Chapter 27

International Environmental Law

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§ 27:1 Introduction

International environmental law is a field of vast proportions, encompassing multilateral accords on a wide array of cross-border and supranational issues such as climate change, sustainable development, biodiversity, endangered species protection, fishery management, chemical and hazardous waste management, and the regulation of pollution from shipping and aircraft operations. As international environmental law evolves, we have learned that enforceable programs are most often the product of consensus not just of governmental authorities, but also of the regulated community and civic concerns represented, in part, by non-governmental organizations.

This brief treatment of international environmental law is prepared for the U.S. corporate practitioner with an eye toward those international laws, policies, and programs that find their way into environmental reserves and capital budgets. We begin with an overview of global accords that are broadly enforced throughout the world, including greenhouse gas limits imposed in connection with the Paris Agreement. We then describe those directives of the European Union (EU) that have the greatest impact on companies operating both in and outside of the EU. Last, we provide a survey of national laws relating to the remediation of contaminated land. Throughout the text we provide website references that should facilitate further inquiry. We also provide a sample business diligence request list for international transactions that tracks the subjects treated herein.

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§ 27:2 Global Treaties

There are currently nearly two dozen global environmental treaties that have entered into force since 1972, most signed by more than 100 member countries. While we do not cover all of these accords, we note that they generally can be characterized as treating: (1) control of air emissions impacting climate, (2) manufacture, use, transport, and disposal of dangerous chemicals, (3) conservation of biodiversity, and (4) regulation of impacts to the marine environment.

§ 27:2.1 Greenhouse Gases (Kyoto Protocol and Paris Agreement)

The United Nations Framework Convention on Climate Change (UNFCCC), adopted at the "Earth Summit" in Rio de Janeiro, Brazil in May 1992, was the first international measure to address the problem of global warming. The UNFCCC required all signatories to establish national programs for reducing greenhouse gas (GHG) emissions, obligated them to submit regular reports, and set a nonbinding goal for industrialized signatory countries to stabilize their GHG emissions at 1990 levels by the year 2000. Recognizing that the UNFCCC would be inadequate to control the global increase in GHG emissions, the parties amended UNFCCC through adoption of the Kyoto Protocol in December 1997 and then the Paris Agreement in December 2015.

Under the Kyoto Protocol, industrialized nations (listed in Annex I to the UNFCCC) were required to reduce the emissions of six greenhouse gases (CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) on average by 5.2% below 1990 levels during the first "commitment period" from 2008 to 2012. During the second commitment period from 2013–2020, that percentage increased to 18% via individually determined plans facilitated by periodic conferences of the parties (COP sessions).

The Paris Agreement superseded the Kyoto Protocol in December 2015 following a decade of negotiations to reach an agreement requiring action on climate change from all major economies, not just industrialized nations. The Bali Road Map, adopted in Indonesia in December 2007, was supposed to guide UNFCCC parties to a new universal treaty in Copenhagen at the 15th Session of the Conference of the Parties (COP 15) in 2012. Unable to reach a binding agreement, the leaders of the world's largest economies nevertheless produced the three-page "Copenhagen Accord." This political agreement recognized "the scientific view that the increase in global temperature over 1850, pre-industrial levels should be below 2 degrees Celsius," calling on 196 developed and developing countries alike to undertake, by 2020, verifiable mitigation measures

commensurate with their level of economic development, with the so-called developed countries to mobilize $100 billion per year starting in 2020 from public and private sources, including through a new Green Climate Fund to support the efforts of developing countries. These milestones were formally captured in decisions of the COP one year later in Cancun. At COP 17 in 2011 in Durban, the parties to the UNFCCC launched a four-year process to attempt once again to reach a binding agreement, which they secured at COP 21 in Paris in December 2015. A list of countries who ratified the treaty is available at http://unfccc.int/paris_agreement/items/9485.php.

The Paris Agreement, along with the decisions of the COP governs international climate change cooperation after 2020. The Agreement puts equal weight on mitigation and adaptation, "pursuing efforts" to limit the warming increment to 1.5 degrees Celsius. Article 4 provides that this goal may be achieved both by reducing anthropogenic emissions by sources and by removing GHGs via "sinks". Article 4 provides that each party "shall prepare, communicate and maintain successive nationally determined contributions (NDCs)" that it will undertake to meet the Paris Agreement goal. In addition, parties "shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions." The Paris Agreement requires parties to pursue domestic mitigation measures and submit to the United Nations, at least every five years, successive rounds of NDCs that are progressively more restrictive. For example, the United States committed to reduce its greenhouse gas emissions by 26%–28% below 2005 levels by 2025 and to "make best efforts" to further reduce its emissions by 28%. This goal builds on the United States' pledge under the Copenhagen Accord to reduce its greenhouse gas emissions in the range of 17% below 2005 levels by 2020. China has articulated several goals, including peaking its CO_2 emissions around 2030 (making "best efforts" to peak early), reducing its economy's carbon intensity by 60%–65% below 2005 levels, increasing the country's share of "non-fossil fuels" in primary energy consumption to around 20%, increasing its forest stock volume by around 4.5 billion cubic meters above 2005 levels, and achieving carbon neutrality by 2060. Under the Copenhagen Accord, China had pledged to reduce the carbon intensity of its economy by 40%–45% by 2020 compared to 2005 levels. The European Union pledged a reduction in economy-wide greenhouse gases of 20% below 1990 levels by 2020 under the Copenhagen Accord and 40% by 2030 under the Paris Agreement. The French plan also currently includes a commitment to eliminate all gas vehicles by 2040 and all coal-based power production by 2022.

Article 5 of the Paris Agreement encourages countries to take actions to reduce emissions from deforestation and forest degradation (REDD+) protecting forests as a carbon sink. Article 6 contemplates a "mechanism" to allow countries to trade carbon credits to help one another achieve their respective NDCs and promote sustainable development. Article 8 addresses "loss and damage," allowing countries to seek financial and institutional support when dealing with the adverse effects of climate change. As noted, developed countries committed to provide financial assistance of at least $100 billion per year to developing countries and all parties are to "set a new collective quantified financial assistance goal" before 2025.

Importantly, the Paris Agreement, under Articles 4 and 13, obliges countries regularly to produce GHG inventories and progress reports on their NDCs, which are reviewed by independent experts. While Article 15 establishes a compliance mechanism, it leaves the operational details unresolved and limits itself to a "transparent, non-adversarial, and non-punitive" process.

Finally, recognizing that the first round of NDCs will be insufficient to achieve the treaty's mitigation and adaptation goals, the Paris Agreement sets up a "global stocktake" mechanism under Article 14: Starting in 2023 and every five years thereafter (unless otherwise agreed by a new decision), a comprehensive review will determine parties' collective progress toward the treaty's goals. The outcome of each stocktake is to "inform Parties in updating and enhancing" their actions and financial contributions to keep global action on climate change in line with the best available science. The first stocktake report was issued on September 8, 2023, comprised of 17 key technical findings reached after 2 years of deliberations and concluding that current NDC pledges will result in a 2.5 degree Celsius increase over preindustrial GHG emissions, with the planet having reached a 1.2 degree Celsius increase as of 2023.

§ 27:2.2 Persistent Organic Pollutants (Stockholm Convention) [Note: next Convention meeting set for Oct 9-13, 2023]

The Stockholm Convention on Persistent Organic Pollutants (POPs), subsequently ratified by more than 180 countries, was adopted on May 22, 2001, and went into force on May 17, 2004. POPs are chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of living organisms, and are toxic to humans and wildlife. The Convention seeks to control, reduce, or eliminate discharges of POPs through a variety of mechanisms and under a schedule of deadlines adopted by signatories.

The Convention sets a primary goal of ending the release and use of the most dangerous POPs with twenty-two chemicals currently listed in "Annex A: Chemicals to be Eliminated" (Article 3). These include the nine pesticides aldrin, chlordane, lindane, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, and toxaphene. They also include polychlorinated biphenyls (PCBs), used primarily as an insulating fluid in electrical equipment, certain polybrominated diphenyl ethers used as flame retardants, and the wood preservative pentachlorophenol. "Annex C: Unintentional Production" requires measures to eliminate two families of chemical by-products known as dioxins and furans, which are products of combustion and are released from industrial processes such as the production of pesticides, polyvinyl chloride, and other chlorinated substances. The Convention does not include mercury, which is instead covered under the EU Minamata Convention, which entered into force in May 2017 (signed by 128 countries), and provides prohibitions and use restrictions for mercury compounds over their life cycle (chemical manufacture through waste disposal). PFOS and its derivatives have been included since 2009 and EU ECHA authority has proposed a ban on PFAS in products (2023). Notably, many countries have not or are not likely to achieve the deadlines for POPs bans or use restrictions. One current example is lagging efforts on management and disposal of an estimated 1.3 million tons of PCBs produced prior to 1993.

With regard to pesticides, the Convention bans immediately all production and use of the pesticides endrin and toxaphene in countries that have ratified the Convention. It requires all parties to the Convention to stop producing the pesticides aldrin, dieldrin, and heptachlor and requires those wishing to use remaining supplies to register publicly for exemptions. Countries with exemptions will have to restrict their use of these pesticides to narrowly allowed purposes for limited time periods. The need for exemptions is to be periodically reviewed.

The Convention limits the production and use of two chemical groups listed in "Annex B: Restrictions." These include limits on the production and use of DDT to control disease vectors such as malarial mosquitoes, and as an intermediate in the production of the pesticide dicofol in countries that have registered for this exemption (widespread use of DDT is implicated in serious health impacts to wildlife, leading the United States to ban it in 1972). This exemption was created because DDT is particularly effective in controlling the mosquitoes that spread malaria, which

kills at least 1 million people every year, mostly in Africa.[1] Certain perfluorinated compounds (notably PFOA and PFOS) are also subject to use restrictions.

Finally, the Convention requires governments to take steps to reduce the release of dioxins, furans, hexachlorobenzene, and PCBs as by-products of combustion or industrial production, with the goal of their continuing minimization and, where feasible, ultimate elimination (see "Annex C" list) (Article 5).

The Convention restricts imports and exports of the ten intentionally produced POPs, permitting them to be transported only for environmentally sound disposal or for a permitted use for which the importing country has obtained an exemption. It also requires parties to develop, within two years, national plans for implementing the Convention and to designate national focal points for exchanging information on POPs and their alternatives.

The Convention also establishes a POPs Review Committee that regularly considers additional candidates for the POPs list at an annual meeting, generally held in May (the nineteenth such meeting was held in 2023). Any government can propose a new listing by stating the reasons for its concern. In its review of proposed POPs, the Committee must use a "precautionary approach," under which the lack of scientific certainty would not be cause for postponing cost-effective measures to prevent serious or irreversible damage to human health or the environment.

Although the United States is a party to the POPs treaty, the treaty has yet to be ratified by the Senate. More information on the POPs treaty can be found at www.pops.int.

§ 27:2.3 Biosafety (Cartagena Protocol)

The Cartagena Protocol, first adopted in January 2000 under the United Nations Convention on Biological Diversity, is intended to strike a balance between potential environmental harm associated with genetically modified crops (weed enhancement, unintended impacts on related species, increased insect resistance and health effects in humans) and the need to provide for a rapidly growing world population. The Protocol, which entered into force in September 2003 and currently has been ratified by over 170 nations (not including the United States), sets forth principles for transboundary shipment of genetically modified materials. The central feature of these principles is a requirement that first-time importers of a modified organism or genetically

[1] UNEP, Ridding the World of POPs 8.

modified seed provide advance information on the known risks and benefits of the material. Thus far, notices have been provided for GMO products such as maize, potato, rice, soybean, tomato, and cotton, plus a number of fruits, insects, fish, and mammals. The Protocol expressly grants to the affected nation the right to determine whether it will sanction the proposed importation.

The Protocol has had a central role recently in the notification to the EU of proposed shipments by U.S. agricultural manufacturers and the determination by the EU to decline importation and impose a moratorium on certain genetically modified products. The United States has subsequently filed a challenge to the EU decision with the World Trade Organization dispute-settlement panel and no decision has issued as of yet.

For more information on the Protocol, go to www.biodiv.org/biosafety/default.asp.[2]

§ 27:2.4 Ozone-Depleting Substances (Montreal Protocol)

In March 1985, a framework for control of chemicals that damage the Earth's ozone layer was established with the adoption of the Vienna Convention for the Protection of the Ozone Layer. With the subsequent passage of the Montreal Protocol on Substances that Deplete the Ozone Layer in 1987, countries from every region of the world agreed to take significant steps towards reducing emissions of ozone-depleting chemicals. The Montreal Protocol limits the production and consumption of specific chlorofluorocarbons (CFCs) and halons that contribute to the depletion of ozone in the stratosphere. Ozone depletion leads to increased human exposure to harmful ultraviolet radiation that is associated with higher rates of skin cancer and cataracts and possible suppression of the immune system. Additionally, CFCs have been linked with an increase in global warming. CFCs are used in a variety of products, including aerosols, refrigerants, foaming agents and solvents.

The Montreal Protocol called for a freeze on the production and use of certain CFCs at 1986 levels with additional reductions of 20% and 50%, which took effect in the early 1990s. The production and use of halons covered by the Montreal Protocol were frozen at the 1986 levels. At meetings in London (1990), Copenhagen (1992), Vienna (1995), Montreal (1997), and Beijing (1999), amendments were adopted that were designed to speed up the phasing out of ozone-

[2] *See also* Krainin, *Biotech Crops, Biosafety Protocol: Genetically Modified Sustainability?*, 19 NAT. RES. & ENV'T (Fall 2004).

depleting substances. The amended Protocol called for a phase-out of CFCs by developed countries by 1996, and a total phase-out by 2010. The participants also agreed to a phase-out of halons by developing countries by 1994, with a total phase-out by 2010.

The Montreal Protocol is an example of the length to which countries became willing to go in the 1980s in order to prevent environmental problems that had not yet fully manifested themselves. However, large developing nations such as India, China, Mexico, and Brazil expressed reluctance to take measures that might impede their economic development in order to mitigate environmental problems that they viewed as having been caused by industrialized countries. Developing countries also wanted access to the technology to manufacture alternatives to CFCs as a condition of signing the Montreal Protocol. In this respect, the amended Protocol established a $160 million fund to assist developing countries in switching to substitutes. Moreover, an additional $80 million was earmarked for assistance to new signatories that are developing countries.

It has been reported that, in the thirty years since the ratification of the Montreal Protocol, the size of the "ozone hole" over the Antarctic during winter months has reduced by an average of 20%. In 2016, ratifying countries entered into the Kigali Amendment to reduce emissions of hydrofluorocarbons (HFCs), the materials used to replace CFCs; HFCs are among the class of compounds contributing to climate change and could account for 10% of all greenhouse gases in coming decades. The United States ratified the amendment in September 2022.

For further information on the Montreal Protocol, visit http://ozone.unep.org.

§ 27:2.5 UN Convention on the Law of the Sea

The United Nations Convention on the Law of the Sea (UNCLOS or the "Convention") was adopted in 1982, nine years after the Third United Nations Conference on the Law of the Sea was convened. It went into effect in 1994 after adoption by sixty nations. As of September 2023, 168 countries and the European Union have ratified the Convention. An additional fourteen countries, including the United States, have signed but not ratified the Convention. UNCLOS establishes internationally recognized territorial and economic boundaries within which nations can assert sovereignty and control over the exploitation of natural resources such as oil, gas, minerals, and fish stocks. In addition, UNCLOS is the first comprehensive, enforceable international environmental law covering all forms of marine pollution (land-based, from vessels, and from activities on the sea-bed). As its name implies, the Convention also governs navigation (although

these provisions fall outside the scope of this chapter). At the time of its signing, the United Nations Secretary-General described the treaty as "Possibly the most significant legal instrument of this century."[3]

The Convention established a maximum twelve-mile territorial limit within which a state may assert its sovereignty over vessels and activities, subject to certain limitations (Part II). One key limitation is the right of "innocent passage" through territorial seas granted to foreign vessels. "Innocent passage" is defined as "not prejudicial to the peace, good order or security of the coastal State," and passage is deemed to be prejudicial if it involves any the threat or use of force, propaganda, spying, fishing, research, or "any other activity not having a direct bearing on passage" (Article 19).

The Convention further established a 200-mile exclusive economic zone (EEZ) (Part V). Within such zones, states are granted sovereign rights for the purpose of "exploring and exploiting, conserving and managing the natural resources" in the waters and on and below the sea-bed. This is a significant grant to states, as it is estimated that 87% of all known and estimated hydrocarbon reserves under the sea and 99% of all fish stocks now fall under some nation's jurisdiction.[4] The major beneficiaries of the EEZ regime are nations with large coastlines such as Australia, Brazil, Chile, France, New Zealand, the United States, and the Russian Federation. The Convention grants coastal states the right to determine the allowable catch of fish species in their EEZ, and requires that they ensure through proper conservation and management measures that their fisheries are not endangered by over-exploitation, taking into account the best scientific evidence (Article 61).

The Convention establishes the fundamental obligation of all nations to protect the marine environment, and urges all nations to cooperate on a global and regional basis in formulating rules and taking steps to that end (Part XII). It requires that states take measures to minimize to the fullest extent possible:

- the release of toxic, harmful or noxious substances, especially those that are persistent, from land-based sources, from or through the atmosphere or by dumping;

[3] The United Nations Convention on the Law of the Sea (A Historical Perspective), www.un.org/depts/los/convention_agreements/convention_historical_perspective.htm.

[4] *Id.*

- pollution from vessels, in particular measures for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, preventing discharges, and regulating the design, construction, and operation of vessels; and
- pollution relating to exploration and exploitation of the natural resources of the sea-bed and subsoil, in particular measures for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, and regulating the design, construction, and operation of installations and devices used in connection with such activities (Article 194).

Pollution from vessels is governed by the International Convention for the Prevention of Pollution from Ships (the MARPOL convention), which, as administered by the International Maritime Organization (IMO, a United Nations Agency), has regulations relating to oil discharges, sewage discharge, and air discharges including sulfur oxides, nitrogen oxides, volatile organic compounds, CFCs, and emissions from shipboard incineration) that have been adopted and are currently enforced by the major industrialized nations. The IMO is currently developing regulations to restrict greenhouse gas emissions from vessels. In April 2018, IMO's Marine Environment Protection Committee (MEPC) adopted an initial strategy on the reduction of greenhouse gas emissions from ships, setting out a vision to reduce GHG emissions from international shipping and phase them out as soon as possible in this century. MEPC adopted an updated emissions reduction strategy in July 2023, which includes (1) a goal of reaching net-zero GHG emissions from international shipping "close to 2050," (2) a commitment to ensure an uptake of alternative zero and near-zero GHG fuels by 2030, and (3) interim goals to reduce GHG emission from ships by at least 20% by 2030 and 70% by 2040, each as compared to 2008 levels.

After more than fourteen years of negotiations between IMO Member States, the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention) was adopted in 2004. The BWM Convention requires that ballast water management systems used to comply with the Convention must be approved by the Administration. The guidelines were converted into a mandatory code for approval of ballast water management systems (BWMS Code), which was adopted in April 2018 and entered into force in October 2019.

It is the duty of the "flag state" to enforce the rules adopted for the control of marine pollution from vessels, irrespective of where violations occur (Article 217). Unfortunately, many vessels are

registered in states with little or no enforcement capability (for example, Liberia), thus limiting the impact of this provision. However, coastal states are granted broad authority to enforce their laws and regulations regarding the prevention, reduction and control of pollution from vessels voluntarily within their ports and in their territorial seas (Article 220).

An "Arctic Council" formed under UNCLOS is currently developing policy and procedure to apply to new navigation routes and natural resources exploitation caused by accelerating arctic melt. These deliberations are handicapped by the absence of the United States as a UNCLOS member country.

An International Seabed Authority (ISA) has been established under UNCLOS with authority to regulate use of the ocean floor, especially in connection with mining of "nodules" that contain concentrated metals needed in battery manufacture. The ISA has primacy over metal mining activities over 200,000 square miles of seabed. As of September 2023, the ISA has developed regulations governing deep sea mining (DSM) exploration and has awarded 31 exploration contracts. Regulations governing future commercial mining activities are still in development. The United States, which has not ratified UNCLOS, has developed its own regime for DSM under the Deep Seabed Hard Mineral Resources Act (DSHMRA). The DSHMRA includes a licensing and permit process for the exploration and recovery of mineral resources by persons and entities under U.S. jurisdiction. No commercial DSM is currently being conducted under the DSHMRA, and the National Oceanic and Atmospheric Administration has stated that the DSHMRA is only intended to establish an interim regulatory regime pending the United States' adoption of UNCLOS.

For more information on UNCLOS, go to www.un.org/Depts/los/index.htm.

§27:2.6 Convention on Biodiversity

Following the 1992 Rio Earth Summit, 150 countries entered a new convention on Biological Diversity intended to restore and maintain the natural environmental while still supporting sustainable development. The parties have since conducted over a dozen conventions of parties (COPs) resulting in adoption of several important measures. The Cartagena Protocol on Biosafety entered by 173 countries and in force as of September 11, 2003, provides for the safe holding and transport of genetically modified organisms (GMOs). The Nagoya Protocol on Access and Benefit Sharing as entered by 141 countries on October 12, 2014, creates a scheme for broad access to

GMO resources, including establishment of an Access Benefit Sharing (ACS) Clearinghouse for use by signatories.

Perhaps the most significant development, is the passage of the Kumming-Montreal Global Biodiversity Framework (Framework) following COP 15 in December of 2022, setting forth common goals for restoration, preservation and monitoring of biodiversity under 23 detailed goals, including "Target 3" which requires restoration and preservation of thirty percent of global resources by 2030 (or "30 by 30 target") on the way to more stringent targets with a deadline of 2050. Like the climate-oriented conventions, the Framework requires develop nations to provide financial support to developing nations for achievement of the targeted goals; $20 billion/year starting 2025 and $30 billion/year starting 2030. A total of 61 countries have thus far submitted Biodiversity Strategies and Action Plans under the Framework, including Canada, China, the EU, Italy, France, Japan and 22 African Nations. The United States is not yet a party to the Framework.

In conjunction with its Framework Action Plan, the EU has issued its Regulation on Deforestation Free Products, EU 2023/1115 (EUDR), requiring all countries importing certain biodiversity related crops and their derivative products (wood, palm oil, coffee, cattle, cocoa, rubber and soy) to conduct diligence and certify that imports are not the result of deforestation (or forest degradation) together with a host of labor and social goals, using a retroactive starting reference date of December 31, 2020. The EUDR entered into force on June 29, 2023, and Member Countries begin enforcement in 2025.

More information can be found at www.cbt.int, Convention on Biological Diversity

§ 27:3 EU Law

Our treatment of environmental law in the European Union (EU) covers those regulatory regimes currently in force, recognizing that there are likely to be some U.K. variances following its exit from the EU at the beginning of 2020 and following the so-called "transition period" that terminated on December 31, 2021. A Trade Cooperation Agreement between the U.K. and EU generally requires that the UK not "regress" as to environmental requirements in force at that date, especially as to requirements governing contaminated land, industrial emissions, chemical regulation, biodiversity, and the marine environment.

§ 27:3.1 Carbon Dioxide Emissions Trading

In order to meet the greenhouse gas emissions targets of the Kyoto Protocol, the EU enacted Directive 2003/87/EC, which established a CO_2 emissions trading system.

The EU Emissions Trading Scheme (ETS) applies to approximately 11,000 installations representing half of Europe's CO_2 emissions. The ETS applies to combustion plants that generate greater than twenty megawatts of power, oil refineries, coke ovens, iron and steel plants, pulp and paper plants, cement kilns, and other facilities (Annex I to the Directive). In 2008, the ETS was amended to include the aviation sector (which operates under a separate emissions cap).

Under the ETS, Member States developed national allocation plans (NAPs) setting forth the total quantity of emissions (expressed in metric tons) that the Member State intended to grant to its companies (Article 9). The first trading period under ETS was 2005–2007. Among the lessons learned from the phase-one NAPs was that the process was very time-consuming, and that the NAPs were too complex and not sufficiently transparent.

The second phase ran from 2008 to 2012. The European Commission worked with the Member States to simplify the administrative rules created in the first allocation plans. To ensure greater transparency, the Commission drew up a number of standardized tables to summarize key information contained in the NAPs.

The third phase began in January 2013 and ran until December 2020. Compared to 2005, the proposed caps for 2020 represented a 21% reduction of greenhouse gases. Phase three also introduced an EU-wide cap on emissions (reduced by 1.74% each year) and a shift toward auctioning of allowances in place of cost-free allocations.

The fourth phase began in January 2021 and will run until December 2030. In this phase, there is an increased focus on sectors at the highest risk of relocating their production outside of the EU, with these sectors receiving up to 100% of their allocation free. For less exposed sectors, free allocation will be phased out after 2026 from a maximum of 30% to 0 at the end of the fourth phase (2030).

Following a revision of the ETS Directive in 2009, EU ETS operations were centralized in a single EU registry operated by the European Commission. The Union registry has replaced

Member States' national registries. The single registry covers all thirty-one countries participating in the EU ETS.

The EU registry is an online database that holds accounts for stationary installations which have been transferred from national registries, as well as accounts for aircraft operators, which have been included in the EU ETS since January 2012.

The registry records:

- National implementation measures (a list of installations covered by the ETS Directive in the territory of each Member State and any free allocation to each of those installations in the period 2013–2020);
- Accounts of companies or physical persons holding those allowances;
- Transfers of allowances performed by the account holders;
- Annual verified CO_2 emissions from installations;
- Annual reconciliation of allowances and verified emissions, where each company must have surrendered enough allowances to cover all its verified emissions.

Companies that fail to surrender sufficient allowances are subject to financial penalties of €100 per ton, increasing with EU inflation from 2013 (Article 16). In addition to paying penalties, a company that fails to submit sufficient allowances must submit those allowances in the following year.

A company can reduce its emissions by adding or upgrading pollution control equipment, adopting energy efficiency measures, switching fuels, or changing its production processes.

In May 2023, the European Parliament passed legislation establishing a "Carbon Border Adjustment Mechanism" (CBAM) that imposes a tax on products imported into the EU, beginning with "high-carbon" products iron, steel, aluminum, cement, fertilizers and energy commodities, payable quarterly beginning January 1 2026. The measure is part of an ongoing effort by the EU to prevent "leakage" of carbon-intensive industries to other countries and to push non-EU countries to reduce their industrial emissions.

The goal of the CBAM is to equalize the price of carbon paid for products made in the EU and outside the EU. To achieve that goal, companies that import into the EU are required to purchase CBAM certificates equivalent to the difference between the carbon price paid in the country of production and the price of carbon allowances in the EU. The EU expressly seeks to "incentivize non-EU countries to increase their climate ambition" by imposing their own carbon taxes. The tax is calculated based on the Scope 1 (company) and Scope 2 (energy provider) emissions associated with the production of goods, and if the emissions cannot be verified, a default value is used based on the emission intensity of the 10% worst performing EU installations producing those goods.

Reporting-under CBAM began in October 2023 and focuses on the following industry sectors: iron and steel, cement, fertilizers, aluminum, electricity, and hydrogen. It also covers certain precursors and downstream products related to those industries. The EU has been providing a certain amount of free carbon allowances to those sectors under the ETS to prevent "leakage", and the full CBAM phase-in is being coordinated with the phaseout of those free ETS allowances, which will be complete in 2034.

The reporting period extends until 2026, after which the CBAM is applied to goods in the noted initial sectors.

§ 27:3.2 Integrated Facility Permits: Industrial Emissions Directive

In 1996, the EU enacted the integrated pollution prevention and control (IPPC) directive to reduce pollution and improve environmental management in certain industries by mandating the use of Best Available Techniques (BAT) on a facility-wide basis, including in the areas of pollution control, energy use and waste minimization with an original deadline of 2007 (Council Directive 96/61/EC concerning integrated pollution prevention and control). In 2010, the EU adopted a successor to the IPPC, the Directive on Industrial Emissions (IED) under Council Directive 2010/75/EU ("Directive"). In passing the Directive, the EU sought to elevate environmental standards and practices throughout its membership to the more demanding and sophisticated levels seen in countries such as Germany, France, and the Netherlands. Although implementation of the Directive varies widely from state to state, the Directive serves to impose some measure of uniformity on environmental performance across the continent. As with any EU directive, Member States passed implementing legislation in order for IPPC and IED to take effect.

The Directive applies to "installations" in a wide range of industries, including energy, chemicals, plastics, metals production and processing, pulp and paper, waste management, and large scale food production (Annex I to the Directive). An "installation" may or may not encompass an entire facility. For example, an assembly operation that would not be subject to IED permitting may have a related chrome-plating line that would be a subject "installation." It is estimated that 60,000 installations across the EU are subject to IED requirements. While size or volume thresholds apply to certain industries, facilities in other industries, such as chemical manufacturing, are subject to IED regardless of size.

Article 4 of the Directive sets out the general principles governing installations, which must be operated in such a way that:

- all appropriate pollution prevention measures are taken through application of BAT;
- waste production is avoided;
- where waste is produced, it is recovered, or where technically and economically impossible, it is disposed of in manner that avoids or minimizes environmental impact;
- energy is used efficiently;
- measures are taken to prevent accidents; and
- measures are taken upon cessation of activities to avoid pollution risk and to return site to a satisfactory state.

These obligations are quite broad, and in many respects exceed those of U.S. Clean Water Act, Clean Air Act, RCRA, and CERCLA combined (especially with respect to facility closure).

The centerpiece of the Directive is the requirement that installations meet the BAT standard in implementing pollution control measures (Article 3). BAT standards for each industry are set forth in BAT Reference documents (BREFs) that are developed by the IED Bureau at the EU Joint Research Center in Sevilla, Spain. The BREFs are written by Technical Working Groups that are convened for each industry, comprised of experts from industry, government, research institutes and nongovernmental organizations. The process usually involves several meetings of the working group and several drafts of the document over the course of two to three years, and is usually

driven by the country most dominant in a particular industry. The BREFs are updated from time to time, generally based on revised risk analysis.

A BREF contains the following elements:

- general information about the sector;
- currently applied processes and techniques;
- present consumption/emission levels;
- relevant techniques for selecting BAT;
- selection of BAT;
- emerging techniques; and
- recommendations for future work.

IED permits must include Emission Limit Values (ELVs) based on BAT, without prescribing the use of any specific technique or technology, and taking into account geographical location and local environmental conditions (Article 9).

A key threshold question in IED permitting is where to draw the boundaries of an "installation." In many cases, only a portion of a facility's operations may be subject to IED permitting, but drawing the boundaries of that installation is not always a simple task. For example, a process line that is subject to IED is clearly part of the "installation," but the effluent treatment plant, hazardous waste storage areas and raw material storage areas linked to that process may also be part of the installation, even though they do not solely support the covered process. The inclusion as part of the installation would mean not only that BAT would apply to pollution control measures, but also, for example, that those areas would have to be returned to a "satisfactory state" upon cessation of activities. This could have a significant impact on site closure costs.

Generally speaking, facilities in countries with more developed environmental regulatory regimes require less work to comply with IED. In some jurisdictions older facilities may need to be shut down because they are unable to meet BAT and other IED requirements without unjustifiably large capital investment. For more information on the IED Directive, go to https://ec.europa.eu/environment/industry/stationary/index.htm.

In 2015, the EU approved the Medium Combustion Plants Directive (EU) 2015/2193 (MCP). This directive aims to reduce sulfur dioxide, nitrogen oxides, and particulate matter emissions from existing and new combustion plants with a total rated thermal input of 1-50 MW. Emission limits are generally more strict for new combustion plants than for existing plants. The directive includes transition periods, extending to either 2025 or 2030 depending on the size of the plant.

A new National Emission Ceiling Directive (EU) 2016/2284 entered into force in 2020. The aim of the directive is to reduce the health and environmental impacts and risks caused by air pollutants by 2030. The directive lays down the emission reduction obligations for individual Member States for sulfur dioxide, nitrogen oxides, fine particulate matter, volatile organic compounds, and ammonia directive also establishes requirements for calculating and reporting emissions by the Member States. Besides the substances listed above, these obligations also apply to heavy metals, persistent organic compounds, and black carbon. Reporting obligations became applicable on February 15, 2017.

§ 27:3.3 Major Accident Safety at Prevention and Response (Seveso III)

The EU began regulating industrial facilities handling hazardous substances in 1982, in the wake of to a major accident at a chemical plant near Seveso, Italy that released a vapor cloud containing dioxin.[5] While no immediate fatalities were reported, approximately 2,000 people were treated for dioxin poisoning and approximately ten square miles of land and vegetation became contaminated. Subsequent industrial disasters in Bhopal, India in 1984 and Basel, Switzerland in 1986 led the EU to broaden the Seveso Directive with amendments in 1987 and 1988. Eventually, the original directive was replaced entirely by the "Seveso II" Directive in 1996 and then by the Seveso III EU Accident Prevention Requirements in 2012.[6] The Seveso III Directive covers approximately 12,000 industrial establishments and aims to prevent major accidents involving hazardous substances and limit the consequences of such accidents to human health and the environment. It covers both industrial "activities" as well as the storage of dangerous chemicals under an implementing directive that came into force in June 2015, Directive 2012/18/EU.

[5] Council Directive 82/501/EEC on the major-accident hazards of certain industrial activities ("Seveso Directive").

[6] Council Directives 96/82/EC and 2012/18/EC on the control of major-accident hazards.

The 2015 Directive establishes two tiers of facilities based on the quantity of "dangerous substances" present. The threshold quantities for each tier are set forth in Annex I of the directive. Facilities falling into the lower tier must provide the competent authority a notification indicating the name of the operator, the person in charge of the establishment, information sufficient to identify the dangerous substances involved, the quantity of dangerous substances involved, the activity of the installation, and details regarding the immediate environment of the establishment (Article 6). In addition, lower-tier facilities must prepare and submit a "Major-Accident Prevention Policy" (MAPP), which is "designed to guarantee a high level of protection for man and the environment by appropriate means, structures and management systems" (Article 7). The MAPP must be in writing and must set forth the operator's "overall aims and principles of action" with respect to the control of major accident hazards (Annex III).

Upper-tier facilities establish a MAPP and have an additional obligation to prepare a Safety Report, a Safety Management System, and an Emergency Plan (Article 9). The Safety Report must include a description of the facility, including a description of the processes and dangerous substances handled (Annex II). It must also include a description of the possible major-accident scenarios and the measures that will be taken to limit the consequences of an accident (Annex II).

The Safety Management System (SMS) must address:

- organization and personnel—the roles and responsibilities of personnel involved in management of major hazards at all levels of the organization, as well as the training needs of such personnel;
- identification and evaluation of major hazards—adoption and implementation of measures for identifying major hazards arising from operations;
- operation and control—adoption and implementation of procedures for safe operation;
- management of change—adoption and implementation of procedures for planning modifications to installations, processes and storage facilities;
- planning for emergencies—adoption and implementation of procedures to identify foreseeable emergencies by systematic analysis;

- monitoring performance—adoption and implementation of procedures for the ongoing; assessment of compliance with the objectives set by the MAPP and SMS, including systems for reporting major accidents and near misses; and
- audit and review—adoption and implementation of procedures for periodic systematic assessment of the MAPP and SMS (Annex III).

The Emergency Plan must include:

- names or positions of persons authorized to set emergency procedures in motion and the person in charge of coordinating emergency response;
- name and position of the person with responsibility for liaising with the authority responsible for the external emergency plan;
- for foreseeable conditions or events that could be significant in bringing about a major accident, a description of the action that should be taken to control the conditions of events and to limit their consequences, including a description of the safety equipment and the resources available;
- arrangements for limiting the risks to persons on site;
- arrangements for providing early warning of the incident to the authority responsible for setting the external emergency plan in motion;
- arrangements for training staff in the duties they will be expected to perform; and
- arrangements for providing assistance with off-site mitigatory action (Annex IV).

In the event of a major accident, the facility operator is required to inform the authorities and provide details of the accident and substances involved as soon as it becomes available (Article 14). The operator must also inform the authorities of the steps it proposes to alleviate the medium and long-term effects of the accident and prevent the recurrence of such an accident (Article 14).

The Directive also requires that the competent authorities periodically inspect regulated facilities to ensure that appropriate safety measures are in place and verify the accuracy of the data and other information contained in the Safety Report and other reports submitted by the operator (Article 18).

In 1994 and 1999, the EU adopted two additional and related directives on explosive atmospheres (collectively, *Appareils destiné à être utilises en ATmosphères EXplosibles* or "ATEX") (Directives 94/9/EC and 99/92/EC). ATEX addresses devices and protective systems designed for use in, and minimum requirements for improving the safety and health protection of workers at risk from, explosive atmospheres.

The EU Commission issued its first report on SEVESO III implementation in September 2021, noting that the number of major reportable accidents had declined under the regime, with 25 accidents reported in the prior year. The Commission also noted near efforts to implement an electronic Global Disaster Alert and Coordination System to improve emergency response across the EU. The Commission has also set a priority around disaster containment measures consistent with the Zero Pollution Action Plan for air emissions targeted under the European Green Deal.

More information on the Seveso III Directive can be found at http://ec.europa.eu/environment/seveso/index.htm.

§ 27:3.4 Chemical Safety (REACH)

First introduced in 2003 and adopted December 18, 2006, the legislation concerning the registration, evaluation, authorization, and restriction of chemicals (REACH) requires importers and manufacturers of an estimated 30,000 chemicals to perform toxicity and other testing to demonstrate safety in consumer use.[7] REACH is the culmination of a long effort to improve and integrate chemicals regulation in the EU, and replaces forty existing laws and regulations. It reverses the burden of proof with regard to chemical safety so that industry, rather than public authorities, will be responsible for identifying and controlling risks associated with chemicals manufactured in and imported into the EU.

The Regulation allows a reduced level of chemical testing for substances produced or imported in volumes between one and ten metric tons annually (an estimated 20,000 chemicals), and includes an exemption for volumes below one metric ton annually, a "polymers" exemption, and provision for joint submissions by multiple manufacturers of a single chemical (the one-substance, one-registration—OSOR—approach). REACH empowers the Helsinki-based European

[7] Regulation (EC) No. 1907/2006 of the European Parliament and of the Council concerning the registration, evaluation, authorization and restriction of chemicals, establishing a European Chemicals Agency and amending Directive 1999/45/EC and Regulation (EC) [on Persistent Organic Pollutants].

Chemicals Agency (ECHA) to administer the program and to deny registration and ban manufacture and import of chemicals based on applications submitted, including consideration of cancer potency, reproductive impacts, bioaccumulation and persistence in the environment. REACH allows production and importation of certain chemicals under special conditions that would mitigate risk through regulated and enforceable control measures, as, for example, under the equivalent of U.S. Material Safety Data Sheets.

The basic elements of REACH are as follows.

[A] Registration

All chemical substances produced or imported in quantities of one metric ton or more per year must be registered in a central database, to be managed by ECHA. Some groups of substances are not subject to registration (such as certain intermediates, polymers, and some chemicals managed under other EU legislation). Manufacturers and importers are required to submit a "technical dossier" containing information on the properties, uses and safe handling of the chemicals. The information required will be proportional to production volumes and the risks that a substance poses. The safety information will be passed down the supply chain. General rules are set out for the use of existing information and the waiving of tests, with new tests only required when it is not possible to provide the information in any other permitted way. For substances manufactured or imported in quantities over ten metric tons per year, a "chemical safety report" is also required. This report must include an assessment as to whether the substance is persistent, bioaccumulative, and toxic (PBT), or very persistent and very bioaccumulative (vPvB). For PBT and vPvB substances, the report must include descriptions of potential exposure scenarios for identified uses, along with corresponding risk management measures. To reduce costs to industry, the legislation allows registrants to form "Substance Information Exchange Forums" and consortia to collect and to submit information on the properties and classification of a substance on behalf of their members.

ECHA set three deadlines for registration of chemicals, as determined by the tonnage manufactured or imported. Those above the 1000 metric tonnes per year level were required to be registered by December 1, 2010. The deadline for those above the 100 metric tonnes per year level was June 1, 2013. The final registration deadline for manufacturers and importers was June 1,

2018, for those above the one metric tonne per year level. New substances are to be registered immediately.

Enforcement efforts carried out by ECHA prior to 2013 revealed that two-thirds of companies inspected were not in compliance with one or more provisions of REACH. The most common areas of noncompliance included registration and notification contraventions, failing to retain information, and having deficient risk management procedures. In 2020, an ECHA study found, after examining 1,400 products, that 23% of the products were not compliant with REACH and the related Classification, Labeling and Packaging (CLP) regulations. Product examinations were focused on the presence of certain restricted substances; primarily cadmium, lead, and nickel. Of the 1,225 checks for these substances, 17% of the products had amounts above the regulatory limit. The highest rate of noncompliance was detected in jewelry. As to CLP compliance, 167 products were checked, and 64% were found to be noncompliant. These more recent ECHA reviews suggest that importers, in particular, need to improve compliance with REACH.

[B] Evaluation

REACH also mandates that Member State authorities evaluate chemical dossiers submitted by registrants and, in certain instances, of component substances themselves. One of the primary goals of this step is to review any animal testing proposals in an effort to prevent unnecessary testing. This step is also intended as a compliance check to ensure that registration materials meet the requirements of the Regulation. Member State authorities may also seek clarification of risks to human health or the environment by requesting further information from industry.

[C] Authorization

For approximately 1,500 substances of "very high concern," an authorization from the EU Commission is required for their use and marketing. Substances of very high concern are those that are carcinogenic, mutagenic, or toxic for reproduction category 1 and 2; PBTs and vPvBs; and substances identified as causing serious and irreversible effects to humans or the environment equivalent to those above on a case-by-case basis, such as endocrine disrupters. Once it has been determined that a substance must be authorized, the registrant must apply for an authorization, and in so doing must demonstrate that the risk from the use of the substance is adequately controlled or that the socioeconomic benefits outweigh the risks, taking into account alternative substances

and processes. Based on these factors, the Commission will decide whether a substance will be authorized, and can impose restrictions to ensure that the risks posed are acceptable.

Annex XVII to REACH provides a chart setting forth current use restrictions for several classes of chlorinated compounds as well as uses of metals such as arsenic, cadmium, and hexavalent chromium. For more information on REACH implementation, go to http://ec.europa.eu/environment/chemicals/reach/reach_en.htm.

§ 27:3.5 Electrical and Electronic Equipment (WEEE/RoHS)

In an effort to reduce the impact on the environment of waste electrical and electronic equipment, a fast-growing component of the EU waste stream that often contains hazardous substances, the EU enacted the Directives on Waste Electrical and Electronic Equipment (WEEE) and the Restriction of the Use of Certain Hazardous Substances Electrical and Electronic Equipment (RoHS).[8]

The WEEE Directive makes producers primarily responsible for the reuse, recovery and recycling of WEEE. This "producer responsibility" principle is intended to encourage more environmentally responsible equipment design and production by forcing producers to confront end-of-life disposal issues that are normally the concern of governments, and follows the principles of a previous directive on the recycling of packaging waste. The Directive covers a wide range of electronic equipment identified in ten categories:

1. Large household appliances;
2. Small household appliances;
3. IT and telecommunications equipment;
4. Consumer equipment;
5. Lighting equipment;
6. Electrical and electronic tools (with the exception of large-scale stationary industrial tools);
7. Toys, leisure and sports equipment;

[8] Directive 2002/96/EC; Directive 2002/95/EC.

8. Medical devices F (with the exception of all implanted and infected products);
9. Monitoring and control instruments; and
10. Automatic dispensers.

In 2012, the EU enacted an updated version of WEEE known as "WEEE Recast." That law sets new collection targets of up to 85% of WEEE generated. The existing binding EU collection target of 4 kg of WEEE per capita is increased over time to approximately 20 kg per capita after 2019.

The new WEEE Directive will give EU Member States additional tools to fight illegal export of waste. For example, under the new Directive, WEEE export must take place in compliance with the Waste Shipment Regulations, and the Commission will be required to establish detailed rules for WEEE exporters to prove that treatment of WEEE outside the EU takes place in conditions equivalent to those required by the WEEE Recast.

Starting in 2018, the original ten categories of covered products were consolidated into six categories as follows:

1. Temperature exchange equipment;
2. Screens, monitors, and equipment containing screens having a surface greater than 100 cm^2;
3. Lamps;
4. Large equipment (any external dimension more than 50 cm);
5. Small equipment (no external dimension more than 50 cm); and
6. Small IT and telecommunication equipment (no external dimension more than 50 cm) as waste material.

Excluded are large-scale fixed installations, large-scale stationary industrial tools, certain types of medical devices, and in vitro diagnostic medical devices.

With regard to WEEE from private households, Member States are primarily responsible for setting up systems to allow end users and distributors to return such wastes free of charge, and must ensure the availability of collection facilities, taking into account population density (Article

5). Producers are allowed, but not required, to set up private take-back systems for WEEE from private households. In the case of WEEE other than from private households (for example, offices, institutions), producers, or third parties acting on their behalf, are responsible for collection (Article 5).

Once the waste materials are collected, responsibility for treatment, recovery, and recycling falls entirely on producers, who may act individually or jointly.

Under the RoHS Directive (adopted July 1, 2006) and RoHS Recast (adopted June 8, 2011, replacing the initial Directive), permissible concentrations of lead, mercury, cadmium, hexavalent chromium, and certain brominated flame retardants are severely restricted in the ten categories of equipment established under WEEE, plus an additional Category 11 that includes electrical and electronic equipment not covered by other categories. Compliance was required by January 2, 2013, except for medical devices (Category 8; 2014 or 2016 depending on the type) and monitoring and control instruments (Category 9; 2014 or 2017 depending on the type).

RoHS 3 (Directive 2015/863), published in 2015, expanded the list of prohibited substances from six to ten by adding four types of phthalates. The substances and concentration limits are as follows: lead (0.1%); mercury (0.1%); cadmium (0.01%); hexavalent chromium (0.1%); polybrominated biphenyls (PBB) (0.1%); polybrominated diphenyl ethers (PBDE) (0.1%); bis(2-ethylhexyl) phthalate (DEHP) (0.1%); butyl benzyl phthalate (BBP) (0.1%); dibutyl phthalate (DBP) (0.1%); diisobutyl phthalate (DIBP) (0.1%). The four phthalates are generally used as plasticizers, and are already banned or restricted in many parts of the world. DEHP accounts for a more than half of the plasticizer industry, and is prevalent in PVC. BBP is widely used in vinyl floor tiles, but can also be found in caulking and adhesives. DBP can also be used in adhesives and in inks. DIBP is used in making PMMA (commonly known as acrylic or plexiglass) plastic. The restriction of DEHP, BBP, DBP, and DIBP applied to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, as of July 22, 2021.

Although the scope has been significantly expanded, RoHS Recast also expressly includes a number of exemptions. For example, large-scale stationary industrial tools, fixed installations, and means of transport will remain outside the scope of RoHS. Other exemptions include active implantable medical devices, certain photovoltaic panels, and equipment designed solely for

research or development purposes and made available on a business-to-business basis. Definitions of several key exemptions are also included in the recast Directive to further clarify its scope.

The Annex to the RoHS Directive provides a list of exemptions for certain applications where no current alternative exists (for example, mercury in compact fluorescent lamps not exceeding 5 mg per lamp). The Directive allows exemptions for reasons such as technical or scientific impracticability, and the European Commission is required to obtain comment from interested parties before deciding whether to grant an exemption (Article 5).

In 2017, amendments to RoHS went into effect with regard to secondary market operations. Previously, initial sales and resales of electrical and electronic equipment (EEE) containing prohibited substances in noncompliant concentrations were prohibited after July 22, 2019. The amendments did away with the deadline for equipment and spare parts containing prohibited substances which were put on the market before the respective substances were prohibited. This allowed for the repair, refurbishment, and reuse of EEE.

For more information on the WEEE/RoHS Directives, see http://ec.europa.eu/environment/waste/rohs_eee/.

§ 27:3.6 Public Access to Information

The Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters was adopted under the auspices of the U.N. Economic Commission for Europe in Aarhus, Denmark, on June 25, 1998, and was ultimately ratified by the European Commission on February 17, 2005, in order to "Guarantee the rights of access to information, public participation in decision-making, and access to justice in environmental matters...." (Article 1). The Convention has been implemented through a number of directives and, by U.S. standards, provides a very broad grant of access to information filed with governmental authorities as well as the policy-making process.

The access to environmental information elements of the Convention are implemented in the EU through EC Directive 2003/4/EC on public access to information and came into force on January 1, 2005 ("Environmental Information Regulations") with enforcement under the auspices of the Information Commissioner. The Environmental Information Regulations apply to all public authorities as well as private entities that are substantially controlled by a public entity such as port

authorities. The information subject to access is broadly defined to include public and private filings, with exemption only for such information where the public interest in disclosure is outweighed by potential public injury from disclosure, a matter to be determined by the Information Commissioner and his office. There is long experience regarding application of the exemption based on the EU Freedom of Information Act (FOIA) (applicable to non-environmental requests), which was passed on November 30, 2000. A qualified exemption exists under the FOIA (presumably applicable to the Environmental Information Regulations as well) for trade secret information or "commercial confidential" information proposed for protection on application to the Information Commissioner. Under the Environmental Information Regulations, however, such qualified exemptions are not applicable to information related to releases into the environment.

All requests for information (oral or written) must be responded to in twenty working days, irrespective of cost, with an extension of an additional twenty working days on a finding that responsive material is voluminous. Any decisions on production of information or application of exemptions are subject to appeal, without charge.

Directive 2003/35/EC, issued on May 26, 2003, provides for public participation in environmental legal and policy-making proceedings (broadly defined). Public notice and comment in the permitting process (including current proceedings on Integrated Pollution Prevention and Control Permits) is expressly provided. Member States were to have implemented the provisions of this directive by June 25, 2005.

One immediate impact of the Environmental Information Regulations has been the establishment of a European database that compiles information on facility releases to the environment and permit status.[9] One of the more advanced of such databases is the European Pollutant Emissions Register, which covers approximately 10,000 facilities in the Member States (as well as Norway), with information collected since 2001. Addresses and satellite photographs are included (www.eea.europa.eu/data-and-maps/data/member-states-reporting-art-7-under-the-european-pollutant-release-and-transfer-register-e-prtr-regulation-22).

For more information on the Aarhus Convention and its implementation, see http://ec.europa.eu/environment/aarhus.

[9] *See* prtr.ec.europa.eu/#/home.

§ 27:3.7 Asbestos-Containing Materials

Historically, large verdict personal injury cases based on exposure to asbestos-containing materials have not occurred in the EU as they have in the United States. Such claims are generally foreclosed by compulsory employer's liability legislation creating compensation funds, many of which have been increased in recent years to account for an increasing population of claimants.[10] So-called "end run" claims for asbestos in products or "premises liability" claim (nonemployee invitees exposed to asbestos in place) have been discouraged by the absence of class action practice, unavailability of punitive damages, and ethical bars to contingent fee representation.

A number of factors have contributed, however, to an increase in case filings (and judgments) in recent years. Asbestos exposure generally occurred later in time in the EU than in the United States (most Member States banned asbestos in products in 1999, nearly twenty years later than in the United States), and insolvency and runoff of EU insurers is causing counsel to look for relief from corporations. The U.K. House of Lords, for example, reached a decision in 2000 allowing foreign asbestos plaintiffs access to the U.K. courts (the *Lubbe* decision) and then, in 2003, determined to allow claims to proceed against multiple defendants on an enterprise liability theory (the *Fairchild* decision). In the U.K., the Mesothelioma Act was passed in January 2014 which created new and additional support for those suffering from mesothelioma cancer, a disease caused by exposure to asbestos. Victims, or their dependents (where the victim has died) are now receiving substantially higher payments than previously offered. Coverage will extend to victims who cannot trace liability to their employer or an employers' liability insurer. Payments include up to £7,000 for legal expenses. The increases in coverage are paid by insurance companies. Courts in the United Kingdom and Ireland have allowed "cancerphobia" claims to proceed in some circumstances. Italy has seen a dramatic increase in criminal complaints wherein plaintiffs are able to avoid the national compensation system by alleging criminal and willful misconduct in connection with asbestos exposure. Nations throughout the EU are increasingly receptive to class actions like those utilized for asbestos claims in the United States.

In the meantime, the EU has largely adopted the U.S. regulatory approach to asbestos containment and control under the amended EC Directive 2003/18/EC (effective April 15, 2006).

[10] See, for example, Article 53 of law 2000-1257 passed in France on December 23, 2000, for the purpose of expanding the class of permissible claimants and increasing compensation.

This Directive and implementing rules, "The Control of Asbestos at Work" or CAWR (first issued in 2002) establish a workplace exposure standard of 0.1 fibers per cubic meter on an eight-hour, time-weighted average basis, and requires inspection and maintenance of in-place ACM and removal under specialized work practices in the event of demolition or renovation. A new asbestos Directive, 2009/148/EC, was adopted in November 2009 aimed at further protecting workers from the risk of asbestos exposure. It does not prevent Member States from applying laws which offer greater protection for workers. The Directive applies to activities in which workers are or may be exposed to dust arising from asbestos or materials containing asbestos in the course of their work. If any activity is likely to involve such risk of exposure, a risk assessment must be carried out including consultation with the workers. The risk assessment has to determine the nature and degree of the workers' exposure, and it must be revised if circumstances change significantly. Any activity exposing workers to intentionally added asbestos fibers is prohibited, with the exception of the treatment and disposal of products resulting from demolition and asbestos removal. Under the new regulations, the single-maximum limit value for airborne concentrations of asbestos remains at 0.1 fibers per cubic centimeter as an eight-hour time-weighted average. For more information, see https://osha.europa.eu/en/legislation/directives/2009-148-ec-exposure-to-asbestos-at-work.

§ 27:3.8 Environmental Liability Directive

In April 2004, the EU adopted an Environmental Liability Directive (Directive 2004/35/EC) providing for enforcement action in connection with, and assessment of damages resulting from, releases of hazardous substances, using a "polluter pays" rather than a strict liability principle except in certain narrowly defined circumstances of ultrahazardous risk. The Directive became effective in April 30 2007 and applies only to damage occurring after that date.

The Directive is the culmination of deliberation first begun under an EU February 2000 White Paper advocating application of a "polluter pays" principle in light of spill events causing significant damage to property and natural resources (NRD), often without response or reimbursement of cleanup costs by responsible parties. The EU proceedings formative to the Directive note, for example, a 1998 release of contaminated sediment from a mine in the south of Spain, which reached the Donana Natural Park and resulted in contamination of water and massive loss of wildlife, resulting in clean-up costs estimated at €240 million. The EU Commission

estimate that €1.5 billion was being spent annually on remediation for such releases as of the adoption of the Directive.

The Directive requires Member States to set regulations empowering environmental authorities to order remediation of releases (or abate an imminent threat of release) with respect to land contamination that creates a significant risk of harm to human health, protected species and natural habitats (defined as those protected under the 1992 Habitats Directive and 1979 Wild Birds Directive) and waters covered by the 2000 Water Framework Directive. Citizens can compel action under the Directive by competent authorities but have no separate right of recovery for injury. The Directive requires remediation of soil to conditions protective of human health and remediation of contaminated waters and/or affected species and habitat to pre-release conditions. Where habitats cannot be restored, the Directive provides for acquisition of or restoration of comparable habitat (similar to many natural resource damage programs adopted in the United States).

The Directive establishes two different liability schemes. First, strict liability (liability without regard to fault) applies to industries covered by the Industrial Emissions Directive, operators of waste treatment, storage and disposal facilities, dangerous materials transporters, and producers/transporters of genetically modified organisms. A defense is available only where an owner/operator can demonstrate that a release was caused by acts of third parties under circumstances where appropriate safety measures were in place. The Directive does not apply to maritime or nuclear events, force majeure events, or permitted releases (absent showing of negligence or fault). Second, for industry not covered under the first scheme, liability may be established but only where fault is established, i.e., on a "polluter pays" basis. Under both schemes, NRD is evaluated under U.S.-type regulations, the Resource Equivalency Methods for Assessing Environmental Damage (REMEDE).

The Directive is not intended to preempt EU Member State laws covering remediation of historic contamination (treated at length below). Nor does it foreclose Member States from implementing more stringent legal requirements (as may be the case in Denmark, France, and Sweden).

The Directive has been amended to set additional requirements for specific industries three times—Directive 2006/21/EC (regarding the management of waste from extractive industries);

Directive 2009/31/EC (regarding primarily the geological storage of carbon dioxide); through Directive 2013/30/EU (on safety of offshore oil and gas operations). The amendments broaden the scope of strict liability by adding the "management of extractive waste" and the "operation of storage sites pursuant to Directive 2009/31/EC" to the list of dangerous occupational activities in Annex III of the Directive. The Offshore Safety Directive, containing an amendment to the Directive (extension of the scope of damage to marine waters), was adopted in June 2013.

Implementation of the Directive has varied among Member States . The European Commission has noted that a "patchwork" of environmental remediation, together with the lack of key data on implementation and on the cost (both administrative and financial security), was found to be a major remaining challenge. As a result, Member States have adopted a consultative process, "Making the Environmental Liability Directive More Fit for Purpose," which, seeks, to implement amendments on core issues such as financial assurance, common enforcement mechanisms, and criteria to be used in evaluating enforcement actions. Increasingly, Member States are requiring posting of financial assurance (bonds, letters of credit, financial guarantees, and insurance) to secure facility end-of-life remediation obligations and Seveso III accident response. A partial list of these includes Bulgaria, Czech Republic, France, Greece, Hungary, Portugal, Romania, Slovakia, and Spain.

For additional information, see https://ec.europa.eu/info/index_en.

§ 27:4 Environmental, Social, and Governance (ESG) Requirements

In recent years there has been significant regulatory activity in the EU and other jurisdictions to regulate what companies and financial firms report on environmental, social, and governance (ESG) attributes of their products, services, and operations, with efforts to compel companies to incorporate ESG principles into the management of their businesses. In the United States, the Securities and Exchange Commission has proposed a rule to require disclosure of GHG emissions, as well as climate-related risks and impacts. This is an area of the law that is evolving rapidly. Many of these rulemaking efforts have particular focus on climate/GHG emissions reporting and reduction requirements with reference to global benchmarks established by the Task Force on Climate-Related Financial Disclosures (TCFD) and International Finance Reporting Standards Foundation (IFRS), Currently, ESG disclosure and compliance regimes are being phased in or established in the EU, Canada, U.S., Brazil, Nigeria and the Asia-Pacific. The following is a brief

description of several key regulations that have gone into effect or are being developed in the EU and U.S.

EU Sustainable Finance Disclosure Regulation (SFDR). This regulation, which became effective in March 2021, imposes transparency and disclosure requirements on financial market participants and financial advisors, including banks, investment firms, pension funds, asset managers, and insurance companies, including alternative investment fund managers. The SFDR requires firms to publish policies and make disclosures on the integration of ESG risks into investment decisions; comply with transparency rules; publish online descriptions of sustainable investment targets and information on the methodologies used to assess, evaluate, and monitor investments; and issue periodic reports on ESG impacts on investments.

The SFDR also has requirements that apply to financial products, including: defining a sustainable investment as an investment in an economic activity that contributes to an environmental objective, such as scaling up renewable energy, using raw materials more efficiently, or reducing greenhouse gas emissions, or an investment in an economic activity that contributes to a social objective; requiring an explanation for each financial product as to whether, and if so how, a financial product considers principal adverse impacts on sustainability; where a financial product promotes ecological or social characteristics, requiring information on how those characteristics are met; and providing information about the extent to which the environmental or social characteristics are met and, for certain financial products, the overall sustainability-related impact of the financial product with reference to relevant sustainability indicators.

For more information about the SFDR, see https://finance.ec.europa.eu/sustainable-finance/disclosures/sustainability-related-disclosure-financial-services-sector_en.

EU Taxonomy Regulation. This regulation, which became effective in July 2020, establishes a classification system intended to establish a common language for identifying the degree to which economic activities can be considered sustainable. Its goal is to "provide clarity and transparency on environmental sustainability to investors, financial institutions, companies and issuers thereby enabling informed decision-making in order to foster investments in environmentally sustainable activities." The majority of the regulation impacts asset managers who make available a "financial product" that either has an environmental sustainability objective or promotes environmental characteristics, but it also requires that financial market participants

that do not take into account criteria for financially sustainable investments provide a statement to that effect. An economic activity is considered "environmentally sustainable" under the regulation if

(i) it makes a "substantial contribution" to one of the following six objectives:

- climate change mitigation;
- climate change adaptation;
- sustainable use and protection of water and marine resources;
- transition to a circular economy;
- pollution prevention and control; or
- protection and restoration of biodiversity and ecosystems;

(ii) it does "no significant harm" to any of those six objectives;

(iii) it avoids violation of minimum "social safeguards"; and

(iv) it complies with "technical screening criteria."

For more information, see https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en.

EU Non-Financial Reporting Directive (NFRD) and Corporate Sustainability Reporting Directive (CSRD). As its title indicates, the NFRD represents an effort by the EU to force disclosure on nonfinancial information that may nonetheless be of significance to investors and other stakeholders. The NFRD, adopted in 2014, established periodic reporting requirements for environmental and social matters, including treatment of employees, human rights, board diversity, and anticorruption and bribery. It does not provide for sanctions for noncompliance. The NFRD was amended by the CSRD, which was adopted in November 2022. The CSRD expands the universe of companies subject to reporting, to ensure more uniformity and consistency in reporting, and to require third-party audits of reports.

The CSRD applies to:

- All large EU companies, which means companies (including EU subsidiaries of non-EU parent companies) exceeding at least two of the following criteria:

    - more than 250 employees;
    - a turnover of more than €40 million; or
    - total assets of €20 million.
- Companies with securities listed on an EU-regulated market, irrespective of whether the issuer is established in the EU or a non-EU country.
- Non-EU companies with annual EU-generated revenues in excess of €150 million and which also have either a large or listed EU subsidiary or a significant EU branch (generating €40 million in revenues). The respective subsidiary or branch will be responsible for publishing CSRD-style sustainability reports for these non-EU undertakings at a consolidated level from 2028 onwards.
- The CSRD applies to companies that are already subject to NFRD, with the first report expected to be produced in 2025. Large companies that are not presently subject to NFRD will have to apply CSRD from financial years starting on or after January 1, 2025, and therefore report in 2026 on 2025 data. For financial years starting on or after January 1, 2026, CSRD will be rolled out to listed SMEs, albeit subject to an opt-out until 2028, with the report in 2027 being based on 2026 data.

The European Financial Reporting Advisory Group (EFRAG) has developed the European Sustainability Reporting Standards (ESRS), which were adopted by the European Commission on July 31, 2023. Sustainability information will be required to be reported in a clearly identifiable dedicated section of the company's management report, which must be made publicly available. Key reporting metrics include:

- General standards
    - Environmental matters (such as climate change and biodiversity).
    - Social factors (such as working conditions, equality, non-discrimination, diversity and inclusion, human rights, and the effects of the company's operations on people and on human health).

    - Business strategy and the resilience of the business model and strategy to risks related to sustainability matters.
- Sector-specific standards
    - Proportionate to the scale of the risks and effects related to sustainability matters of the relevant sector.
- Targets and transition plans
    - Sustainability targets and transition plans (if any) established to ensure that business model and strategy are compatible with:
        - the transition to a sustainable economy;
        - the objectives of limiting global warming to 1.5°C (over pre-industrial levels) in line with the Paris Agreement; and
        - achieving climate neutrality or "net zero" status by 2050 in line with the EU's goals in the European Climate Law, with no or limited overshoot.
    - Science-based, including by reference to Intergovernmental Panel on Climate Change reports and reports by the European Scientific Advisory Board on Climate Change.
- Value chains
    - Disclose due diligence process with regard to sustainability matters in a company's own operations and its value chain, and the principal actual or potential adverse effects connected thereto.
    - Any actions taken to prevent, mitigate, remediate, or bring an end to actual or potential adverse effects.
- Intangible resources
    - Report on "key intangible resources" (non-physical) on which the company's business fundamentally depends and that are a source of value creation for the

company. Intangible resources may be relevant to sustainability information in some cases, including the company's relationships with its stakeholders.

- Forward-looking disclosures. Sustainability information must be provided on a forward-looking as well as retrospective basis, both in qualitative and quantitative terms, and based on conclusive scientific evidence where appropriate. Uniform indicators will be developed in the ESRS.

- Double materiality. Disclosures must be based on a "double materiality" assessment, meaning that a company must assess not only the impact of ESG issues on its own business, but also the company's impacts on people and the environment.

- Non-EU Entities. For non-EU companies subject to CSRD from 2028, the CSRD requires the publication of a sustainability report in accordance with EU disclosure standards or comparable non-EU standards. To ensure a level playing field for companies operating in the EU market, these reports will have to include information comparable to that noted above, but especially as to "impact regarding social and environmental matters."

EU Corporate Sustainability Due Diligence Directive (CSDDD). The CSDDD, adopted in May 2024, is another significant step by the EU to implement its ESG framework. The CSDDD expands reporting responsibility for companies beyond their own operations to those of their suppliers and energy providers. It requires companies to conduct due diligence to identify and report on adverse environmental and human rights impacts of their own operations and those of their subsidiaries, and throughout their "value chains." "Value chain" includes the activities of third parties involved in the production of goods or the provision of services to the company. The CSDDD also requires companies to set ESG improvement benchmarks as directed by and enforced by Member States.

The CSDDD applies to EU companies with more than 1000 employees and more than €450 million in global turnover and to non-EU companies with more than €450 million turnover in the EU, ubject to a phase-in schedule that begins in 2027 for the largest companies and ends in 2029. Member States are free to adopt more aggressive timetables and, notably, Germany and Norway have already done so.

The CSDDD requires companies to integrate ESG due diligence into all of their corporate policies, which must be updated annually. If adverse environmental and/or human rights impacts are identified, companies are required to create prevention action plans with clear timelines to prevent or, if prevention is not possible, mitigate the potential adverse impacts in the nearer term while working toward prevention. Companies in breach of their diligence obligations could face penalties from regulators or civil liability brought by stakeholders who claim that they were adversely impacted. For more information, see https://ec.europa.eu/info/business-economy-euro/doing-business-eu/corporate-sustainability-due-diligence_en.

U.S. SEC Rules on GHG and Climate-Related Disclosures. [JR1]Current U.S. Securities and Exchange Commission (SEC) guidance issued in 2010 highlights that filers must make disclosures on any material "financial impact of climate change." In March 2024, the SEC issued rules that would require registrants to report material direct and indirect GHG emissions in their registration statements and periodic reports, and to provide detailed information about climate-related risks that are reasonably likely to have a material impact on their business, results of operations, or financial condition, and certain climate-related financial statement metrics in a note to their audited financial statements. Shortly after it was published, the Rule was challenged in federal court, and was stayed by the SEC pending the outcome of the challenge.

If implemented, the rule would require a registrant to disclose information about (1) the registrant's governance of climate-related risks and relevant risk management processes; (2) how any climate-related risks identified by the registrant have had or are likely to have a material impact on its business and consolidated financial statements, which may manifest over the short, medium, or long term; (3) how any identified climate-related risks have affected or are likely to affect the registrant's strategy, business model, and outlook; and (4) the impact of climate-related events (severe weather events and other natural conditions) and transition activities on the line items of a registrant's consolidated financial statements, as well as on the financial estimates and assumptions used in the financial statements. The rule also would require a registrant to disclose information about its direct GHG emissions (Scope 1) and indirect emissions from purchased electricity or other forms of energy (Scope 2).

Under the rule, accelerated filers and large accelerated filers would be required to include an attestation report from an independent attestation service provider covering Scopes 1 and 2

emissions disclosures, with a phase-in over time, to promote the reliability of GHG emissions disclosures for investors.

In late 2023, before the SEC issued its rule, California passed two laws requiring reporting of GHG emissions and climate-related financial risks by public and private companies doing business in the state and meeting certain revenue thresholds. Reporting under those rules, entitled the Climate Corporate Data Accountability Act and the Climate-Related Financial Risk Act, begins in 2026.

§ 27:5 Hazardous Site Cleanup

In 1980, the Comprehensive Environmental Response Compensation Liability Act (CERCLA)[11] became law in the United States resulting in evaluation of contamination at over 40,000 sites and remediation at 1400 "National Priority List" sites under a strict, joint and several liability regime for past and present owners of contaminated sites, as well as parties that generated and transported hazardous substances to those sites. CERCLA provides for tracking and listing of contaminated sites in a public database. Most states in the U.S. have comparable laws and data systems covering local sites and facilities. Federal and state remediation programs provide for remediation at sites where no solvent responsible party can be found (referred to as "orphan sites".

Following the enactment of CERCLA, nations around the world began establishing programs to identify and require remediation of contaminated lands. In the EU, such enactments are often coordinated with conditions of IED permits wherein "baseline" evaluations of soil and groundwater conditions are performed at the time of installation start-up or, for existing installations, at the time of first IED permit renewal after January 7, 2013 (see IED Technical Bulletin 20/18). Remediation is then required on cessation of manufacturing activities or facility sale. While there is no formal EU-wide registry of contaminated sites, there were an estimated 1,400,00 sites as of 2023, www.eee/europa.eu/data.

In 1999, Council Directive 1993/31/EC entered into force, harmonizing EU landfill regulation with permitting, technical standards, and remediation obligations found under the 1996 U.S. Resource Conservation Recovery Act, including establishing classes of landfills receiving hazardous and nonhazardous waste ("Landfill Directive"). Article 14 of the Landfill Directive

[11] 42 U.S.C. § 9601 *et seq.* (the "Superfund Act").

provides phase-in requirements for existing landfills (including closure in some instances) with enforcement before the European Court of Justice.

Certain former eastern bloc countries (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia, and Romania) are in the earlier stages of developing contaminated land programs. Some of these countries have created state funds or provided guarantees for costs of cleaning up historic contamination in conjunction with privatization efforts. There remain a number of European jurisdictions where the primary contaminated land task has been the remediation of extensive contamination from armed conflict and military installations (including Albania, Croatia, Macedonia, and Serbia). In a few jurisdictions (notably Austria, France, and Switzerland) a tax has been imposed on industry to create a fund for the remediation of orphan sites. Other jurisdictions require notification of site contamination conditions at the time of transfer or sale. The U.S. Oil Pollution Liability Act (OPA), 33 U.S.C. § 2701 *et seq.*, provides a CERCLA-like system for remediation of oil spills and also financial assurance requirements for vessels and facilities. A 1990 International Convention on Oil Pollution Preparedness Response and Cooperation (OPRC) ratified by over 190 countries provides for oil spill remediation for on-shore and off-shore events.

Part 2A provides that certain categories of contaminated land may be designated as "special sites," including installations or property that:

- seriously affects drinking water, surface water, or important groundwater resources;
- has been, or is being, used for certain industrial activities such as oil refining or making explosives;
- is being or has been regulated under an IED permit;
- has been used to dispose of hazardous waste acid tars;
- is owned or occupied by the Ministry of Defence;
- is contaminated by radioactive materials; or
- is a nuclear site.

The next section provides a detailed description of hazardous site cleanup laws by country. Given exceptionally high costs of remediation, we have noted whether these jurisdictions have

requirements for persistent contaminated by perflourinated compounds (PFOS and PFOA). In the EU, a drinking water directive (2020/2184) sets levels for PFAS and PFOS, and the European Commission has issued a draft Environmental Quality Standard for the substances in surface and groundwater (2023).

[A] Overview

Part 2A and its associated guidance establish a system regime for a "risk-based" cleanup of a contaminated site in consideration of its threat to human health or the environment. Liability is retroactive and several, but not joint; that is, individual responsible parties are separately liable for their individual share of the costs. The Regulations establish rules and standards for defining contaminated sites, identifying and allocating liability among responsible parties, and selecting the appropriate risk-based remedy. Part 2A defines contaminated land as

> land which appears... to be in such a condition, by reason of substances in, on, or under the land that
>
> (a) significant harm is being caused or there is a significant possibility of such harm being caused (SPOSH); or
>
> (b) significant pollution of controlled water is being, or is likely to be caused.

Revised statutory guidance for local authorities in England and Wales on how to implement the regime was published by Defra and the Welsh Government, respectively, in 2012.

Part 2A provides that certain categories of contaminated land may be designated as "special priority sites,"' including installations or property that:

- seriously affects drinking water, surface water, or important groundwater resources;
- has been, or is being, used for certain industrial activities such as oil refining or making explosives;
- is being or has been regulated under an IED or post-Brexit equivalent permit;
- has been used to dispose of hazardous waste acid tars;
- is owned or occupied by the Ministry of Defence;
- is contaminated by radioactive materials; or
- is a nuclear site.

In Scotland, Part 2A is implemented by the Contaminated Land (Scotland) Regulations 2005, with a slight refinement to the definition of contaminated land:

> land which appears... to be in such a conditions, by reason of substances in, on or under the land that
>
> (a) significant harm is being caused or there is a significant possibility of such harm being caused (SPOSH); or
>
> (b) significant pollution of the water environment is being caused or there is a significant possibility of such pollution being caused.

The statutory guidance for the operation of the Contaminated Land Regime was published by the Scottish Government in 2006.

In Northern Ireland, Part III of the Waste and Contaminated Land (Northern Ireland) Order 1997 (as amended by the Waste and Contaminated Land (Amendment) Act (Northern Ireland) 2011) makes similar provision to Part 2A for dealing with contaminated land, but the regime is not yet in effect. [?]Under Part 2A, local authorities allocate liability for remediation among two or more identified "appropriate persons", and local authorities issue remediation notices to appropriate persons setting out the schedule of required remedial actions. An "appropriate person" may include a purchaser or developer of previously contaminated land who has knowledge of such contamination.[12] In cases where appropriate persons refuse to perform the remedy or no appropriate persons are identified or available, local authorities may perform the remedy and recover costs of the remedy from available appropriate persons. Local authorities maintain registers of all actions taken and notices issued with respect to identified Contaminated Land.

Part 2A empowers responsible regulatory authorities to enter on and, when appropriate, conduct intrusive sampling of suspected contaminated landwhen it believes that it is likely that a contaminant linkage exists on the land and, given the current use of the property, that a receptor is actually present or likely to be present. After conducting inspections and investigations, the local authority must then determine whether a particular site qualifies as contaminated land and proceed to issue a remediation notice to appropriate persons where warranted. Failure to comply with a remediation notice is a criminal offense that can carry penalties of up to £20,000 plus an additional £2,000 per day for continuing violations. Furthermore, Part 2A provides that the Government

[12] *See* Circular Facilities Ltd v. Sevenoaks Dist. Council [2005] EWHC 865 (Admin).

Authority may enter a remediation agreement with appropriate persons which governs the authority's recovery options.

The Environmental Damage (Prevention and Remediation) Regulations 2009 (the ED Regulations) transposed the Environmental Liability Directive (see section 27:3.8). The ED Regulations came into force in March 2009 and have since been amended by eleven other statutory instruments. Therefore, in 2015, the ED Regulations and amendments were consolidated in the Environmental Damage (Prevention and Remediation) Regulations 2015.

The ultimate aim of the ED Regulations is to enforce action to undertake remedial measures in response to the most significant cases of damage, covering:

- damage to protected species and natural habitats;
- damage to water; and
- risks to human health from land contamination.

In the case of damage to water or species and habitats, remedial measures include not only "primary" remediation (for example, cleaning up the contaminated site), but also complementary remediation (cleaning up an alternative site if the damaged site cannot be fully restored), and compensatory remediation (carrying out other measures to provide alternative natural resources to compensate for the time during which the damaged site remains in its damaged state). The operator must agree to appropriate measures with the regulator and pay for them to be undertaken.

[B] Cost Recovery and Voluntary Cleanup Agreements

As noted, enforcing authority may conduct a remediation action and recover the costs of remediation from appropriate persons and/or place a lien on the property to safeguard its right to cost recovery or, alternatively, enter into a remediation agreement.

Appropriate persons entering into remedial agreements, fall outside the scope of the remediation notice process in two key ways. First, the company exercises greater control over the investigation and remediation process (Part 2A requires local authorities to approve alternative remedial approaches so long as they would sufficiently address contamination at the site, and encourages local authorities to allow innovative remedial techniques, so long as the proposing person agrees to remain liable for additional remediation if the innovation falls short of remedial standards). Second, the company's obligations with respect to the remediation are set out in the

agreement and would fall outside the enforcement and cost recovery provisions applicable to remediation notices. By way of example, in 2018, a developer entered into a voluntary remediation agreement to convert the former Avenue Coaking Works facility in Chesterfield, England to a 500-home residential community with estimated remediation costs of £180 million but no needed reimbursement of governmental authorities.

[C] Liability of Appropriate Persons

If no appropriate person who has "caused" or "knowingly permitted" site conditions has been found, the current owner or occupier of the contaminated land can be held liable subject to certain limitations.The government may bear the remediation costs associated with the portion of contaminant for which no appropriate persons can be found ("orphan linkages," referred to as the "orphan share" in the CERCLA context).

[D] Liability Exemptions and Exclusions

Part 2A provides a liability exclusion for lenders (provided they do not take possession or exercise control of the land under any security they have taken); underwriters and insurers; waste generators who contracted for the proper disposal of wastes with another appropriate party; innocent landlords or licensors whose tenants or licensees caused the contamination; those performing environmental site remediation services, except those whose intrusive sampling is a cause of the contamination; and those who sold contaminated land to a fully informed buyer. Additionally, a hardship exception may apply to reduce or waive liability in some instances.

[E] Implementation

The Part 2A regime is supported by statutory and nonstatutory guidance issued by the Parliaments of England, Scotland, Wales, and Northern Ireland, especially a Contaminated Land Exposure Assessment (CLEA) Model, published by the Environment Agency in 2009 and which sets out the method for deriving health criteria values (HCVs) and soil guideline values (SGVs), together with toxicological guidance and supporting data. The approach used in the CLEA model can be used to derive "generic assessment criteria" (GAC) on a site-by-site basis for a range of land use types and contaminants of concern.

The CLEA model and related regulations also allow authorities to require financial assurance in connection with an approved remediation "performance agreement" Guidance on classification of contaminated, was published 2012. The guidance introduced a four-category system for

classifying land under Part 2A; Category 1 and 2, land posing an unacceptable risk to human health, Category 3, land does not meet the definition of SPOSH and Category 4, no or low risk to human health. An Impact Assessment accompanying the guidance identified a potential role for new "Category 4 Screening Levels" (C4SLs) in providing a more pragmatic (but still precautionary) approach by allowing "low-risk" sites to be dismissed from the need for further risk assessment quickly. All local authorities have now prepared formal inspection strategies required under the Act. Local authorities in England and Wales prepare "risk summaries" for any land that may be determined as contaminated land, deferring formal designation until a risk summary (understandable to a lay person) has been prepared. The Act has provided funding to local authorities for purposes of conducting assessments and performing remediation where "appropriate persons" cannot be identified. By 2016, an estimated £52 million had been expended. Since 2013, only £0.5 million per annum has been available for all local authorities in England for contaminated land investigation and remediation, with funding completely withdrawn in 2017. Contaminated land capital projects funding ceased in Wales by the end of 2011. More recently, funding has been provided by local councils. In 2014, for example, residents of a housing estate in Stirlingshire, Scotland, were awarded £125,000 by Stirling Council (who had designated their homes as contaminated land), £300,000 by the Scottish government and £255,000 by the U.K. Treasury in order to pay for the necessary remediation. There remains considerable confusion around the future of funding for remediation of contaminated sites in the United Kingdom in light of the decision to withdraw funding from the capital projects scheme. By most measures, the Act has produced relatively few completed remediation projects, largely because of the time required for local authorities to establish an inspection scheme and the complexity of the regime.

An April 2016 report by the Environment Agency of England indicated that, with 197 of the 326 Local Councils reporting, over 11,000 sites of an estimated 33,800 contaminated sites had been inspected at cost of over £32 million, with over 500 of the inspected sites designated for remediation. A 2015 report by the Wales Environmental Authority, indicated that, with nineteen of twenty-two Local Authorities responding, 10,130 sites were identified as potentially contaminated, 800 were inspected, and 175 were designated for remediation (ninety-five of which have been cleaned up at a cost £3.7 million). The inspected sites in both reports include many properties where no appropriate persons have been identified. A recent determination of the U.K.

courts has made clear that contaminated land cannot be abandoned (disclaimed as an "onerous" property) in insolvency proceedings.[13]

For further information, go to http://www.defra.gov.uk.

§ 27:5.2 Argentina

Argentina does not have a federal contaminated land regime under its 1994 constitution. However, the Province of Buenos Aires adopted a law in 2012 requiring investigation and restoration of contaminated land (law 14,343), followed by comparable measures in the Province of Canada and Buenos Aires Archdiocese Region. Any person with knowledge of contamination is required to report to competent authority (ACUMAR) and liability attaches to both former and current owners and operators. A further enactment, Law 26,994, entered into force on October 1, 2014, established joint and several liability for owners or "custodians" of property causing damage to the environment. A Registry of Environmental Liabilities of the Province of Buenos Aires has been set up to record reported contamination.

§ 27:5.3 Australia

Australia is a federation of six states and two territories and the Australian Constitution does not provide for federal (or "Commonwealth") government jurisdiction over environmental or land use planning issues such as remediation of contaminated land. Therefore, the regulation of contaminated land is the responsibility of the state and territory governments. However, federal legislation under the Environment Protection Council Act (1994) and the National Environmental Protection (Assessment of Site Contamination) Measure 1999, as amended in 2013 (ASC NEPM 2013) aims to promote a consistent approach to site assessment across the country. The NEPM does not provide guidance on apportioning responsibility for cleanup.

All states and territories have legislation for regulating contaminated land, generally under a polluter pays approach, but with owners bearing liability for historic contamination in some states. For instance, the Contaminated Land Management Act of 1997 empowers the New South Wales (NSW) Environment Protection Authority (NSWEPA) to deal with site contamination that is significant enough to warrant regulation under the Act given the site's current or approved use. The Act provides a hierarchy of responsibility: first, the polluter of the land; second, the land

[13] *In re* Doonin Plant Ltd., 2018 CSOH 89 (Scotland).

owner; and third, "notional owners." A notional owner is a person who is entitled to freehold estate of the land, such as a purchaser under contract or a mortgagee in possession operating the land for commercial benefit. A mortgagee in possession simply for the purposes of exercising its power of sale is specifically excluded. State authorities generally have the power to issue orders requiring remedial investigation, management, and/or cleanup or can enter into enforceable voluntary management proposals. In some states, notably NSW, private parties may sue to compel remediation. Amendments to the Contaminated Land Management Act in 2010 provide that the NSWEPA can enter into "Voluntary Management Proposal" (VMP) arrangements for management of significantly contaminated land designated for reuse or development.

NSW provides a registry of over 1,080 notifications contaminated sites (a large number are still "under investigation"). For further information on contaminated land management in NSW, go to www.epa.nsw.gov.au/prclmapp/searchregister.aspx. For other states or territories, go to the relevant state or territory websites, including:

- www.epa.vic.gov.au/
- www.qld.gov.au/environment/pollution/management/contaminated-land
- www.der.wa.gov.au/your-environment/contaminated-sites
- www.epa.sa.gov.au/data_and_publication/site_contamination
- http://epa.tas.gov.au/regulation/contaminated-sites
- www.environment.act.gov.au/
- www.ntepa.nt.gov.au/waste-pollution/compliance/audits/contamination

Australia is a party to OPRC, which is enforced via Offshore Petroleum and Greenhouse Gas Storage regulations issued in 2009 and amended recently in February 2014. Enforcement is via a national (commonwealth) agency—NOPSEMA—and the eight state authorities who conduct enforcement according to guidelines that recognize potential for both strict liability and polluter-pays liability (liability in consideration of intent, negligence, and degree of recklessness) depending on severity of the spill event. Major spill enforcement has increased as a result of the 2009 Montara oil well blowout off the coast of the Northern Territory, which continued for

seventy-four days with estimated remedial damages of $230 million to operator PTTEP Australasia including a $40 million payment to the federal and state authorities.

In the province of Queensland, under an Environmental Protection Chain of Custody Act passed in April 2016, remediation orders can now be issued again indirect owners and investors who "significantly financially benefit" from operations causing contamination. This so-called veil-piercing measure is subject to Guidance which indicates it will not generally be enforced against purely "passive" investors. The measure was passed after a local entrepreneur acquired insolvent mining concerns and sold off assets, leaving contamination unattended.

§ 27:5.4 Austria

As of July 1, 2004, Austria has enforced the so-called Legacy Sites Atlas Ordinance (Altlastenatlasverordnung, Altlastenatlas-VO, BGBl. II Nr. 232/2004). This regulation has been imposed by the Federal Ministry of Agriculture, Forestry, Environment and Water Management, and regulates the registration of those old landfill sites/filling areas (Altablagerungen) and old (closed) industrial sites (Altstandorte) as legacy sites (Altlast), including their priority classes (Classes Pk0/no Pk and Pk I–Pk III), which—based on a risk assessment—are judged to require remediation on a polluter pays basis (with owner liability if a polluter can not be found). In addition, legacy sites where required remediation has been completed are listed in this Atlas. The Federal Environmental Agency (Umwetbundesamt, or UBA) publishes the latest statistics for these sites in an annual report. The January 2017 report listed the following (suspected) contaminated sites (www.umweltbundesamt.at/umweltsituation/altlasten/statistik/):

- 6,038 registered old landfill sites/filling areas (Altablagerung), plus 62,531 registered old (closed) industrial sites (Altstandort) (Registrierte Altablagerungen und Altstandorte)
- 853 suspected old landfill sites/filling areas, plus 1,120 suspected old (closed) industrial sites (Verdachtsflaechen)
- 136 legacy sites (Altlasten) of the varying priority classes (Pk I through Pk III, of which six sites have not been prioritized (Pk0)); of these, remediation is ongoing at sixty-two sites
- 152 legacy sites that have been remediated

Austria has an online database maintained by the UBA to search for known or suspected contaminated sites. To search the database, it is necessary to know the land title registration (property number) of the property in question. The website is www.umweltbundesamt.at/umweltsituation/altlasten/verzeichnisse/.

The Water Law Act (Wasserrechtsgesetz) is the primary basis in Austria to enforce, register, and require investigation/risk assessment of suspected contaminated sites as well as remediation/safeguarding of known contaminated sites (safeguarding measures may be agreed in order to protect surface waters and/or groundwater receptors in cases where remediation measures would require disproportionally high action).

The Legacy Sites Remediation Act (Altlastensanierungsgesetz) presents the legal basis for the financing of a legacy site's remediation. This law further provides regulations for the Austria-wide registration of suspected contaminated sites as well as associated risk evaluation.

Other important regulations provide for the protection of human health and prevention of detrimental impact on the quality of water bodies (surface water streams, groundwater):

- The Trade Ordinance (Gewerbeordnung) requires the owners and operators of installations to implement adequate protection measures when constructing/commencing the operation of, and decommissioning, installations. The regulator may issue orders to implement protection measures or may execute such measures with the right to reclaim related costs.
- The Waste Management Act (Abfallwirtschaftsgesetz) implements the principle of sustainability with the aim to reduce possible detrimental environmental effects, conserve resources, and dispose of waste in a manner that minimizes potential risks for future generations. This regulation also includes measures for the decommissioning and closure of landfills, the assessment of environmental impacts arising from landfills, and the prevention of follow-up impact risks (that is, measures regulating the safeguarding and remediation of landfill or filling areas (Altablagerungen)).
- The Environmental Aid Act (Umweltfoerderungsgesetz) regulates financial aid and measures to protect the environment, including measures to safeguard and remediate old landfills/filling areas and old industrial sites. Cleanup of orphan sites may be financed

through legacy fees (Altlastenbeitraege). For example, funds may be provided for contamination caused prior to July 1, 1989.

- The Safety Police Act (Sicherheitspolizeigesetz) may apply in cases of direct risks, such as those caused through environmental damages; public authorities have the power to prevent access to risk sites where human health, property, or the environment is significantly affected, and public organizations such as competent agencies, fire brigades, etc. may implement initial general assistance.

Regulatory references can be found on the website of the UBA, www.umweltbundesamt.at/umweltsituation/altlasten/gesetze/.

§ 27:5.5 Belgium

[A] Soil and Groundwater Legislation

Belgium consists of a federal state comprising several entities: the Federal State, three Regions (Brussels-Capital Region, Flemish Region, Walloon Region) and three Communities (Flemish Community, French Community, and German Community). Each entity has its own parliament (legislative power) and government (executive power), with the exception of the Flemish Region and Flemish Community, which were combined. Enforcement is undertaken by authorities in each of the different entities and each entity has its own legislation for soil and groundwater.

[B] Flemish Region

Within Flanders, the Flemish government passed a soil remediation decree that came into force on October 29, 1995, and establishes a regime for both historic soil and groundwater contamination (contamination that existed before the decree) and new contamination (occurring after that date). "New contamination" is to be remediated whenever a release occurs that results in contamination over published cleanup criteria. A registry of polluted sites has been established as to which the provincial government has authority to require preliminary assessment and (depending on results of the assessment) full investigation and cleanup. Such investigation and cleanup of industrial facilities must be performed on closure or transfer of property. Transfer is conditional on the issuance of a certification that the property meets cleanup values or is subject to a plan for achieving those values.

The two key pieces of regulation for soil and groundwater protection in Flanders are (1) Decree of 27 October 2006 concerning Soil Remediation (Bodemsaneringsdecreet), replacing the 1995 Decree; and (2) Order of the Flemish government of 22 April 2008 (published June 1, 2008) concerning the establishment of the Flemish regulations concerning soil remediation (VLAREBO), replacing the 1996 VLAREBO and subsequent revisions.

The Soil Remediation Decree identifies the establishment of a contaminated land register and also establishes a procedure for property transfer (which cannot take place without a certificate from the OVAM). The decree contains specifications or procedures for investigation and remediation of contaminated land, as conducted by certified soil investigation firms. The decree identifies parties liable for site investigations and remediation as well as acceptable cleanup measures (such as land use restrictions). The current owner is liable unless he can prove innocent owner status.

The VLAREBO contains reference values established for soil and groundwater quality, and contains other specifications for industrial sites (such as for required baseline and periodic investigation).

For additional information, go to www.ovam.be.

[C] Walloon Region

Soil and groundwater legislation in Wallonia is regulated through a soil management decree of March 1, 2018. The Decree was published on February 18, 2009, with an addendum on March 6, 2009, and put into application retrospectively as of May 18, 2009.

The main objectives of the Decree are to grant a "certification" to a parcel of land when sold; inform the population and the operators; define clear work procedures when a parcel is sold; and develop public-private partnerships in view of cleaning up polluted sites in the Walloon Region.

The Decree is based on experience gained over the years, the application of the former Decree of 1 April 2004, and existing and future European laws on environmental responsibility. The Decree defines historical and new pollution based on the pivotal date of April 30, 2007, which is the date of the implementation of the European directive regarding environmental responsibility. The procedures to realize soil investigations are clearly defined. These procedures, as well as the conditions for experts to perform the studies, must be approved by the local authorities. A main

tool is the creation of a land register, the Soil-State Database (BDES) which holds all information regarding polluted and potentially polluted sites. The BDES in available to the general public. Currently, companies or private owners do not have the obligation to investigate their properties when selling them. Only when it is dictated in the environmental or building permit must they perform a site investigation.

The addendum defines the norms and standards and provides a classification of activities that might pose a risk to the soil and groundwater.

In addition, a specific brownfield redevelopment plan (called the Marshall Plan) has been developed for the Walloon Region (August 2005). The plan allows for the remediation of historic industrial sites in Wallonia. As of January 1, 2013, it is no longer possible to elaborate a remediation action plan for historical contaminations according to Article 92 of the Decree of 5 December 2008.

For additional information, go to http://environnement.wallonie.be.

[D] Brussels-Capital Region

In the Brussels Region, soil and groundwater legislation is regulated through the Ordinance of 5 March 2009 regarding the management and remediation of polluted soils in the Brussels Region.

The ordinance was enacted to prevent soil and groundwater pollution, to identify potential sources of pollution, and to define a legal framework for completion of soil and groundwater investigations, as well as appropriate methodologies for the remediation phase.

Norms and standards are defined through an additional Decree of 17 December 2009 voted by the Brussels Government.

The Brussels Region will also work with a land register on which all plots will be classified according to five categories related to their soil and groundwater condition.

The Ordinance also defines conditions under which a soil and groundwater investigation must be completed, namely: when a "risk" activity is stopped; when there is a new permit application for a new risk activity; on a periodic basis; and upon the sale of a plot on which a risk activity is or has been carried out.

Finally, the Ordinance defines the conditions for obtaining an accreditation as a soil expert in the Brussels Region. Subsidies for performing the first two steps in the soil and groundwater investigation are foreseen by the Ordinance.

For gas stations, there is separate legislation (Ordinance of 21 January 1999). Through the Decree of 20 December 2007, there is also the possibility of obtaining financing by the Brussels Region government for undertaking soil or groundwater investigation.

Soil and groundwater assessments in the Brussels-Capital Region are also undertaken by registered experts.

The Ordinance of 5 March 2009 includes a prescriptive procedure on how to assess whether a site is contaminated, and if so, how to address the contamination. The procedure starts with a baseline soil investigation to verify if the Brussels thresholds for soil and groundwater are exceeded. If exceeded, a comprehensive site investigation is required to delineate the contamination, and in some cases it is required to assess potential risk for human health, spreading, and the environment. Depending on the outcome of this assessment, remediation or risk management may be required. If so, the remedial action plan (which includes a BATNEEC evaluation of the different remedial alternatives) requires up-front approval by the BIM/IBGE.

For additional information, go to www.leefmilieubrussel.be.

§ 27:5.6 Brazil

Under the 1988 Federal Constitution of Brazil, Article 225 provides: "Everyone has the right to an ecologically sound environment, an asset for the common use of the people and essential to a wholesome quality of life. This imposes upon the Public Authorities and the community the obligation to defend and preserve the environment for present and future generations."

The Brazilian environmental regulations establish strict joint-and-several liability for any party associated with pollution and environmental degradation. Enforcement is generally carried out through the work of local public prosecutors (in consultation with unions and local authorities) who enter into consent agreements providing for investigation and remediation. Under its National Environmental Policy, contamination liability extends to parties directly and "indirectly" responsible, creating some uncertainty as to the liability of successors, parent entities and financing sources. (Fed. Law 6938/1981)

The Environmental Crimes Law (9605/1998) gives citizens the right to compel environmental recovery for any environmental damages, including remediation of contaminated land by the current owner, or to seek damages in relation to such contamination. If contamination exists, the current owner must perform remediation and then has a separate right to seek contribution or indemnification from other liable parties. To date, there has been relatively little governmental action at the federal level to compel remediation, as the environmental regulations vary from state to state. Federal action is typically undertaken by the attorney general seeking civil sanctions. The state environmental agencies may also require environmental recovery from industries and individuals, and assess administrative sanctions.

CONAMA is the National Environmental Council, which is responsible for issuing specific regulations regarding environmental management in Brazil. CONAMA Resolution 420/2009 presents technical guidelines and procedures regarding management and recovery of contaminated sites and is based on the following principles: generation of relevant information to the stakeholders, attribution of obligations to the polluter, and risk identification and communication. Every potentially contaminated site must be subject to the following studies, which may be required by state environmental agencies: preliminary site assessment (nonintrusive investigation), confirmatory site investigation (intrusive investigation, with collection of soil and groundwater samples), detailed investigations (as many as required to define the extension of the environmental impacts); human health risk assessment; and cleanup. The Resolution also establishes the reference values for soil and groundwater that are used as guidelines for site remediation.

In the highly industrialized state of São Paulo, in May 2002, the State Environmental Agency, Companhia de Tecnologia de Saneamento Ambiental (CETESB), has issued investigation and reevaluation guidelines (Dearson 125/2021) and the first Registry of Contaminated Areas, which is updated every year. This was a first step toward creating a governmental program for remediation of contaminated areas based on established cleanup goals and criteria, especially in the context of land use development. These guidelines have also been adopted in the remaining states of the country. Under a 2005 Directive, Sao Paulo has also established detailed requirements for remediation (Intervention Plans) including posting of financial assurance equivalent to 125% of the educated estimated remediation cost (June 2013). For further information (in Portuguese) about the contaminated sites management procedures in the State of São Paulo, the most developed state in terms of environmental laws and requirements, go to www.cetesb.sp.gov.br/ and click in

"Áreas Contaminadas" (Contaminated Sites). Currently, similar contaminated sites regulations are being prepared by other Brazilian states. In the absence of a more restrictive state law, the Federal CONAMA Resolution 420/2009 must be applied.

Brazilian law defines a polluter as the "individual or legal entity, private or public, who is directly or indirectly responsible for an activity that causes environmental damage."[14] Recent court rulings have suggested that, under Brazilian law, financial institutions may be deemed indirectly responsible for environmental damages caused by a borrower and, therefore, be held jointly and severally liable for the obligation to remedy said damages. Both government and private party damage actions with large claims for offshore spills have been brought frequently in recent years. For example, following a spill from a Transocean Ltd. offshore rig in November 2011, operator Chevron Corporation and Transocean Ltd. were sued by the Brazil federal prosecutor for $11 billion in damages and an injunction as to further operations. A major iron ore tailings spill in November 2016 by the Vale/BHP Billiton joint venture Samarco resulted in government claims of $6.4 billion (and homicide charges in connection with seventeen residential deaths) as well as a community damage action for $50 billion.

CETESB generally follows U.S. EPA remediation standards likely including those applicable to PFOS and PFOA.

§ 27:5.7 Canada

Canada's constitution allocates powers relevant to the regulation and cleanup of contaminated sites largely to the ten provinces and two territories (Yukon and Northwest). Guidance issued since 1993 by the Canadian Council of Ministers of the Environment (CCME), a coordinating body of the federal and provincial environment ministers without legislative authority, suggests "polluter pays" as a central principle in the allocation of cleanup responsibility. Consequently, the environmental statutes of most provinces assign responsibility to polluters to clean up contaminated properties. It is noteworthy that the use of the polluter pays principle in Quebec's environmental legislation was approved by the Supreme Court of Canada in 2003.[15] The CCME also suggests the "beneficiaries pay" principle, based on the view that there should be no "unfair enrichment" of parties who acquire properties at a price reduced because of contamination.

[14] Law No. 6.938/1981, article 3, IV.
[15] Imperial Oil Ltd. v. Quebec (Minister of Env't), [2003] 2 S.C.R. 624.

Provincial legislation therefore frequently imposes cleanup responsibility on a broad range of responsible persons (RPs) including current and past owners and occupants, those who had or have management, charge or control and often, current and past operators, frequently on a "no fault" basis. Liability is also typically retrospective and joint and several. Private-party contribution actions for cleanup costs proceed under basic tort principles, but notably, the applicable statute of limitations varies by province.

Provincial authorities typically issue orders to polluters or RPs requiring them to control, contain or cleanup contamination. Cleanup standards or guidelines apply in most jurisdictions typically in the form of land-use based criteria, or criteria based on site-specific risk assessments. Confirmation of cleanup to regulatory requirements is documented in some provincial governments by certificates of compliance. Others permit the filing of documents that confirm cleanup, but without governmental sign-off. Most provinces have adopted some lender liability exemptions or caps for receivers and trustees. To date, governmental certification has been primarily directed at protection of the environment and human health, not facilitating brownfield redevelopment. However, there has been more focus in the legislation on reuse of contaminated sites in recent years. In a few instances noted below, cleanup is a precondition to property transfer or closure.

In Alberta, the regulators may designate property as a contaminated site where it is believed that a contaminant may, is or has caused a "significant adverse effect" at the site. In practice, however, sites are rarely designated. Instead, orders are typically issued under administratively more expedient "release of substance" provisions to require remediation of both spills and contaminated sites. Liability is typically limited to the licensee of record (and current working interest participants) for all current and historic environmental liabilities associated with many types of petroleum operations. Seeking recovery from former licensees, even if they were the "polluter," is uncommon. If the current licensee and working participants are defunct, then environmental liability is typically covered by an industry-funded abandonment, remediation and reclamation fund. The fund only applies to certain types of oil and gas operations; other industries are generally not supported by a remediation fund.

British Columbia's Environmental Management Act (BCEMA) adopts many U.S. superfund concepts, provides for issuance of cleanup orders and makes the full gamut of RPs absolutely,

retroactively and jointly and severally liable for remediation costs. A "cost recovery" provision (unusual in Canada), permits the recovery by an RP that pays to cleanup a site from other RPs as defined under the BCEMA. The BCEMA also includes an "innocent landowner" concept, creates special allocation panels to assist in apportionment of liability and, in appropriate circumstances, provides early release of liability for de minimis parties. British Columbia also requires the delivery of an environmental site profile by vendors of certain commercial or industrial properties, filing of such profiles in certain circumstances with provincial authorities and posting on a site registry.

Ontario also provides for the issuance of cleanup orders and has recently adopted innovation to facilitate cleanup. The new regime exempts municipalities, secured lenders, investigators and others from liability. The legislation also authorizes the creation of records of site condition (RSC) which document that the site's environmental condition is appropriate for certain uses. RSCs are certified by statutorily identified "qualified persons" and can be filed in an electronic site registry. Before a change to certain sensitive land uses, such as residential, can occur, an update RSC certification must be filed. Once the RSC is filed, responsible persons are deemed to have satisfied remedial obligations.

In addition to a cleanup order regime, Quebec's environmental statutes contain a requirement for persons conducting prescribed commercial or industrial activities on land to perform a characterization of that land within six months after the activity has ceased or prior to certain changes in land use. If the site is contaminated, an approved rehabilitation plan is required and must be carried out on the property. If a risk assessment satisfactory to the government is available, the plan may allow for contaminants exceeding otherwise applicable regulatory limits, to remain on site.

Under the Canadian Environmental Assessment Act, a public registry of environmental assessments has been established and can be found at www.acee-ceaa.gc.ca/index A registry of 23,000 federal contaminated sites (active, suspected and closed) can be found at www.canada.ca//contaminatedsites. To date, there has been little effort to coordinate Canadian and U.S. cleanup regimes under the environmental provisions of the 1992 North American Free Trade Agreement, as superseded by the U.S.-Mexico-Canada Agreement, which entered into force in July 2020.

For more information on provincial remediation programs, go to the Environmental Canada site at www.ec.gc.ca/npri-inrp-comm.

§ 27:5.8 China

China amended the Environmental Protection Law of the People's Republic of China in April 2014 (Environmental Protection Law), which came into force on January 1, 2015. The supreme law of environmental protection in China stipulates that the country is to strengthen on soil environment protection, and to establish and improve the corresponding investigation, monitoring, risk assessment and remediation systems for the soil environment. In addition, the Law of the People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Wastes (Solid Waste Law) is the principal legislation governing hazardous wastes. It was revised in 2016 in an effort to improve China's management of solid waste and hazardous waste pollution. The Solid Waste Law adopts a "polluter pays" liability scheme in the Environmental Protection Law (1989, amended in 2013, 2015, and 2016) for the cleanup of contaminated sites and provides for administrative and civil liability for hazardous waste pollution. Where no pollution can be identified, the site owner can be held liable. Enterprises that generate hazardous waste must establish hazardous waste management plans with details of the types of hazardous waste, their output, flow direction, storage, treatment, and other relevant information, and must register such plans with the local environmental protection bureau (currently ecological and environmental protection bureau, EPB). Where violations or contamination occurs, EPBs have authority to order remediation by those responsible and to impose administrative penalties. China is presumed to have an unprecedented number of contaminated sites as a result of decades of rapid industrial growth in the absence of hazardous waste regulation. Although a substantial regulatory framework has been in place since 2004, current demand for licensed treatment, storage, and disposal facilities far exceeds supply, and compliance is not consistent throughout the country. Uncontrolled releases have also taken a toll on water supplies. In 2007, the algae bloom in the Taihu Lake caused by chemical plant discharges left tap water undrinkable for more than 2.3 million residents of Wuxi city.

The performance of soil and groundwater contamination assessment and remediation upon closure of facilities generating hazardous wastes (or facilities producing, storing, or using dangerous chemicals) is required under several enactments, primarily the Law on Soil

Contamination Prevention and Control (2018, effective January 1, 2019).Remediation may also be requested under the Environmental Protection Law (2015), the Law on Water Pollution Prevention and Control (effective June 1, 2008 and amended January 1, 2018), the Solid Waste Law (effective April 1, 1996 and amended November 17, 2016), the Opinion on Strengthening Soil Contamination Prevention and Protection by the Environmental Protection Ministry (June 6, 2008), the Circular on Ensuring Environment Safety of Redevelopment and Reutilization of Industrial Sites (November 26, 2012), the Directive Opinion on Boosting Relocation and Renovation of Former Industrial Zone in Urban Area (March 11, 2014), the Circular on Enforcement of Work for Pollution Prevention and Control during Industrial Enterprises "Closures, Relocation or Contaminated Site Redevelopment" (May 14, 2014), the Rules on Soil Environment Management for Contaminated Sites (trial, 2017), and the Administrative Measures on the Soil Environment of Industrial and Mining Land Sites (trial, 2018). In connection with efforts to reduce fine particulate air pollution associated with industrial sites (the 2013 "Blue Skies" initiative of President Xi Jinping), a significant enforcement effort was commenced in the spring of 2017, utilizing a new inspection force of 5,000, and leading to closure of an estimated 150,000 facilities by the end of 2018. These closures will often trigger the noted assessment and remediation obligations. Enforcement of the 2019 soil contamination law is primarily at the provincial level, though several municipal authorities have issued their own guidelines, including, for example, "Guidance for Soil and Groundwater Incidents Response" issued by Shanghai on April 19, 2021.

According to Article 6 of the Circular on Ensuring Environment Safety of Redevelopment and Reutilization of Industrial Sites (2012), for any new, expansion, or modification construction projects approved after this Circular, the Environmental Impact Assessment (EIA) shall include soil and groundwater investigation and risk assessment, and provide measures, such as release prevention, monitoring, etc., to prevent soil and groundwater contamination, and the prevention measures shall be inspected and approved during the Project Completion Inspection and Approval program. When the ownership of the land use right is to be changed, soil and groundwater investigation shall also be conducted, and remediation shall be conducted as per regulatory requirements if contamination is identified. It should be noted that if the polluter cannot be identified and there is no agreement otherwise during the transfer of land use right, the current owner will generally have to pay for all possible remediation costs. In addition, Article 7 of the

Circular on Ensuring Environment Safety of Redevelopment and Reutilization of Industrial Sites (2012), which addresses the "relevant responsible party," indicates that in line with the "polluter pays" doctrine, the entity causing the site contamination is the relevant responsible party who must take responsibility for the site investigation, risk assessment, and site remediation (the "relevant responsibility"). If the ownership of the contaminated site is changed, the entity that inherited the site liabilities after the transaction bears the relevant responsibility. If the entity that caused the contamination of the site has been terminated, local government at the county level or above bears the relevant responsibility. If the ownership of the land use right of the site is transferred, the party that receives the land use right bears the relevant responsibility.

Local agencies are responsible for supervision of remediation and cleanup. The Ministry of Environmental Protection (MEP) has promulgated a few supportive guidelines in relation to contaminated site management in February 2014, such as the Technical Guidelines for Environmental Site Investigation (HJ 25.1-2014), the Technical Guidelines for Environmental Site Monitoring (HJ 25.2-2014), the Technical Guidelines for Risk Assessment of Contaminated Sites (HJ 25.3-2014), The Technical Guidelines for Site Soil Remediation (HJ 25.4-2014), and the Terms of Contaminated Sites (HJ 682-2014). These guidelines introduce the standard approaches/methods for investigation, environmental monitoring, risk assessment, and the remediation technologies for the (potential) contaminated sites. The Environmental Soil Quality—Construction Site Soil Pollution Risk Control Standards (Trial) (GB36600-2018) is effective August 1, 2018, replacing the previous Environmental Quality Standard for Soil (GB 15618-1995) for soil environment management, and provides technical support for management of construction sites. In addition, the Quality Standard for Groundwater (GB/T 14848-2017) stipulates the quality classification of groundwater, groundwater quality monitoring, evaluation methods, and groundwater quality protection. Several local EPBs (Beijing Municipality, Chongqing Municipality, Zhejiang Province, Jiangsu Province, Liaoning Province, etc.) have issued regulations including more detailed requirements on contaminated site management, such as the Beijing Technical Guideline for Contaminated Sites Remediation Validation (DB11/T 783-2011), the Beijing Screening Levels for Soil Environmental Risk Assessment of Sites (DB11/T 811-2011), the Beijing Guideline for Environmental Site Assessment (DB11/T 656-2009) and the Zhejiang Guideline for Risk Assessment of Contaminated Sites (DB33/T 892-2013), among others.

The Ministry of Ecology and Environment (MEE) (formally MEP) promulgated the Law on Soil Contamination Prevention and Control on August 31, 2018 (effective January 1, 2019) ("Soil Law"). The Soil Law requires certain "key" sites (including facilities that historically produced, used, stored, recycled, or treated hazardous substances; facilities that historically stored or buried solid waste; locations with significant and significant pollution incidents; etc.) to strictly control the discharge of toxic substances, submit annual monitoring reports to EPB, and implement risk management plans. Prior to a change in land use or land use right of key sites, the land use right holder must investigate the soil conditions. For non-key soil environment scrutiny sites, the completion of soil contamination and/or groundwater contamination assessments is generally required upon closure of facilities generating hazardous wastes or facilities producing, storing, or using dangerous chemicals. If adverse environmental impacts are identified during these investigations, a remediation plan must be developed and implemented.

On December 26, 2009, China passed a Tort Liability Law, effective on July 1, 2010. Chapter 8 of the Tort Liability Law is dedicated to environmental tort and systematically codifies special liability and evidentiary rules that are significantly more stringent than prior environmental legislations and court interpretations. Under this law, a company that pollutes the environment will be strictly liable in tort for damage caused and will bear the burden of proof in respect of causation.

On February 21, 2013, MEP and the China Insurance Regulatory Commission (CIRC) jointly promulgated the Guiding Opinions on Pilot Scheme for Compulsory Environmental Pollution Liability Insurance, which for the first time requires compulsory purchase of environmental pollution liability insurance by enterprises with high environmental risks.

National environmental authorities have stepped up enforcement efforts and are working with China's banking, trade, securities, and insurance regulators to implement long-term economic policies to enforce environmental compliance. In 2007–2009, the national environmental authority rejected approximately 30% of the projects that submitted an environmental-impact assessment. Over 8000 facilities were fined and 3200 facilities were shut down. In 2009 alone, seventy paper mills were ordered closed for failure to meet wastewater emission standards. MEP has also published (and updated) a list of over 600 facilities that failed to meet emission limits or otherwise caused unpermitted releases to the environment. In March 2008, the former State Environmental Protection Administration (SEPA) was upgraded to ministerial level, reflecting the national

prioritization of environmental protection policy and regulatory development trend. There are signs that the shift in priorities is taking place at the local level as well. In February 2008, for example, the Guangdong Province listed fifty companies that failed to meet an environmental protection review and these companies were imposed warnings and fines. Before 2009, special environmental courts were established in Guizhou Province, Jiangsu Province, Yunnan Province, and Sichuan Province to expedite civil and criminal prosecutions. Notably, PFOS and PFOA are now included in soil and groundwater assessments.

In August 2013, China National Petroleum Corporation (CNPC) and Sino Petroleum Corporation (Sinopec), the two biggest Chinese state-owned monopoly enterprises, were informed by MEP that environmental permitting processes for any new, expansion, and renovation projects (except for oil product quality upgrading and energy saving and emission reducing projects) were suspended, because the enterprises failed to complete the annual pollutant reduction tasks and thus did not pass their environmental audits in 2012.

The Environmental Protection Tax Law of the People's Republic of China will go into effect on January 1, 2018. Entities that discharge taxable pollutants to the environment directly must pay the tax according to the law. If taxable pollutants discharged to the environment by a centralized sewage or domestic waste treatment/disposal site exceed relevant national or local pollutant discharge limits, environmental protection tax will be levied. If enterprises store or dispose of solid wastes without proper protections, as required by relevant national and local regulations, they will pay the tax as well.

For further information, go to http://english.mee.gov.cn.

§ 27:5.9 Colombia

Columbia passed its first Law Regulating Environmental Liabilities in 2023 (Law 2327) including provisions for remediation of contaminated lands, including those where polluters are "unknown". Implementing regulators are expected to follow those recently put in force by the City of Bogotá (reference ASTM 2801)

§ 27:5.10 Czech Republic

The Czech Environmental Act (Act No. 17/1992) generally provides for use of a "polluter pays" approach in connection with environmental damage. In general, sanctions or improvement

notices may only be imposed on an entity breaching legal obligations or violating environmental law or environmental permits conditions.

In an effort to encourage new industrial development in areas with significant contamination caused largely by governmental facilities prior to 1989, the Czech government has entered into privatization agreements wherein it provides a purchase price reduction or an environmental indemnity (funded formerly by the National Property Fund and currently by the Ministry of Finance). Under the Privatization Act ("Conditions for the Transfer of the State-Owned Property onto Third Parties," No. 92/1991) the party applying for the price reduction or environmental indemnity has to prepare an environmental audit to evaluate the compliance status of the privatized property and the existing environmental damage.

Under the Water Act (No. 254/2001), the party that caused land contamination due to inadequate wastewater or dangerous substances handling is responsible for land remediation. The Water Act further provides that parties that acquired property without knowledge of contamination (and who have not entered into a special privatization agreement and were not provided a price reduction) will not be liable for contamination in place. Instead, the Act provides that necessary remediation will be paid for by the government.

Guidance criteria for evaluation of soil and groundwater contamination are provided by the new Methodical Guideline of the Ministry of Environment issued in February 2012. Regional screening levels (RSLs) for soil and RSL–tap-water values were newly evaluated in the Czech Republic based on the U.S. EPA screening levels. Site-specific cleanup criteria are developed based on risk assessment (considering specific environmental conditions, land uses, and presence of sensitive receptors). In addition, the Rules on Soil Environment Management for Contaminated Sites (Trial) were recently promulgated by the MEP and became effective July 1, 2017. These rules set out the requirements for investigation of suspected contaminated sites; for risk assessment, risk control, and remediation; and for the completion of a remedy effectiveness assessment for contaminated sites. These rules apply to sites where land use is changed from industrial to residential or commercial, and in circumstances where the land use right has or is expected to revert to the government and land contamination is known or suspected. The liability for soil cleanup is lifelong.

For further information, go to www.env.cz.

§ 27:5.11 Denmark

Contaminated sites have been systematically mapped in Denmark since the early 1990s. The Soil Contamination Act, which entered into force on January 1, 2000, provides for strict liability as to parties causing contamination after 1991. Contaminated sites are grouped into two categories: (1) Class V1 includes sites with potential contamination due to historic activities; (2) Class V2 includes sites with verified contamination. As of January 1, 2007, sites with minor contamination attributed to a location within a city area with long historic development are no longer mapped. As of January 1, 2008, areas with assumed minor contamination are included in a group classification, meaning that a municipality has a right to ensure potential exposure risks to contaminated soil have been minimized and that no soil is removed from these sites without prior sampling and chemical analysis. The Ordinance on Removal of Soil details requirements for soil removal at different sites and under different scenarios.

Within the Danish regulatory framework, authorities are responsible for further investigations and remediation at sites belonging to categories V1 or V2 unless contamination at those sites occurred on or after January 1, 2001. Criteria for soil contamination are as follows: (1) soil quality criteria defining concentration levels considered not to pose an environmental or health risk even in the most sensitive land use; and (2) cut-off/intervention criteria defining the concentration levels above which action is required to ensure no risk is caused to human health. Given the public investment need, contaminated and potentially contaminated sites have been prioritized for further actions. In practice, remediation is publicly funded for areas located within groundwater abstraction zones, areas located within groundwater protection zones, or sites with sensitive land use (residences, kindergartens, etc.). While the commencement of publicly funded further investigations or remediation is pending, land use restrictions typically apply. Furthermore, development involving building on and removal of soil from such sites (for example, in case of site expansion requiring soil excavation) is subject to approval, soil sampling, and analysis prior to removal.

A direct “polluter pays” principle applies for sites where the contamination, or most of it, occurred on or after January 1, 2001.

§ 27:5.12 Finland

Environmental liability for contaminated soil and groundwater is regulated in the Environmental Protection Act 517/2014. Provisions of the Act apply to cases of contamination that have occurred after January 1, 1994. For contamination that occurred between April 1, 1979, and December 31, 1993, provisions of the repealed Waste Act 673/1978 apply. Apportionment of liability for contamination that occurred prior to April 1, 1979, is not clear, as no regulatory provisions existed at the time.

Environmental liability in Finland is based firmly on the "polluter pays" principle. However, where the polluter cannot be identified, cannot be reached (for example, does not exist any longer), or is otherwise incapable of taking on the responsibility, the occupier may be held liable for the contamination provided the occupier knew and consented to the contamination at the time it occurred or should reasonably have been expected to have known of the contamination at the time of acquiring occupation of the site. Liability can be bypassed only if it is deemed wholly unreasonable. Where neither the polluter nor the occupier can be held liable, it is the duty of the municipality to conduct investigations and assess the need for remediation.

Remediation measures generally require an environmental permit. However, where the extent and degree of contamination is well known and the remediation measure that is intended to be used is common and generally accepted for the purpose, and does not cause environmental damage, a notification to the relevant enforcement authority (ELY-Centre) is deemed sufficient.

Where land is sold or rented, the seller or lessor is obliged to provide all information available on the operations, substances, and wastes present that could potentially cause contamination of soil or groundwater.

§ 27:5.13 France

Decree No. 77-1133 of September 21, 1977 (application of Law No. 76-663 of July 19, 1976, on the listed installations for environmental protection—"Installations Classées pour la Protection de l'Environnement," referred to herein as ICPE), as modified by decree No. 2005-1170 of September 13, 2005 (in application of the Law 2003-699 of July 30, 2003 on the prevention of technological and natural risks and damage compensation), specifies the regulatory context for remediation of contaminated sites. Environmental laws are regularly updated and integrated into the Environmental Code established in September 2000, most significantly, by Law No. 2008-757

of August 1, 2008, which implemented the EU Environmental Liability Directive. As amended in March of 2014, the Code governs remediation of contaminated lands on a polluter pays basis (with liability for current owners where a polluter cannot be found). The Ministry of Environment (called the Ministry of Ecology, Energy and Land Planning) issued a series of policy documents (called circulaires) on February 8, 2007, which set forth general principles for managing potentially contaminated sites. Upon these principles, the Prefects (the Regional Administrator) may issue orders (referred to as permits) requiring remediation where there is a finding of unacceptable risk to human health or the environment, or upon facility closure, or change in site usage (for instance from industrial to residential). The circulaires call for the establishment of site-specific cleanup values in consideration of human and environmental receptors, generally risk-based objectives considering the current or future site use.

While the circulaires follow a "polluter payer" approach, closure remediation costs are to be borne by the last operator (or owner if the operator is no longer solvent) of the property. Under a recent decision of the French courts, any remediation order pertaining to a closed ICPE facility must be issued within thirty years of the official site closure date to still be enforceable. The remediation of orphan sites is financed by a fund created in February 1995, through an industrial waste tax (now part of the general tax imposed on Classified Installations). The fund is administered by a national agency, the Agency of Environment and Energy Management (ADEME), which is in charge of the remediation of orphan sites on behalf of the government. Following a number of highly publicized bankruptcies of Classified Installations, which left orphan cleanup obligations far exceeding the assets of the fund, a directive was issued in the summer of 2003 providing for the inclusion of financial assurance/guarantee obligations in site contamination permits/decrees. Both the obligations under the permits/decrees and the financial assurance requirements are generally established by the Direction Regionale de l'Industrie, de la Recherche et de l'Environnement (DRIRE), which technically supports the Prefects with more than 200 offices throughout France. An inventory of contaminated sites is maintained by the Prefects and lists sites and responsible parties by region (twenty-four regions in all). The list (updated quarterly) currently contains over 4033 sites and can be found at http://basol.environment.gouv.fr.

For more information, go to www.eugris.info.

§ 27:5.14 Germany

The Federal Soil Protection Act (*Bundes-Bodenschutzgesetz, BBodSchG*, 1998/2017) came into force on March 17, 1999. The law empowers competent authorities (the sixteen federal states and municipalities) to take action to require remediation and to prevent harmful impacts on soil quality. All parties that have owned or operated sites after the effective date of March 1, 1999, parties that have caused contamination, and successors to those parties are liable, generally on an "equitable" basis. The former owner of a site can be liable for remediation if he transferred the site after March 1, 1999. Enforcement is increasingly via "administrative contracts" or consent orders between polluters and the competent state authority.

Under the Soil Protection Act, the federal government is entitled to issue ordinances requiring current and past property owners and operators to restore sites. The Federal Soil Protection and Contaminated Sites Ordinance (*Bundes-Bodenschutz- und Altlastenverordnung, BBodSchV*, 1999/2017) provides the requirements for investigation and remediation (including application for site-specific trigger and action limits for a limited number of inorganic and organic substances), based on the type/sensitivity of site use and considering relevant migration paths (soil to human; soil to crop; and soil to groundwater). According to BBodSchV, decontamination measures are suited for remediation if they are technically and economically proven. Measures are suited for remediation if they guarantee that the pollutants remaining in the soil or on contaminated sites will not lead to any permanent risks or considerable disadvantages or nuisances for individuals or the general public.

Germany has not implemented binding assessment criteria for groundwater investigation. Soil and groundwater analysis results had been typically assessed using reference values presented in the "LAWA" Criteria (*Länderarbeitsgemeinschaft Wasser; Empfehlungen für die Erkundung, Bewertung und Behandlung von Grundwasserschäden*) of 1994. This guideline had been developed by the German State Environmental Authorities to give recommendations for investigation, evaluation, and remediation of soil and groundwater impacts, with the specific aim of groundwater protection. The LAWA criteria had been commonly used until the late 1990s as an assessment guideline in the Federal States of Germany, although these were not mandatory criteria. LAWA published "negligible limit values" in December 2004 (*Länderarbeitsgemeinschaft Wasser: Ableitung von Geringfügigkeitsschwellenwerten für das Grundwasser*; *LAWA-GfS*, 2004) and an updated version in January 2017 (*LAWA-GfS*, 2017),

providing contamination limits that are now the common reference point in Germany for assessment of groundwater conditions. Also, on July 28, 2017, LAWA published negligible limit values for a range of PFCs (or PFOSs), that is, per-fluorinated and poly-fluorinated chemicals.

For the assessment of soil conditions, the criteria of the LAWA 1994 and the BBodSchV 1999 provide reference values for a limited number of substances and these are still commonly used.

Certain German States such as the State of Saxony have also published State-related limit values that govern the risk assessment process. While these do not replace the Federal Soil Protection Ordinance (*BBodSchV*) assessment criteria, local authorities may work with such State criteria rather than the *LAWA-GfS* 2004/2017 criteria for the purpose of groundwater contamination assessments.

While competent authorities maintain lists of contaminated sites (Atlastenkataster), these are generally unavailable under the German Privacy Act. A request may be tendered and disclosure generally requires approval by affected current owners. The Federal Environmental Agency provides technical assistance and information on contaminated sites including former landfill, mines, chemical sites, and military and warfare-related sites (contamination from world wars and military installations). Amendments to the BBodSchV effective August 1, 2023 established test methods for seven classes of PFAS. Go to www.uba.de.

For more information, go to the German Federal Ministry for the Environment site: www.bmu.de.

§ 27:5.15 Hong Kong

Hong Kong does not currently have contaminated land legislation. As all land is held by the government, most remediation is governed under leases. Leases typically require restoration of property to its original condition at lease termination, compliance with environmental law during the term, and indemnification of the government to the extent of any cleanup costs. Requirements for end of lease term remediation are often contained in a permit administered by the Environment Agency. Contamination events may constitute grounds for lease termination in certain circumstances. For additional information, go to http://epd.gov.hk.

§ 27:5.16 Hungary

Environmental legislation emerged in Hungary following the departure of Russian armed forces in 1991 and disclosure in the world press of substantial contamination at 171 army bases, with an estimated cleanup expense of over $1 billion. The Act LIII of 1995 of the General Rules of Environmental Protection, the Act LVII on Water Management of 1995 (superseded by Act CLXXXV on Waste Management of 2012), and the Act XLIII of 2000 on Waste Management all provided for funding of the Hungarian Privatization Agency Environmental Protection Assistance Fund for the purpose of cleaning up contaminated sites. Funding under these authorities is further coordinated through a National Environmental Action Plan passed by the Parliament in 1997, followed by the National Environmental Action Plan II (2003–2008).

The 1997 plan calls for registration of potentially contaminated sites followed by implementation of site-specific remediation plans. Currently, some 14,600 such sites with potential soil and/or groundwater impact are listed by the environmental authorities.

Between 1994 and 2006, the implementation of remediation started at over 500 major sites involving a total state budget contribution of $580 million. Until the end of 2004, thirty-nine of the highest priority military bases and industrial operations have passed through the remediation process and an additional 160 sites (which include industrial facilities, former coal and uranium mines, and railway terminals) are in progress. During 2007 and 2008, an additional amount of $40 million was allocated from the state budget for remediation purposes mostly for the remediation of the site of a former chemical and pharmaceutical complex. A decree issued in 2004 (Government Decree 219/2004 on the Quality of Groundwater) empowers the Minister of the Environment (since 2010, the environmental matters fall within the portfolio of the Minister of Agriculture) to require remediation by private parties on a polluter pays basis (with current owner liability if no polluter can be found). Where possible, work is to be carried out under an administrative resolution providing subsequent to a risk-based assessment a detailed remediation plan. Detailed assessment criteria for soil and groundwater contamination are set by the law, applying a one-tier system. Contamination limits are established as regulatory guidance concentrations; site permitting as well as soil and groundwater remedial actions are based on these guidance concentrations (that is, no separate intervention thresholds are defined in the Hungarian law).

The remediation of historical soil and groundwater impacts continues under the National Environmental Remediation Program as part of the National Environmental Action Plan National Environmental Action Plan IV (2014–2019). This program is largely focused on areas where highly vulnerable groundwater resources are present. Financial provisions are made annually in the state budget. Additional funding of approximately €1.2 billion is made available by the European Union for the period of 2014–2020 through the EU Structural and Investment Funds.

The EU Directive 2010/75/EU on industrial emissions has been transposed in Hungary. It commissions major industrial operations to conduct a baseline assessment of the soil and groundwater conditions in their sites, and if any impact is revealed, to follow it up with the appropriate remedial measures.

Further information can be found at www.palyazat.gov.hu/szechenyi_2020.

§ 27:5.17 India

The Indian Supreme Court has adopted the polluter pays principle for environmental remediation and, in the Environmental Protection Act of 1986, India legislatively incorporated the principle. In addition, in general, India employs traditional doctrines regarding the separate corporate identity of parent and subsidiary corporations. Until recently, state authorities had primacy over contaminated land matters. In March 2014, the Indian Supreme Court ordered the establishment of a national EPA and that agency has subsequently entered into a joint relationship with the U.S. EPA to reform hazardous waste programs. A special National Green Tribunal established in 2010 has heard a number of disputes related to allocation of liability for remediation expense.

The Central Pollution Control Board released the guidelines for "Implementing Liabilities for Environmental Damages Due to Handling & Disposal of Hazardous Waste and Penalty" in January 2016. See www.cpcb.nic.in/Guidelines_Environmenal_Damages_Costs_200116.pdf. This document outlines various liabilities to be imposed on a responsible party for causing environmental damages arising from improper handling or disposal of hazardous waste.

A list of priority contaminated areas is available for review on the Central Pollution Control Board (CPCB) website, www.cpcb.nic.in/LIST_OF_HW_CONTAMINATED_SITES.pdf (accessed June 25, 2017). Further, the Ministry of Environment, Forest and Climate Change

(MoEF&CC) released a report dated December 2015 that presents a list of 320 sites identified as "probably contaminated." This report is available at http://envfor.nic.in/sites/default/files/ilovepdf_merged.pdf.

§ 27:5.18 Indonesia

Law No. 32 of 2009 Regarding Environmental Protection and Management compels any person polluting and/or damaging the environment to undertake mitigation and restoration. *Government Regulation No. 18 of 1999 Regarding Hazardous and Toxic Material (B3) Waste Management* stipulates that any person involved in the generation, collection, recovery, transportation, treatment, and storage of B3 waste is held responsible for dealing with incidents and pollution of the environment as a result of release or spillage of the B3 waste. The *Minister of Environment Regulation No. 33 of 2009 Regarding Procedures for Restoration of Land Contaminated with B3 Waste* was issued as guidance for the implementation of restoration or remediation of land contaminated with B3 waste. Although no specific cleanup standards were stipulated in the *Regulation 33 of 2009*, there are provisions for three basic approaches in the evaluation of the level of effectiveness of restoration or remediation: (1) comparison with the baseline conditions of the land prior to contamination; (2) adoption of the standards (based on beneficial land use) of other countries with similar soil conditions as Indonesia; and (3) establishment of risk-based screening levels or site-specific target levels.

Since 2009, the government has pursued several enforcement actions against most foreign mining interests in connection with site contamination. The most highly publicized of the actions has been against Newmont Mining in connection with gold mining operations in Buyot Bay (including a settlement reached in late 2006 that provides for $30 million over ten years).

§ 27:5.19 Ireland

There is no statutory definition of "Contaminated Land" in Ireland; however, the issue of contamination is covered in a number of legislative acts and, for sites which are not subject to environmental license, cleanup is primarily driven by the planning and development process. Under the Waste Management Act of 1996 (as significantly amended in 2012), the Ireland Environmental Protection Agency (EPA), through a National Hazardous Waste Management Plan, has created a system for the management and closure of hazardous waste disposal sites, including actions against owners and operators of such sites for cost recovery. Pursuant to the Local

Government Water Pollution Acts (last amended in 1990) and the Derelict Sites Act of 1990, local authorities are separately empowered to issue orders requiring remediation of land contamination that potentially affects groundwater and navigable waters. The local authorities are assisted by the EPA's Waste and Contaminated Land Inspectorate (WCLI) and the Environmental Heritage Service. While enforcement efforts in Ireland to date have been primarily directed toward current and former waste disposal facilities, contaminated land enforcement follows a "polluter pays" and "source-pathway-receptor" approach. In 2013, the Irish EPA published a Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (for example, large-scale industrial activities, large petrol storage facilities), which establishes a risk-based approach for soil and groundwater assessment and remediation. The approach followed by this Guidance is in line with the *Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites* (COP) published by EPA in 2007 and the U.K. Environment Agency's document *Model Procedures for the Management of Land Contamination: Contaminated Land Report No. 11* (CLR 11). It should be noted that this approach may also be suitable for the assessment of land damage at sites under the Environmental Liability Regulations, while the COP and associated guidance should continue to be used when assessing unregulated historic landfills.

For further information, go to www.epa.ie.

§ 27:5.20 Italy

The Legislative Decree 152/2006 (the so-called TUA Decree), Part Four, Title V sets the requirements for soil and groundwater remediation, establishing quality standards for soil and groundwater, and methodologies for investigation, sampling, and remediation activities. Remediation of contaminated land falls under the jurisdiction of the Ministry for the Environment, the Regional Agency for Protection of the Environment (ARPA), and designated regional/provincial/municipal authorities.

According to Article 242 of the TUA Decree, in case of a potential pollution event, the responsible party must:

- inform the relevant authority immediately;
- implement all the necessary emergency containment measures within twenty-four hours to prevent further damage; and

- perform a preliminary investigation of the site.

According to Comma 3 of Article 242, if, following the preliminary investigation, soil and/or groundwater contamination threshold concentration levels (indicated as "contaminants screening levels" (CSCs) included in Annex 5, Title V, Part Four of the TUA Decree) are exceeded, the responsible party must:

- provide the local municipality and province with the description of the precautionary and emergency measures carried out and adopted; and
- prepare and submit for approval to the relevant authorities (region, province, and municipality) a site characterization plan within thirty days.

Following the approval of the characterization plan, obtained by the "conferenza dei servizi" (steering committee) called by the Region within thirty days, the site must execute it. Based on the results of the characterization, a site-specific risk assessment must be carried out and approved by the relevant authorities within six months. The ASTM PS 104 Risk Based Corrective Action guidance is currently used as a reference for remediation projects and PFAS thresholds were adopted in 2023. The point of compliance for groundwater is the point, located hydrogeologically downstream of the contamination source, where the original status of groundwater (for example, the natural groundwater quality) must be guaranteed. The point of compliance is identified at the downstream facility boundaries. This means that at the site boundary, the "risk threshold concentrations" (CRSs) must equal the CSCs.

If the calculated CRSs are exceeded, soil and/or groundwater remediation measures are necessary and a cleanup/remediation plan must be prepared, submitted, and approved by the relevant authorities.

According to Article 243 of the TUA Decree, wastewater coming from site cleanup operations shall be reused, wherever possible, in the site's production cycle or may be discharged, after treatment—directly or after being used on site—into a surface water body if permitted by the authorities in charge. Treated cleanup water can also be re-injected in the aquifer.

Although the "polluter pays" principle is in force in Italy, regulations deal with the duties and liabilities of "nonresponsible parties" and "innocent owners." Article 245 of the TUA Decree is dedicated to this matter:

- Comma 1 establishes the nonresponsible party's right to voluntarily initiate containment and remedial actions;
- Comma 2 sets out the duty to report both the identified exceeding of the contamination threshold concentrations and any "concrete and present" danger of exceeding those concentrations. The province officials have the task of investigating to identify the polluter.

Where the responsible polluter cannot be found or is judgment-proof, the current owner or operator still has to implement all emergency containment measures to prevent further damage and/or reimburse the public authority for remedial measures taken in accordance with Article 253 of TVA Decree. Under the TVA decree, the competent regional authority may also undertake remedial measures and impose a lien on the subject property for expense incurred.

As set out in Article 253, the remediation is an actual real estate burden on the property and it is reported on the property certificate of use. When public funds are used for site cleanup activities, the amount constitutes a special real estate privilege which is prejudicial against any third party's rights on the property. The innocent owner's liability or exposure cannot exceed the market value of the property as assessed after the completion of the cleanup. An innocent owner who spontaneously carries out the remediation has a right of recourse against the party responsible for the pollution for all the remediation costs and further damages incurred.

One of the key aspects of the TUA Decree (as laid out in Article 304) is the creation of a more effective mechanism for environmental damage compensation.

In May 2017, the EC brought Italy before the Court of Justice for failure to close or rehabilitate 44 landfill facilities as required by the 1999 Landfill Directive.

According to the TUA Decree (art. 252), a contaminated site may be classified as being of national interest (known as SIN) and listed on the Ministerial website, www.isprambiente.gov.it/it/temi/siti-contaminati/siti-di-interesse-nazionale-sin. Such listings are based on site characteristics; the quantities and hazards of identified pollutants; environmental impacts; or health and ecological risks. Similarly, according to the TUA Decree (art. 251), less significant contaminated sites may be classified as being of regional interest (known as SIR) and listed on the related Regional website.

For each category of contaminated site (SIN and SIR), each local Environmental Agency (ARPA) collaborates with Regions and/or the Minister of the Environment to prepare and update lists of contaminated sites to indicate cleanup status and provide technical support during the remedial activities. The Ministry, Region or a municipality may serve as enforcement lead.

According to Ministerial Decree No. 272/2014 (based on the IED Directive), if the site is subject to the integrated environmental permit (known as *Autorizzazione Integrata Ambientale*), it must carry out a preliminary screening (known as *Verifica di Sussistenza*) on the amount of hazardous substances used on-site (current and historical) and on soil and groundwater quality. This screening is due to be completed according to national legislation and the deadline is defined by each Regional Authority. The results of this preliminary screening will determine whether the site is required to prepare a soil and groundwater baseline characterization report (known as *Relazione di Riferimento*), including related intrusive soil and groundwater investigations results.

§ 27:5.21 Japan

The Soil Contamination Countermeasures Law was enacted on May 22, 2002, and took effect on February 15, 2003. The Law was enacted in part as a reaction to heavily publicized incidents where important development projects failed or were postponed due to late discovery of soil contamination, often after substantial investment (for example, construction on a large apartment complex development in Osaka's Toyonaka City was halted on discovery of contamination when the project was 70% complete). By some estimates, approximately 440,000 sites have contaminated soil.

Under the Law, the landowner is obligated to conduct a soil contamination survey when decommissioning a facility that has utilized hazardous substances or where a prefectural governor orders such surveys on a finding of risk to health. The prefect can then require remediation as well under site-specific remedial methods (including containment where appropriate). The landowner may seek redress against actual polluters who are responsible for the soil contamination such as former owners or adjoining landowners. Hazardous substances are defined to include lead, arsenic, trichloroethylene and twenty-two other contaminants. Soil cleanup standards have been established for each of these. To date, fifty-six sites have been listed as contaminated "Designated Areas," all under voluntary remediation. The law does not currently provide for assessment of facilities closed prior to the February 15, 2003, effective date.

The Soil Contamination Countermeasures Law was significantly amended in 2010 to require thirty day advance notification to the governor of a prefecture before undertaking land development projects such that the governor can determine if remedial investigation is required. If investigation and/or remediation is required, the 2010 amendment empowers the governor to require the same, even if the owner/developer has no responsibility for the subject pollution.

Soil and groundwater quality standards in Japan are found mainly in the Environmental Quality Standard (EQS) for soil pollution and the EQS for groundwater pollution. EQSs for soil pollution were issued in 1991 and amended in 1994. Twenty-five substances were regulated in the standard. EQSs for groundwater pollution were issued in 1997 and amended in 1999, 2000, 2001, 2011, and 2012. Twenty-eight substances, including heavy metals, volatile organic carbons, etc., were regulated in the standard. PFAS and PFOA are yet to be included. A separate law deals with dioxin contamination. The Guidelines for Investigation and Countermeasures for Soil and Groundwater Pollution were issued in 1994, to ensure proper implementation of surveys and countermeasures based on the EQS and relevant evaluation standards.

For additional information, go to www.env.go.jp/policy.

§ 27:5.22 Kazakhstan

Under an Ecological Code adopted on January 2, 2021, Kazakhstan has imposed a polluter pays require (with current owners liable if a polluter can not be found), with enforcement by The Ministry of Ecology and Natural Resources.

§ 27:5.23 Luxembourg

The Administration of Environment governs remediation activities including those imposed as permit conditions under the EU Industrial Directive pursuant to the Environmental Liability Law of April 2009. Requirements are provided in a "Draft" Polluted Site Law under discussion since 2018.

§ 27:5.24 Malaysia

The Environmental Quality Act 1974 and amendments provide for the protection of soil and, indirectly, groundwater. Section 24 broadly states that "no person shall, unless licensed, pollute or cause or permit to be polluted any soil or surface of any land in contravention of the acceptable conditions specified under Section 21." The "acceptable conditions," however, have not been

defined. In early 2011, the Department of Environment of Malaysia disseminated a series of guidelines developed specifically for the assessment and management of contaminated sites. The guidelines provide the recommended site screening levels (SSLs), which are the screening criteria to be used to determine if a site is contaminated and assess the need for remediation. At present, the SSLs are not enforceable by law. An implementing regulation is expected to be passed and gazetted by 2018.

§ 27:5.25 Mexico

The General Law for the Prevention and Integral Management of Wastes traditionally imposed liability on waste treatment, storage, and disposal facilities under the auspices of the Secretaria de Medio Ambiente y Recursos Naturales (SEMARNAT). The law also grants the SEMARNAT jurisdiction over the transfer of property contaminated with hazardous waste. Under an amendment effective May 28, 2005, the law now applies to all contaminated sites and imposes strict, joint and several liability on owners and operators. SEMARNAT has estimated that 1000 sites will require remediation, with particular focus on sites owned by petroleum refineries, airports, manufacturing sites in the maquilladoras regions (Tijuana, Mexicali, Ciudad Juarez, and Matamoros), and chemical company sites in the states of Mexico, Jalisco, and Veracruz. SEMARNAT and the Secretary of Health (SSA or Secretaria de Sulbridada y Assistencia) approved cleanup standards based on review of remediation standards in the EU and the United States. SEMARNAT has also certified sixty-five firms to perform soil remediation work. A further amendment effective in June 2013 allows the government to also pursue damages for natural resource injury.

In July 2020, SEMARNAT has published standards for heavy metal and hydrocarbon remediation as well as an Environment and Natural Resources Program agenda for the period 2020–2024. The agenda includes commitment to reducing waste flow to treatment, storage, and disposal facilities, in part by encouraging a "circular economy" approach.

For more information, go to http://gobernacion.gob.mx/dof/2005 (in Spanish).

§ 27:5.26 Netherlands

The Soil Protection Act of 1987 (as significantly amended in 1995 and 2006) establishes liability for historic soil and groundwater contamination under the authority of the Ministry of Infrastructure and Environment (I&M) and the National Institute of Public Health and

Environmental Protection (RIVM), the latter of which developed technical cleanup criteria and advice. Their legal requirements have been carried forward in The Environment and Planning Act (Omgevingswet) of 2024. Soil and groundwater contamination caused prior to 1987 is regarded as historic, while contamination caused in 1987 or later must in principle be cleaned up immediately based on a stringent duty of care (Art. 13 of the Soil Protection Act), which is reinforced in a site's environmental (operational) permit pursuant to the EU Industrial Directive. The application of risk-based and land-use-based cleanup values is generally available for historic contamination. Under the Soil Protection Act, provinces and larger municipalities have the authority to order remediation subject to a limited innocent landowner defense (referring to a party that did not cause or know of contamination and has no legal relationship with liable parties). The authorities may require financial assurance by the owner/lessee for costs related to required remediation.

Technical guidance for the evaluation of contamination is provided in a circular on soil and groundwater remediation, first published in 2006 and subsequently replaced by newer versions. The most recent guidance includes reference values for the evaluation of contaminated land, that is, reference "target" values for groundwater and intervention values for soil and groundwater including a PFAS limit of .1 microgram.

The Dutch reference target values and intervention values (concentrations compelling government action), which are widely albeit informally used throughout the EU, have been included in the appendix of this circular.

For additional information, go to www.rwsleefomgeving.nl/language/english/soilplus/legislation (in English).

§ 27:5.27 New Zealand

Contaminated land is subject to management and remediation requirements under the jurisdiction of the New Zealand Ministry for the Environment (MfE), pursuant to the Resource Management Act 1991. The Ministry has issued a National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS, 2012) and a related series of guidelines for site investigation, reporting, remediation, and management. The NESCS is applicable to activities that involve investigating, disturbing, changing the use of, or developing land that has previously been used for one of fifty-three specified activities or industries listed on the Hazardous Activities and Industries List (HAIL). Territorial authorities (regional and district

councils) have responsibility for identifying land that is contaminated, and for enforcing the requirements of the NESCS. A Contaminated Sites Remediation Fund is in place, providing funding on a prioritized basis to regional councils for remediation of contaminated sites that pose a risk to human health and the environment.

Under the Hazardous Substances and New Organisms Act 2001 (and subsequent amendments), operators of sites that use hazardous substances are required to gain regulatory approvals from Worksafe New Zealand. The HSNO Act is designed to regulate how hazardous substances are used across their life cycle. It focuses on the prevention of contamination by creating a regime of controls for how hazardous substances are contained, labelled, stored, used, transported, or disposed of.

For additional information, go to www.mfe.govt.nz and www.business.govt.nz/worksafe.

§ 27:5.28 Norway

The Pollution Control Act of 1981 empowers the Norwegian Environment Agency to require remediation of contaminated land (including by current innocent owners with knowledge of contamination) in some circumstances with the assistance of regional authorities.

In Norway, criteria used to complete risk assessments of potentially contaminated sites are set forth by the KLIF in guidelines 99:01 and TA2553. These guidelines apply to soil only, and include acceptable concentrations for a large number of organics and metals, which are not to be exceeded under specific land uses. Regulations for addressing soil impacts are included in the Regulations on the Limitation of Contamination from 2004. In guideline TA2553, soil is classified into one of the five condition/quality classes based on the concentration of pollutants: 1, very good; 2, good; 3, moderate; 4, poor; and 5, extremely poor. If the concentrations of pollutants exceed the guideline value of the fifth class, the soil is classified as a hazardous waste. The guideline values are based on a Risk Calculation Tool described in the SFT's guideline 99:01. Definitions of different classes are quality assured by the Norwegian health authorities and are compared against Norwegian and other countries' experiences. This review ensures that the same criteria are used at all locations with the same land use, thus reducing the need to implement site-specific risk calculations. Norwegian background soil values have been taken into account when setting the guideline values.

Regulations on the protection of groundwater resources in Norway are included in the Regulation Framework for Water Management, which is consistent with the Water Framework Directive of the European Council (2000/60/EC) on protection of groundwater from impact by hazardous substances. The list of hazardous substances includes a large number of organic contaminants and metals; however, quality standards are only provided for use as drinking water. Limit values for drinking water are set for thirty-eight chemical parameters, including total petroleum hydrocarbons (TPH), polynuclear aromatic hydrocarbons (PAH), trichloroethene (TCE), perchloroethane (PCE), benzene, and a number of heavy metals. Norway has all known and potentially contaminated sites listed in a public database, which can be accessed at www.miijodirektoratet.no/grunn/.

§ 27:5.29 Peru

Peru enacted a General Law of the Environment in 2005, nominally providing for enforcement via state authorities. The law was amended creating a Ministry of the Environment (CONAM) with the power to bring civil actions and impose sanctions. A set of cleanup standards was adopted in 2017, including soil levels geared toward the dominant petroleum and mining industries, Supreme Decrees 11 and 12/2017. Among subsequent actions are a consensual remediation of soil contamination by Doe Run at its La Oroya smelter with an estimated cost of $400 million and a January 2014 action to compel remediation of contaminated soil, sediments, surface waters, and drinking water in the vicinity of the large oil concession operated by the national oil concern, Pluspetrol.

§ 27:5.30 Portugal

The Portuguese Government is in the process of developing a specific law on ground contamination and cleanup which reportedly is scheduled to be enacted in 2014. In the interim, contaminated land management is governed by the policies included in Law 11/87, the Basic Law on Environment and by the Decree-Law No. 147/2008 of July 29, which establishes the legal regime of liability for environmental damage (the "polluter pays" principle) and transposes into national law Directive 2004/35/EC of the European Parliament and Council of 21 April 2004. The main entity in charge of contaminated land management is the Portuguese Environmental Protection Agency, the Agência Portuguesa do Ambiente (APA). In the absence of national

cleanup criteria, the APA endorses the Ontario, Canada reference values for contaminated land, which follow a risk-based approach.

For more information, go to www.inresiduos.pt.

§ 27:5.31 Romania

Romania has gradually adopted the core EU contaminated land directives after entering the Union in January 2007. Its Environmental Protection Law entered into force the same year, providing rules and standards for the remediation of soil and groundwater (Government Decision 1408/2007 and Government Decision 1403/2007). Almost all waste disposal is via landfills and there were an estimated 800 such landfills as of 2016. In February 2017, the EC brought Romania to the Court of Justice for failure to close or rehabilitate sixty-eight landfill facilities as required by the 1999 Landfill Directive. While the National Environmental Protection Agency generally requires remediation by the responsible party, there is recent precedent for requiring current "innocent" owners to take action.

§ 27:5.32 Singapore

Singapore established contamination liability under The Environmental Protection and Management Act of 1999 ("Act") as enforced by its Director-General. Liability is based on a polluter pay scheme, with current owners liable if no polluter is found. Under the Act contamination assessments are required for new development. PFAS is a recognized contaminant.

§ 27:5.33 Slovakia

The Slovak Republic was established in January 1993, after it was severed from the former Czechoslovakia. Under the Slovakia privatization act ("Conditions for the Transfer of the State-Owned Property onto Third Parties," No. 92/1991), the Slovakia Ministry of Environment (which has concurrent jurisdiction over contaminated land with the Ministry of Agriculture) has entered into agreements with new owners of former state land providing funding for existing contamination.

In the early 1990s, a National Act on Waste Management (1993) and resulting National Environmental Action Program (1995) provided guidelines requiring the reporting of new releases and remediation of the same with reference to Canadian cleanup criteria. At that time, Slovakia completed a geochemical survey of the entire country on a one square kilometer grid for thirty-six

target contaminants, as well as more detailed surveys of former Soviet military sites. A total of eighty-seven "contamination zones" were identified at eighteen military sites (generally petroleum hydrocarbons). At most of these locations, geological, remedial, and monitoring works were performed prior to 2008.

Since 2003, a complex approach to address environment liabilities has been implemented, comprising implementation of a consistent methodology for registration and prioritization of contaminated sites, systematic identification of contaminated sites (2006–2008), preparation and implementation of methodical guidelines for investigation and risk assessment, preparation of a new legislation relating environmental liabilities, and compilation of a guideline of remedial methods (2008–2010).

Based on the systematic identification of contaminated sites during 2006–2008, a Register of Contaminated Sites was compiled as part of a wider information system of contaminated sites. The Register covers the entire territory of Slovakia. Registered contaminated sites are sorted based on the risks to human health and the environment.

A National Program for Remediation of Environmental Liabilities for 2010–2015 was adopted by the Slovak Government and defines priorities, tasks, and goals for dealing with contaminated sites.

Environmental liability is viewed as a special case of civil liability addressed by the Civil Code (No. 40/1964). This act stipulates that a person is liable for damage he or she has caused to another person by breaching a legal duty or in the course of his or her business, unless it is proved that the damage was caused by force majeure outside his or her control. Water Act (No. 364/2004) also states that any party causing land contamination is responsible for remediation (that is, the "polluter pays" principle applies).

Under the Slovakia privatization act (Conditions for the Transfer of the State-Owned Property onto Third Parties, No. 92/1991), all liabilities, known and unknown, related to the privatized property pass to the party acquirer. Any privatization project includes evaluation of environmental liabilities related to the privatized property confirmed by the respective environmental authority.

There are no provisions for compensation of costs related to remediation of historical contamination or provision of reduced price in privatization embodied in the Slovak legislation.

Cleanup is rather addressed case-by-case by regional, district, or central environmental authorities by means of individual agreements (for example, Motorola, U.S. Steel, and Volkswagen as strong foreign investors have run remedial projects under such agreements).

On January 1, 2012, the Act on Environmental Burdens No. 409/2011 came into force. The Act stipulates rules for identification, classification, and registration of environmental burdens (subsurface contamination) and establishes the polluter as a person fully responsible for environmental remediation. The polluter is any party causing subsurface contamination, with the exception of parties that executed a so-called environmental contract with the Slovak state for remediation of privatized property. The polluter is obliged to develop a remediation plan and pay remediation costs. If the polluter no longer exists, the respective Regional Authority establishes an obliged person who is responsible for remediation. If the polluter is not known or the obliged person cannot be established by the Regional Authority, the property owner can be established as the obliged person. In January 2012, the Methodical Guideline for Risk Assessment of Contaminated Site No. 1/2012-7 was issued by the Ministry of Environment. The guideline also stipulates new criteria for soil and groundwater contamination evaluation.

For more information, go to www.enviro.gov.sk or www.mst.dk/udgiv.

§ 27:5.34 Slovenia

Slovenia became a state on April 1, 1999, and has created an environmental program pursuant to an Environmental Protection Act. The state has the power to issue a "regulation" declaring land as contaminated and providing for remediation, and to sanction non-performing parties under a penal code. As a practical matter, most contamination relates to former uranium mining and military operations; both are addressed with government funds. Due to former mining activities in the Zirovski Vrh mountains, various radioactive waste rock and tailings piles are present. The remediation of the affected area is ongoing, and the total remediation costs are estimated at about €86.3 million. The government is evaluating remedial option in connection with significant lead and zinc contamination from mining activities in the Meza Valley area.

The EU Directive 2010/75/EU on industrial emissions, which obligates major industrial operations to conduct a baseline assessment of the soil and groundwater conditions, has been transposed to Slovenia.

In April 2017, the EC brought Slovenia before the Court of Justice for failure to close or rehabilitate twenty-eight landfill facilities as required by the 1999 Landfill Directive.

For more information, go to www.arso.gov.si/en/.

§ 27:5.35 Spain

Under the Spanish constitution, the power to enact and enforce environmental legislation is divided between the national government and seventeen autonomous regions, with the Ministry of Environment (Ministerio de Medio Ambiente) having primacy over policy. The national policy on contaminated land was enacted through the Royal Decree 9/2005, which includes Tier 1 reference values for contaminated soil, and through Law 22/2011 on Waste and Contaminated land. These measures are carried forward in The Waste and Contaminated Land Act of 2022. The Basque Country and Catalonia have been the most aggressive enforcement regions to date. The Basque Country has published its own law on contaminated land, Law 1/2005, which includes a detailed methodology on contaminated land management.

For the assessment of groundwater contamination, the Dutch reference values are generally used in Spain.

Current funding for contaminated land cleanup is mostly generated by private land owners or by polluters. The 2022 Act Liability regime provides a polluter pays systems (with current owners liable when a polluter can not be found) Royal Decree 3/2023 has established human consumption water quality limits for 20 PFAS compounds.

For more information, go to www.clarinet.at/policy/esp_approach/htm.

§ 27:5.36 Sweden

The Environmental Code (Miljobalken 1998:808) sets the framework in Chapter 2, Section 8 and Chapter 10 for regulations concerning contaminated land including liability, notification duties, and obligations regarding environmental risk areas. The Swedish EPA has additionally issued guidelines for defining contaminated soil, groundwater, and surface water. The County Administrative Boards maintain inventories of contaminated and potentially contaminated sites (MIFO).

For contamination that occurred prior to July 1, 1969, and was caused by operations that ceased prior to July 1, 1969 (when the first environmental protection act came into force), no liable parties

exist, and remedial actions (where necessary) are financed from the government funds when the risk is considered significant enough. Furthermore, remediation of sites with significant environmental and/or health risk and with no identifiable polluters is funded by the state.

For contamination occurring between July 1, 1969, and January 1, 2000, the "polluter pays" principle applies, and the current landowner can be ordered to participate in financing further investigations—but not actual remediation, unless the owner is the polluter. For new cases (contamination occurred after January 1, 2000, or the site was acquired after January 1, 2000), if an operator is not able to carry out or pay for remediation or corrective actions of a contaminated property, the person who acquired the property and was aware of the pollution at the time of acquisition, or ought to have detected it, is liable for corrective actions. Groundwater remediation standards have been established for eleven classes of PFAS.

§ 27:5.37 Switzerland

The environmental law in Switzerland regulating cleanup activities is the federal Law for Protection of the Environment (Umweltschutzgesetz, 1983) and August 26 1998 Decree on Contaminated Sites.

Cleanup requirements for contaminated sites/properties are specified by the Ordinance on the Cleanup of Contaminated Sites (Verordnung über die Sanierung von belasteten Standorten—Altlastenverordnung) of August 26, 1998, and last amended in March 2017, with the current version enforced by May 1, 2017, Ordinance SR 814.680. The Ordinance on the Cleanup of Contaminated Sites requires the compilation of a cadaster (or register) of contaminated sites by the cantonal authorities.

The current status of the registry of contaminated sites can be found at www.bafu.admin.ch/bafu/de/home/themen/altlasten/fachinformationen/altlastenbearbeitung/stand-der-altlastenbearbeitung-in-der-schweiz/online-kataster-von-kantonen-und-bundesstellen.html. The Federal Office for Civil Aviation, the Department for Defense, Civil Protection and Sport, and all twenty-six cantons have completely or partially published their contaminated sites registers online. Orphan sites include an estimated ten million square meters of abandoned industrial brownfield property.

Orphan sites are addressed through a fund established through a supplemental landfill tipping fee, which is regulated in the Ordinance on the Contribution to the Remediation of Contaminated Sites (Verordnung Über die Abgabe zur Sanierung von Altlasten, September 26, 2008, which came into force on January 1, 2009). The ordinance in effect as of January 1, 2012, replaced the version of April 5, 2009.

Assessment criteria (reference, proof, remediation values) for soil are provided in the Ordinance Regarding Impacts on Soil (Verordnung über Belastungen des Bodens, July 1, 1998, previously amended in 2008, current updated version dated March 22, 2017). Based on the results of the technical investigation, the authorities determine whether a site needs monitoring or remediation. In circumstances where remediation of a contaminated site is required, the authorities can obligate the site owner or operator to conduct a detailed subsurface investigation. Based on the results of the detailed investigation, the authorities define remediation targets and the priority for remediation. The ordinance empowers BAFU and local canton authorities to require cleanup on a "polluter pays" basis, including cleanup by current owners who had knowledge of contamination when they came into possession. A recent amendment provides a liability exemption for "innocent" owners who performed appropriate disclosure pre-acquisition. (Dec, 2005)

The registry includes landfills, operating sites, and sites where spill and/or release incidents are known to have occurred. The authorities require background research and technical investigation of the sites registered in the registry to evaluate the potential for contamination and to identify constituents of concern. The ordinance provides assessment criteria waters, soil gas, and soil for agricultural, horticultural, and residential use. The soil assessment criteria have been included since September 2008.

Since the ordinance was first implemented, certain aspects of the rules have been clarified or amended (for example, to avoid different interpretations of the regulation by the individual cantons). The most recent ordinance amendment dated March 22, 2017, includes the following relevant changes to the Ordinance of the Clean-up of Contaminated Sites:

- The ordinance includes a provision under which remediation of a contaminated property may be required in cases where substances originating from the affected site reach groundwater abstractions of public interest; however, the provision was not clear in

providing specific instruction as to what levels of contamination at the abstraction would trigger a remedial requirement. The amended ordinance clarifies that remediation is necessary in relation to groundwater protection, if substances are encountered in those groundwater abstractions of public interest at concentrations "exceeding the limit of detection" (Art. 9 Abs. 2 Bst. a AltlV).

- The ordinance includes a provision under which remediation of a contaminated property is required when substances concentrations in soil gas exceed thresholds specified in Annex 2 of the Ordinance *and* the vapors originating from the site reach locations where persons stay regularly for longer time periods. In practice, regulators have often imposed a post-remedy monitoring requirement in such circumstances, even though such a requirement was not specifically codified in the ordinance. In the most recent amendments, post-remedy vapor monitoring has now been formally added to the Ordinance when soil vapor contamination is at issue (Art. 11 AltlV).
- To advance the goal of the Swiss Federal Council (Bundesrat) to complete all existing soil and groundwater remediation within one to two generations' time, the Federal Agency for the Environment (Bundesamt für Umweltschutz, BAFU) has been given the right to periodically check the progress and especially the legally required priority list of ongoing remediation and investigation projects, to review optimization options with the respective cantons (Art. 21 Abs. 1 AltlV).

As of April 2020, special threshold values are established for residential and public space soils and groundwater, including for lead, PAH, Benzo(a)pyrene, PCBs, dioxin, furans, and BTEX.

For more information, go to www.bafu.admin.ch/bafu/de/home/themen/altlasten.html.

§ 27:5.38 Taiwan

Remediation may be required by The Environmental Protection Administration under the Soil and Groundwater Pollution Remediation Act of 2023, under a polluter pays regime.

§ 27:5.39 Thailand

The Enhancement and Conservation of National Environmental Quality Act of 1992 is used by several ministries to establish remediation requirements in the conduct of commercial and agricultural development under a polluter pays regime.

§ 27:5.40 Ukraine

The Law on Environmental Protection dated June 25, 1991 governs contaminated sites with more specific requirements contained in subsequent codes and more specific statutes, including a Law on Radioactive Land enacted after the Chernobyl disaster. The Ministries of Environment and Agriculture lead enforcement efforts under a polluter pays approach.

§ 27:5.41 United Kingdom

Cleanup of land and water in the United Kingdom (England, Wales, Scotland, and Northern Ireland) is enforced through Part 2A of the Environmental Protection Act 1990 (as amended by the Environment Act 1995) (commonly referred to as "Part 2A" or the "contaminated land regime"). Additional and complementary permit requirements were put in place to address land and water cleanup at the time of adoption of the above-noted IED permit Baseline Report Scheme, via the 2013 Environmental Permitting Amendment Regulation (England and Wales), the 2012 Pollution Prevention and Control Regulations (Scotland), and the 2013 Pollution Prevention and Control (Industrial Emissions) Regulations (Northern Ireland), as well as regulations intended to implement the requirements of the EU Water Framework Directive 200/60/EC. Some specific regulations, and the regulatory bodies responsible for enforcement, vary between England, Scotland, Northern Ireland, and Wales with the UK Environment Agency having primacy. Land subject to redevelopment is preferentially dealt with under the planning system, rather than the statutory Part 2A regime. The Part 2A regime seeks to promote voluntary remediation, and cleanup of contaminated land through the planning and development process is the primary means of addressing historical contamination.

§ 27:5.42 Vietnam

The 2023 Law on Environmental Protection, and decrees issued under that law, provides for government led remediation of contaminated land on a polluter pays basis. Enforcement is undertaken by local authorities including provincial representatives of the Environmental Ministry, police and "Peoples Committees". Specific soil standards have been set for pesticides, POPs, dioxins and heavy metals.

§ 27:6 Sample Due Diligence Request

The following items represent a sample due diligence request regarding selected international environmental law issues.

(1) Identify all greenhouse gas emissions limits and reporting obligations that apply to the Company's operations, emission reduction obligations and applicable deadlines. Provide information on the Company's plan for compliance with such limits (for example, emissions control upgrades, purchasing emissions credits), as well as estimated costs (including operation and maintenance costs).

(2) Provide information on any substance manufactured, stored or handled by the Company that is regulated under the Stockholm Convention on Persistent Organic Pollutants. Provide information on applicable deadlines and estimated compliance costs.

(3) Provide information on any genetically modified products or organisms manufactured or imported by the Company. Provide documentation of compliance with the Cartagena Protocol on Biosafety, to the extent such activities take place in a signatory country and are subject to the Protocol.

(4) Provide information on chlorofluorocarbons (CFCs) or halons manufactured, stored, or handled by the Company that are subject to regulation under the Montreal Protocol. Describe the Company's plans for complying with phase-out requirements and other restrictions.

(5) Identify all Company facilities subject to EU IED permitting requirements, and provide an estimate of costs for complying with such requirements and applicable deadlines, including financial assurance requirements. Provide copies of all permits and/or permit application materials.

(6) Identify all facilities subject to EU Seveso regulations pertaining to the prevention of major accidents. Provide information on applicable deadlines and estimated compliance costs. Furnish any process hazard analyses performed to date. Identify all facilities at which a major accident has occurred and furnish detailed information on the nature of the events and related remedial costs. Further, please provide copies of all related regulatory submissions, including Major Accident Prevention Plans, Safety Reports, Emergency Plans, and reports of major accidents.

(7) If the Company manufactures chemicals in the EU or imports chemicals into the EU (including PFAS, PFOS, and PFOA compounds), please provide a list of such chemicals

and the volumes manufactured or imported annually, and indicate whether the chemicals have been deemed to be persistent, bioaccumulative and toxic (PBT), very persistent and very bioaccumulative (vPvB), carcinogenic, or mutagenic. Further, please provide any Company estimates with respect to compliance with the EU REACH legislation.

(8) If the Company manufactures any electrical or electronic equipment for sale in the EU, please provide all documents relating to compliance with the WEEE/RoHS Directives on recovery and recycling of such equipment and restrictions on the use of certain hazardous substances in such equipment. Further, please provide an estimate of annual WEEE/RoHS compliance costs.

(9) If the Company ever manufactured or distributed any asbestos-containing materials (ACMs), please provide a description of such products, as well as sales volumes and locations where such products are (or were) sold.

(10) Identify all ACMs present in Company facilities, including in building materials, pipe and boiler insulation, or elsewhere, and provide copies of all asbestos surveys and operations and maintenance (O&M) plans. If the Company has ever been subject to claims alleging exposure to asbestos in products or at a facility, please provide details and copies of relevant documentation including insurance claims, and information on the disposition of such claims including amounts paid pursuant to judgment or settlement.

(11) Identify any current or former owned, leased, operated, or utilized facilities that are or have been subject to regulation in connection with the generation, treatment, storage, disposal, or handling of hazardous materials or hazardous wastes.

(12) Identify any and all releases of contaminants and hazardous substances, including those reported to governmental authorities from current and former facilities owned, operated, or utilized by the Company, provide copies of communications concerning the same, and indicate status of any investigation and remediation requirements as to the same and any associated costs, fines, and penalties projected or paid, including any potential costs in connection with damage or injury to property, human health, and natural resources.

(13) Identify any current or former facilities and any off-site locations to which contaminants and hazardous substances were shipped for treatment, storage, disposal, and handling that are listed on any governmental registry of contaminated sites, furnish information regarding the same, and indicate the status of any investigation or remedial efforts concerning the same, together with costs incurred to date and projected.

(14) Identify any current or former facilities that are in whole or in part scheduled for closure or decommissioning, any governmental notices in connection with the same (provide copies of all related communications), and costs incurred, reserves, and costs projected in connection with the same.

(15) Identify any current or former facilities subject to financial assurance or guarantee requirements under applicable environmental law, and provide relevant documentation.

(16) Identify any current facilities as to which a governmental notice or approval is required in connection with the subject transaction under applicable environmental law.

(17) Identify any current facility that is subject to taxation under applicable environmental law and indicate the amount of tax paid to date and projected to the extent reasonably estimable.

(18) Identify any contractual environmental law indemnity rights or obligations in force.

(19) Describe any fire, storm, seismic and flood events recently affecting operations.

(20) Provide copies of any Phase I or comparable reports on current and former owned, operated, and utilized facilities in the possession of the Company, its consultants, and advisors.

(21) Provide current disclosures and commitments under EU NFRD, SFDR, CSRD, CSDDD or comparable international sustainability requirements.