia, Croatia, Serbia, Romania, Bulgaria, and Ukraine) to develop emergency response plans.³⁶⁷ In the end, the release killed ten people, injured at least 250 residents, contaminated waterways, poured through homes, and destroyed all vegetation other than trees.³⁶⁸

362. *El Supremo exime a Boliden del pago de 89,9 millones por el vertido de Aznacóllar* [The Supreme Court Exempts Boliden from Payment of 89.9 Million for the Aznacóllar Spill], EL PAÍS, Dec. 6, 2011, http://sociedad.elpais.com/sociedad/2011/12/06/actualidad/1323126006_850215.html.

363. See WISE URANIUM PROJECT, *supra* note 351.

364. Dir.-Gen. for the Env't, *Stakeholder & Practitioner Workshop: Implementation of the ELD in the EU*, at 2 (Nov. 8, 2011), available at <http://ec.europa.eu/environment/legal/liability/pdf/workshop/report.pdf>.

365. *Hungarian Chemical Sludge Spill Reaches Danube*, BBC NEWS (Oct. 7, 2010, 4:16 PM), <http://www.bbc.co.uk/news/world-europe-11491412>; *'One year' to Clean Toxic Spill in Hungary*, BBC News (Oct. 6, 2010, 8:44AM), <http://www.bbc.co.uk/news/world-europe-11481740>.

366. *Deadly Toxic Mud Spill Pours Over Western Hungary*, DISCOVERY NEWS (Oct. 5, 2010), <http://news.discovery.com/earth/hungary-toxic-sludge-spill-cleanup.html>.

367. *Hungarian Chemical Sludge Spill Reaches Danube*, *supra* note 365.

368. Stefan Bos, *Six months on, chemical spill still haunts Hungary*, DEUTSCHE WELLE (Apr. 4, 2011), <http://www.dw-world.de/dw/article/0,,14963107,00.html>; *Hungarian Chemical Sludge Spill Reaches Danube*, *supra* note 365; *Hungary: EU Tackling Toxic Sludge*, EURONEWS (Jan. 12, 2011), http://ec.europa.eu/echo/civil_protection/civil/hungary_2010.htm.

In response to the disaster, the Hungarian government declared a state of emergency and deployed emergency response workers to attempt to neutralize the overflow.³⁶⁹ Member states of the EU responded quickly to Hungary's activation of the EU Civil Protection Mechanism.³⁷⁰ More than forty specialists were offered by ten EU States.³⁷¹ The European Union ("EU") selected five EU environmental experts – from France, Belgium, Sweden, Austria, and Germany – to help the Hungarian government cope with the spill.³⁷²

Acknowledging the devastation the accident had caused, the Prime Minister of Hungary promised to compensate the affected villages for the damage incurred.³⁷³ By August 2011 this promise was fulfilled when compensation was paid by the government.³⁷⁴ Hungary was eager to initiate legal procedures for reimbursement against the operator of the facility. On October 11, 2010, Hungary arrested the managing director of MAL and charged him with "criminal negligence leading to a public catastrophe."³⁷⁵ In September 2011, MAL was fined 472 million euros.³⁷⁶ Despite Hungary's quick reaction to the spill and subsequent push to hold the responsible party liable, the incident caused some to push for the adoption of mandatory insurance schemes to ensure the polluter pays and the taxpayer does not.³⁷⁷

2. Croatia – Bakar Ex Cokeing Plant

The Bakar Ex Cokeing Plant Site in the Republic of Croatia has been undergoing remediation for a decade. The coke plant in Bakar began operation in 1978.³⁷⁸ During the period the plant operated, a total of fifteen

369. *Hungary declares state-of-emergency after toxic spill*, EURONEWS (May 5, 2010), <http://www.euronews.net/2010/10/05/hungary-declares-state-of-emergency-after-toxic-spill/>.

370. *Hungary: EU Tackling Toxic Sludge*, *supra* note 368.

371. *EU response to Hungarian sludge danger*, EURONEWS, (Nov. 10, 2010), <http://www.euronews.com/2010/10/11/eu-response-to-hungarian-sludge-danger/>.

372. *Id.*

373. *After the sludge: Rebuilding Hungary's towns*, BBC NEWS (Aug. 26, 2011), <http://www.bbc.co.uk/news/world-europe-14575564>.

374. *Id.*

375. Dan Bilefsky, *Hungary Arrests Official, Citing Role in Red Sludge*, N.Y. TIMES (Oct. 11, 2010), available at http://www.nytimes.com/2010/10/12/world/europe/12hungary.html?_r=1&pagewanted=all.

376. *Hungarian toxic chemical sludge spill firm fined*, BBC NEWS (Sept. 14, 2011), <http://www.bbc.co.uk/news/world-europe-14922301>.

377. Bos, *supra* note 368.

378. D. LOVRIC, A. ANTOLOVIC & D. SUBASIC, *Establishment and proposal for remediation of contamination on the site of the former coke plant in Bakar*, in BROWNFIELD SITES II: ASSESSMENT, REHABILITATION AND DEVELOPMENT 117, 117 (A. Donati et al. eds. 2004).

million tons of coal was manufactured, which resulted in the production of approximately eleven million tons of coke.³⁷⁹ About 440,000 tons of coal tars were generated as a by-product of coke production.³⁸⁰

Due to environmental damage caused by the plant, the Croatian Government issued an official decree for the plant's closure in 1994.³⁸¹ The processing equipment in the plant was not fully dismantled until 2001.³⁸² When the dismantling was complete, researchers assessed the state of the environment at the site. Preliminary inspection identified contamination through an intensive odor and a discovery of chemical laden upper layer soils. Further research revealed high concentrations of polycyclic aromatic hydrocarbons ("PAH") and total petroleum hydrocarbons ("TPH"), as well as sodium chloride at the site.³⁸³ It also was discovered that contaminated areas had interacted with the adjacent sea and polluted the seabed.³⁸⁴

Initial research and testing took approximately three years to complete.³⁸⁵ When contamination at threatening levels was found, the EU ordered immediate remediation of the site.³⁸⁶ A third party remediation contractor is currently conducting the remediation and cleanup of the site using the process of stabilization and solidification.³⁸⁷ The relevant government authorities are supervising the progress of the remediation, which is continuing "in accordance with the requirements of the Croatian Law and EU Directives."³⁸⁸

C. Central and South America

1. Brazil – Minas Gerais

In March 2003, a reservoir storing chemical residue burst at a paper and pulp mill located about 125 miles north of Rio de Janeiro in Cataguases, Minas Gerais state.³⁸⁹ The mill was operated by Cataguazes de

379. *Id.* at 118.

380. *Id.*

381. *Id.*

382. *Id.*

383. *Id.* at 119-121.

384. *Id.* at 121.

385. Michael Bryska, *Top Examples of Environmental Remediation Projects Around the World*, <http://www.isnare.com/?aid=712410&ca=World+Affairs>.

386. *Id.*

387. *ImmoCem Project References*, PowerCem Western Canada, http://powercem-wc.ca/powercem_western_00000b.htm (last visited Mar. 17, 2012).

388. *Cleaning up the old Coking plant in Bakar*, PowerCem Western Canada, http://powercem-wc.ca/powercem_western_gf000018.pdf (last visited Mar. 17, 2012).

389. *UNEP DTIE SCP Branch: Safer Production*, U.N. ENV'T PROGRAMME,

Papel Ltda.³⁹⁰ Approximately 396 million gallons (1.2 billion liters) of toxic waste, including caustic soda, was dumped into the rivers Pompa and Paraiba do Sul in southeastern Brazil.³⁹¹ Much of the toxic waste ran from Mina Gerais state into the adjacent Rio de Janeiro state and caused half a million citizens near the capital of Rio de Janeiro to be without water.³⁹²

Generated in the pulp bleaching process, caustic soda (also called sodium hydroxide) is found at concentrations of fifty percent, putting its pH to fourteen.³⁹³ A low concentration of caustic soda – e.g., ten percent – will burn the skin.³⁹⁴ Higher concentrations can cause severe corrosive damage.³⁹⁵ The immediate effects of the rise in pH included the deaths of hundreds of animals and fish, prohibitions on fishing, irrigation and recreational activities, and the closing of water supplies.³⁹⁶

Brazilian state government officials responded to the spill by asking the federal oil company, Petrobras, for assistance in containing the spill by isolating and treating water with dilute hydrochloric acid and by capturing the foam from the spill.³⁹⁷ Additionally, the local government itself drilled wells and sent water trucks to the affected areas.³⁹⁸ Within days of the spill, the Environment Minister warned that lax environmental standards would not be acceptable and that crimes of this sort “can in no way go unpunished.”³⁹⁹ The company was subsequently fined US\$15 million.⁴⁰⁰ Additionally, the company faced criminal charges for environmental damage, the closing of water supplies, and preventing public access to beaches.⁴⁰¹ Feeling the crimes were severe, the Federal Police attempted to arrest Felix Santana and Joao Gregorio, the directors of Cataguazes Papel

<http://www.unep.fr/scp/sp/disaster/casestudies/brazil/> (last visited Mar. 17, 2012).

390. *Id.*

391. *Id.*

392. *Brazil water supply tainted by toxic spill*, THE GUARDIAN (Apr. 9, 2003), <http://www.guardian.co.uk/science/2003/apr/10/science.research2>; *Huge toxic spill alarms Brazil*, BBC NEWS (Apr. 2, 2003), <http://news.bbc.co.uk/2/hi/americas/2909355.stm>.

393. Hannah Hoag, *Toxic spill threatens Brazilian rivers*, NATURE (Apr. 4, 2003), <http://www.nature.com/news/1998/030331/full/news030331-11.html>.

394. *UNEP DTIE SCP Branch: Safer Production*, *supra* note 389; *See also* Hoag, *supra* note 393 (quoting the president of DeVany Industrial Consultants in Vancouver “A 10% solution will eat the skin right off your body.”).

395. *UNEP DTIE SCP Branch: Safer Production*, *supra* note 389.

396. *Huge toxic spill alarms Brazil*, *supra* note 392; *UNEP DTIE SCP Branch: Safer Production*, *supra* note 389.

397. Hoag, *supra* note 393.

398. *Huge toxic spill alarms Brazil*, *supra* note 392.

399. *Id.*

400. *Id.*

401. *Alleged culprits of Brazil toxic spill on the run*, PLANET ARK (Apr. 7, 2003), <http://www.planetark.org/dailynewsstory.cfm/newsid/20377/newsDate/7-Apr-2003/story.htm>.

Ltda., shortly after the toxic spill.⁴⁰² Felix Santana was eventually arrested on April 7, 2003, but Joao Gregorio was not found.⁴⁰³ Despite the governmental response to the accident, ecologists warned that the environmental and other damage could take fifteen years to recover.⁴⁰⁴

2. Dominican Republic – The “Dominican Chernobyl”

Bajos De Haina has been called the “Dominican Chernobyl” due to extreme levels of toxic pollution found there.⁴⁰⁵ Metales y Oxido, S.A. (“Metaloxsa”) formerly operated a lead-acid battery recycling facility on an abandoned forty-five hectare site located on top of a hill. Runoff flows through a highly populated residential neighborhood (“Three sides of the site are bordered by homes with dirt floors”) and into the Rio Haina, which deposits into the Bay of Haina.⁴⁰⁶

Due to improper recycling of used lead acid (car) batteries for many years, lead furnace slag has contaminated the soils, water, and food supplies in the region.⁴⁰⁷ Paraiso de Dios, the affected community located near the abandoned lead smelter, is located in the municipality of Haina, which is seven kilometers from Santo Domingo.⁴⁰⁸ Haina’s population suffers from one of the highest levels of lead poisoning in the world.⁴⁰⁹ Most international standards consider lead levels above 70 µg/dL in children a medical emergency.⁴¹⁰ Some children in Haina have been measured at 100 µg/dL.⁴¹¹

Determining that remediation was necessary, the Ministry of Environment in the Dominican Republic teamed with a number of third parties⁴¹² to implement an intervention plan.⁴¹³ From December 2008-

402. *Id.*

403. Carmen Gentile, *Director arrested for Brazilian disaster*, UPI (Apr. 7, 2003), http://www.upi.com/Business_News/Security-Industry/2003/04/07/Director-arrested-for-Brazilian-disaster/UPI-61891049754618/.

404. *Alleged culprits of Brazil toxic spill on the run*, *supra* note 401.

405. Blacksmith Institute’s World’s Worst Polluted Places Report 2009, 12 Cases of Cleanup and Success, 52 (2009), <http://www.worstpolluted.org/files/FileUpload/files/2009-report/Blacksmith-Institute-Green-Cross-Switzerland-WWPP-Report-2009.pdf>.

406. *Id.*

407. *Id.* at 51.

408. *Id.* at 52.

409. *Id.* at 51.

410. *Id.* at 52-53.

411. *Id.* at 53.

412. Blacksmith Institute, the Inter-American Development Bank, University of Santo Domingo, TerraGraphics Environmental Engineering, Inc., and Hunter College, City University of New York. *Id.*

413. *Id.* at 53.

February 2009, excavation of the site occurred, and large amounts of the most dangerous contaminants were removed from the site.⁴¹⁴ Additionally, local crews and contractors worked together to conduct hazardous waste removal operations – a first for the Dominican Republic.⁴¹⁵ The formal industrial site was not the only area remediated. Community walkways and backyards were excavated and then backfilled with uncontaminated sand and soil.⁴¹⁶

D. *Australia and Asia*

1. *Australia – Homebush Bay, NSW*

The Australian and New Zealand Environment and Conservation Council (“ANZECC”) reports that up to 10,000 contaminated sites exist across Australia.⁴¹⁷ Other estimates suggest that Victoria alone has 20,000 potentially contaminated sites and that New South Wales could have as many as 7,000 sites requiring clean up.⁴¹⁸ In New Zealand, 8,000 sites are thought to be potentially contaminated, of which 1500 are viewed as high risk sites.⁴¹⁹ The cleanup of New Zealand’s high risk sites alone could cost NZ\$600 million.⁴²⁰

One of the most famous examples of a land remediation in Australia occurred in New South Wales in an area called Homebush Bay. The site was considered one of the most polluted places in Australia.⁴²¹ The sixteen hectare site is located on the edge of Sydney’s waterfront and was formerly owned by Union Carbide and Allied Feeds.⁴²² Chemicals, including coal tar, DDT and chlorobenzenes were produced at the site.⁴²³ The land is now owned by the State government, and the plan is to have it remediated to a level that makes it safe for residential uses.⁴²⁴ The estimated cost is A\$90 million including a contribution from the State government of A\$21

414. *Id.*

415. *Id.*

416. *Id.*

417. Anna Kingsbury, *Funding the Remediation of Contaminated Land in Australia and New Zealand: The Problem of Orphan Sites*, WAIKATO L. REV. 2 (1998), <http://www.nzlii.org/nz/journals/WkoLRev/1998/2.html>.

418. *Id.*

419. *Id.*

420. *Id.*

421. *History of Homebush Bay Site*, NEW SOUTH WALES HOMEBUSH BAY REMEDIATION, <http://www.rhodesremediation.nsw.gov.au/areahistory.html>.

422. *Id.*

423. *Id.*

424. *Id.*

million.⁴²⁵

The New South Wales government initially asked Union Carbide to clean up the site when contaminated sediments were identified in Homebush Bay in the late 1980s.⁴²⁶ Union Carbide undertook a capping method of remediation in the early 1990s that was satisfactory for industrial use.⁴²⁷ The government then persuaded adjoining property owners to work together to develop a joint remediation plan.⁴²⁸ However, it was not until 1997 that the government allocated A\$21 million to remediate the Homebush Bay sediments.⁴²⁹ In 1999 the government acquired the site and rezoned it for residential use.⁴³⁰ In the year 2000, bids were solicited to find the best remediation plan, and the EIS process was commenced.⁴³¹ The following year the government entered into a remediation contract with Thiess Services. Following another EIS and all the proper approvals from different government agencies, Thiess commenced work in May of 2005 with a goal of having the remediation complete in less than five years.⁴³² A project control group was also to review project progress every month.⁴³³ The project was actually completed in March 2011 for the Union Carbide site, while remediation of the Bay concluded in August 2010.⁴³⁴

2. Vietnam – Agent Orange

Within the last year, the U.S., in collaboration with the Vietnamese government, has ramped up efforts to clean up land contamination in Vietnam from the use of Agent Orange during the Vietnam War. While this contamination has been a strain on U.S.-Vietnam relations, clean up efforts have been underway for the last five years.⁴³⁵ A recent push has been made to remediate certain hot spots of contamination. One in particular is the area surrounding the Danang Airport.⁴³⁶ The U.S. has

425. *Id.*

426. *Clean Up History of Homebush Bay Site*, NEW SOUTH WALES HOME BUSH BAY REMEDIATION, <http://www.rhodesremediation.nsw.gov.au/cleanuphistory.html>.

427. *Id.*

428. *Id.*

429. *Id.*

430. *Id.*

431. *Id.*

432. *Id.*

433. *Id.*

434. *Former Lednez/Union Carbide Site & Homebush Bay Remediation*, RHODES REMEDIATION PROJECTS, <http://www.rhodesremediation.com.au/index.php?q=node/1>.

435. Udo Schmidt, *Vietnam, US ramp up Agent Orange remediation*, DEUTSCHE WELLE (Jun. 22, 2011), <http://www.dw.de/dw/article/0,15181072,00.html>.

436. *Id.*

provided almost forty-two million dollars since 2007 to help clean up the residue of Agent Orange.⁴³⁷ Danang Airport is where the U.S. stored the defoliant, and over a ten year period more fifty million liters of it were sprayed.⁴³⁸ The plan is to remove dioxin from twenty-nine hectares of soil so that it can be redeveloped for economic and commercial activity.⁴³⁹

E. Africa

1. Tanzania – Old Korogwe’s DDT Stockpile

With a population nearing 10,000, Old Korogwe is a small town located approximately 280 kilometers north of Dar Es Salaam, Tanzania’s capital.⁴⁴⁰ Beginning in the 1980s, a former sisal factory stored DDT and thiodan in a “rust-pitted shed” near the community.⁴⁴¹ The site contained a 100-ton stockpile of DDT, which was leaching into the soil and the adjacent Pangani River, a source of water and food for the town.⁴⁴² Recognizing the severity of the problem, the Tanzanian government worked with a third party to safely remove the pesticides from the community and to transfer them in accordance with international waste transfer regulations. The successful remediation resulted in the removal of eighty-six tons of DDT and twenty tons of DDT contaminated construction material.⁴⁴³ Additionally, the training provided to local residents and to the Tanzanian government will help them handle future chemical waste disposal issues more easily.⁴⁴⁴

2. Nigeria – Ogoniland

The Niger Delta has been a toxic dump zone for quite some time. The oil industry, Royal Dutch Shell in particular, has been polluting Ogoniland in the southeast region of Nigeria for the past fifty years.⁴⁴⁵ Most of the pollution comes from the aging infrastructure left by the company after operations ceased back in 1993.⁴⁴⁶ For the past two years, the UN

437. *Id.*

438. *Id.*

439. *Id.*

440. Blacksmith Institute’s World’s Worst Polluted Places Report 2009, *supra* note 405, at 64.

441. *Id.*

442. *Id.*

443. *Id.* at 63-64

444. *Id.* at 64

445. Julia Hahn, *UN says Ogoniland oil cleanup could become world’s largest*, DEUTSCHE WELLE (Nov. 8, 2011), <http://www.dw.de/dw/article/0,,15310337,00.html>.

446. *Id.*

Environment Programme (“UNEP”) has been investigating the damage caused. UNEP recently leased its most detailed study of contamination of soil, surface, and ground water in the area.⁴⁴⁷ The report, funded by Shell, found that cleanup could take almost thirty years and would result in the biggest oil spill remediation project in history.⁴⁴⁸ The report also concluded that current remediation efforts were proving futile.⁴⁴⁹ Levels of contamination in this area are extremely high. Benzene, a known carcinogen, was found in concentrations 900 times higher than what the WHO considers to be safe.⁴⁵⁰ UNEP recommended that the oil industry and government create a US\$1 billion restoration fund for Ogoniland.⁴⁵¹ Shell maintains that they have cleaned up the spills from their facilities.⁴⁵² They place the blame on criminals who sabotage or try to steal oil from the pipelines. There is no indication of when remediation work will begin.⁴⁵³

V. CONCLUSION: CERCLA IN A GLOBAL CONTEXT

Although no country has adopted an environmental remediation program as comprehensive as CERCLA’s, the environmental laws of many countries are gradually moving in CERCLA’s direction. The European Union’s Environmental Liability Directive has helped spur the EU’s twenty-seven member states to adopt laws holding parties responsible for environmental contamination to pay for the costs of remediating it. These laws generally are more limited than CERCLA in the contamination they cover and they permit a wider range of defenses to liability than CERCLA does. While most EU member states impose some form of joint and several liability, liability does not apply to contamination that occurred prior to the enactment of the legislation, unlike CERCLA which also imposes retroactive liability. CERCLA imposes liability on broader classes of parties than those covered by the ELD, but member states are beginning to broaden the range of parties they hold liable.

Over time, CERCLA has been modified to increase its fairness and flexibility. Responsible parties can now bring contribution actions and the liability of recyclers, financial institutions, de minimis contributors, and developers of brownfields has been limited. As a result, CERCLA is

447. *Id.*

448. *Id.*

449. *Id.*

450. *Id.*

451. *Id.*

452. *Id.*

453. *Id.*

becoming less stringent even as other countries are strengthening their liability and remediation schemes. In most other countries the government bears the cost of remediation when the party causing the contamination cannot be found or is insolvent. After repelling an early lobbying campaign by the insurance industry to convert CERCLA to a public works program, the U.S. government has now relaxed its original refusal to bear any portion of the costs of “orphan shares” in order to facilitate broader and more rapid settlements under CERCLA.⁴⁵⁴

CERCLA was adopted at a time of grave public concern about the legacy of uncontrolled disposal of toxic waste. This helps explain why it remains the world’s most comprehensive program for remediating environmental contamination. As incidents of environmental contamination in other parts of the world command public attention, other countries are upgrading their laws to expand their liability nets. Global environmental law is evolving in CERCLA’s direction in the name of vindicating the “polluter pays” principle and reducing the likelihood of future Love Canals.

454. Kenneth Kilbert, *Neither Joint nor Several: Orphan Shares and Private Cercla Actions*, ENVTL. LAW LEWIS & CLARK LAW SCH. (Feb. 17, 2012), <http://elawreview.org/2012/02/neither-joint-nor-several-orphan-shares-and-private-cercla-actions/>.