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Hazardous Substances and Activities

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CHAPTER 33

HAZARDOUS SUBSTANCES AND ACTIVITIES

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C33.S1

I. INTRODUCTION

C33.P1

THE modern world is built on synthetic and naturally occurring chemicals that are used to produce almost everything humans use, including pharmaceuticals, electronics, automobiles, fabrics, and construction materials. Companies may manufacture toxic chemicals as useful products with commercial applications, and they may also generate hazardous substances as by-products of manufacturing. Once released into the environment, the chemicals can be transported over long distances through air and water, raising issues of international law.

AQ: I have changed "mimaterials" to "materials."

C33.P2

For humans, chemicals may present risks of cancer, birth defects, genetic mutations, nerve damage, hormone disruption, and a wide array of other adverse health effects. Chemicals may also harm plants and animals. Pesticides, for example, can cause species loss through concentration of the chemicals in animal tissues that are consumed at higher levels on the food chain.

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This chapter analyzes the enormous scope of international instruments addressing hazardous substances and activities by assessing both the regulatory junctures and the specific strategies that governments rely upon to reduce risk. It begins with the challenge of identifying which substances are hazardous to human health or the environment (risk assessment) and then discusses the major treaties that regulate chemical hazards (risk management). This chapter discusses treaties and other international instruments governing chemical production, use, labelling, and disposal as well as those governing industrial accidents. It concludes with a discussion of instruments designed to promote pollution prevention and toxics use reduction.

C33.S2

II. HAZARD IDENTIFICATION AND TESTING

C33.P4 One of the first questions that regulators encounter in crafting public policies for toxic substances is how to identify the substances that will be subject to regulation. Because of the wide variety of toxic substances and exposures, the decision on which substances to regulate is largely a social policy determination involving the application of judgement and values. In making the distinction between 'toxic' or 'hazardous' substances[1] that warrant policy interventions and the remainder that do not, regulators must first gather basic empirical toxicity data. Of the tens of millions of known chemical substances, about 100,000 are utilized in industrial processes. Of those, very few have been thoroughly tested for human toxicity or adverse environmental impacts.

C33.P5 The criteria justifying testing and specific testing protocols are mostly a matter of domestic law rather than international law. In 2016, the United States overhauled its law governing chemical testing, the Toxic Substances Control Act (TSCA), strengthening the authority of the federal government to require manufacturers to test chemicals. The pace is slow, however. TSCA requires ~~manufacturers~~ to evaluate the risk of only twenty high priority substances by 2020.

C33.P6 In the European Union (EU), chemical testing is conducted under a 2007 regulation called Registration, Evaluation, and Authorization of Chemicals (REACH). Under REACH, the EU established a mission-specific supranational authority, the European Chemicals Agency (ECHA), to compile testing data. As of 20~~18~~, the ECHA had flagged approximately ~~190~~ substances for further review and evaluation. In both the United States and the EU, chemical testing is usually conducted by manufacturers, under protocols developed by governments, rather than conducted by governmental authorities themselves.

C33.S3

A. OECD Harmonization Initiatives

C33.P7 International coordination of chemical testing has significant benefits. It can reduce redundant or contradictory requirements from one state to another and reduce deaths of laboratory animals. Divergent municipal testing requirements, on the other hand, can sometimes impede global trade. Based on these considerations, the Organization for Economic Cooperation and Development (OECD) has been actively involved for several decades in harmonizing national policies for testing chemicals. These harmonization efforts have been largely non-binding, as there is no compulsory international

[1] For the purposes of this chapter, the terms 'toxic' and 'hazardous' are used interchangeably in a non-technical sense to identify situations characterized by a heightened risk of injury, disease, or death from exposure to a substance. Further elaboration as to specific risks in a variety of contexts is set out in the instruments ~~discussed~~ in this chapter.

instrument that mandates chemical testing, establishes testing protocols, or requires mutual recognition.

C33.P8 Building on prior efforts, the OECD harmonization initiative reached an important milestone with its Screening Information Data Set programme, which was first set out in a 1991 undertaking on cooperative investigation and risk reduction of existing chemicals. Under this programme, OECD member states have tested and shared basic toxicity information for more than 1,200 high production volume chemicals. The data include the results of tests for physico-chemical properties, environmental fate, environmental effects, and health effects. As with other testing programmes, the principal goal is to assure adequate characterization of a substance to determine appropriate regulation for that chemical. Since the 1980s, the OECD has also had a programme to encourage the mutual recognition of chemical test data by OECD member states, an initiative that has now been extended to non-members as well.[2]

C33.P9 In 2018, the OECD adopted a Decision-Recommendation on the Co-operative Investigation and Risk Reduction of Chemicals,[3] which replaced the 1991 effort. The 2018 Decision-Recommendation reiterates the importance of harmonizing testing protocols and sharing of data and also recommends 'concerted activities' by OECD members to reduce chemical risks. The recommended activities include traditional command-and-control regulation as well as non-regulatory efforts, such as use of environmentally preferable production techniques, product labelling, and economic incentives.

C33.P10 Within the OECD, efforts at harmonizing toxicity testing have been largely non-binding, and testing regimes remain based in municipal law rather than international law. States have opted for this modest, primarily voluntary approach to chemical testing because of their concerns over sovereignty, protection of domestic industry, and protection of confidential business information.[4]

C33.S4 B. Initiatives in the United Nations System

C33.P11 In 1995, following a recommendation in Agenda 21, several intergovernmental organizations established the Inter-Organization Program for the Sound Management of Chemicals (IOMC). The World Health Organisation (WHO) provides secretariat

[2] See eg 'Decision Concerning the Mutual Acceptance of Data in the Assessment of Chemicals' OECD Doc C(81)30, as amended by OECD Doc C(97)186; 'Decision-Recommendation on Compliance with Principles of Good Laboratory Practice' OECD Doc C(89)87, as amended by OECD Doc C(95)8; 'Decision Concerning the Adherence of Non-Member Countries to the Council Acts Related to the Mutual Acceptance of Data in the Assessment of Chemicals' OECD Doc C(97)114.

[3] 'Decision-Recommendation on the Co-operative Investigation and Risk Reduction of Chemicals' OECD Doc C(2018)51.

[4] The International Agency for Research on Cancer (IARC), a component of the World Health Organization (WHO), publishes a series of monographs, in which more than 1,000 chemical agents have been evaluated. Unlike the OECD, the IARC is primarily a scientific research organization and not a forum for harmonizing national policies.

services. The OECD, Food and Agriculture Organization (FAO), the International Labour Organization (ILO), UNEP (now UN Environment), United Nations Industrial Development Organization (UNIDO), and United Nations Institute for Training and Research (UNITAR) are participating organizations that provide resources, while the United Nations Development Programme (UNDP) and the World Bank participate as observers. Unlike the OECD's work on chemicals, the efforts of the IOMC are potentially global in reach.

C33.P12 The IOMC coordinates international assessment of chemical risks; harmonization of classification and labelling of chemicals; information exchange on chemicals and chemical risks; establishment of risk reduction programmes; strengthening of municipal capabilities and capacities for management of chemicals; and prevention of illegal international traffic in toxic and dangerous products. In 2001, the IOMC facilitated the establishment of a globally harmonized system for the classification and labelling of chemicals, and it implemented a non-binding prior informed consent procedure similar to the legally binding 1998 Rotterdam Convention (Section VI). It has assisted states in developing national implementation plans under the 2001 Stockholm POPs (persistent organic pollutants) Convention (Section III) and has assisted African states with the management and disposal of pesticides.

C33.P13 The IOMC's most far-reaching effort to date is the Strategic Approach to International Chemicals Management (SAICM). Launched in 2006, SAICM outlines a framework for chemical risk management under five main themes: risk reduction, knowledge and information, governance, capacity-building and technical cooperation, and illegal international traffic. Relying mainly on voluntary action, the SAICM adopted a Global Plan of Action in 2006 containing a menu of work areas and activities for each of the five themes. The Global Plan of Action also contains targets, timetables, and indicators of progress for each theme. Despite missing a prior target to assure that every country will produce and use chemicals in ways that minimize significant adverse impacts on the environment and human health by 2020, SAICM has recently reaffirmed its fundamental analytical approach.[5]

C33.S5

III. CONDITIONS OF PRODUCTION AND USE

C33.P14 Another regulatory strategy for addressing toxic chemical risks is to establish conditions to reduce hazards from the production and use of chemicals. Regulators may prescribe product or production standards as requirements for governmental pre-market approval or licensing of the substance. For example, both the EU's REACH regulation and the US TSCA (Section II) authorize imposing conditions of use on a chemical. The EU's

[5] SAICM, 'Lessons from the past to inform SAICM and the Sound Management of Chemicals and Waste Beyond 2020' (2020).

Seveso III Directive (Section V) likewise relies on this regulatory approach. In some cases, a government may phase out or ban a substance if it concludes that the environmental and public health risks of the substance are unacceptable.

C33.S6

A. Stockholm POPs Convention

C33.P15 Persistent organic pollutants (POPs) are a global threat because they damage human health and remain in the environment for long periods before decomposing. These chemicals, such as PCBs (Polychlorinated biphenyls) and DDT (Dichloro-diphenyl-trichloroethane), are dangerous at the local level and also end up widely distributed geographically, often far from the place of manufacture or release. They accumulate in the fatty tissue of living organisms and therefore concentrate at higher levels of the food chain. The Stockholm Convention on Persistent Organic Pollutants addresses the risk from POPs through both phase-outs and bans, initially targeting a 'Dirty Dozen' list of pesticides and industrial chemicals which originated from a global NGO campaign.

C33.P16 The Stockholm Convention goes further than other treaties governing toxic chemicals (Section VI) in directly limiting production and release of certain chemicals at the domestic level, whether those substances are involved in international trade or not. It is an example of global harmonization of municipal policies on conditions of use, in some cases by eliminating use of a substance altogether.

C33.P17 The Convention initially targeted nine chemicals and categories of chemicals for limitation: the pesticides aldrin, chlordane, dieldrin, endrin, heptachlor, mirex, and toxaphene; and the chemicals hexachlorobenzene and PCBs. The Agreement also strictly limits the use of DDT to controlling disease-carrying insects and requires governments to limit unintentional releases of PCBs, hexachlorobenzene, dioxins, and furans.

C33.P18 As a dynamic instrument, the Stockholm Convention contains a process by which the parties can regulate new substances as the need arises. That mechanism expressly states that decisions to list new chemicals should be taken on the basis of a precautionary approach.[6] Many of the original Dirty Dozen chemicals were already banned in major industrialized states under domestic law, which explains widespread support for the treaty. Since 2001, however, listing additional substances under the treaty has been more controversial. Nonetheless, since ~~its~~ ent~~ry~~ into force, the parties have added sixteen substances to the list of chemicals governed by the Convention.

C33.P19 The Global Environment Facility (GEF) serves as the funding mechanism for the Stockholm Convention, as well as other major multilateral environmental agreements including the Minamata Convention (Section VIII). The GEF has financed national implementation plans for the management of POPs, and a majority of the parties have implemented legal and administrative efforts to control the original Dirty Dozen

[6] See Chapter 18, 'Precaution', in this volume.

chemicals.[7] As a result, the concentration of the twelve original POPs has decreased or remained low in both air samples and in human tissues.[8] However, the growing number of POPs governed by the Stockholm Convention places additional pressures on governments because it is difficult to monitor chemical concentrations in the environment comprehensively. Environmental monitoring is often not comparable across states, inhibiting evaluation of the Convention's effectiveness.

C33.S7

B. Multilaterally-Agreed Standards for Pesticides and Other Toxics

C33.P20 The international community has also implemented standards for the production and use of chemicals through non-binding mechanisms. The best known voluntary instrument is the FAO Code of Conduct on the Distribution and Use of Pesticides, first adopted in 1985. The Code of Conduct was revised in 2013 to include provisions on vector control and pesticides intended to protect public health, while the original Code focused only on agricultural pesticides. The FAO Code of Conduct has become the internationally accepted standard for labelling, packaging, storing, using, and disposing of pesticides.

C33.P21 The OECD has established a broader set of non-binding guidelines, the Guidelines for Multinational Enterprises, which include standards for pesticides and also apply to a larger set of business activities that might cause environmental damage. The Guidelines, for example, include measures to reduce toxic chemical releases and risks from operations involving hazardous substances.[9] Consistent with the non-binding format, the FAO Code of Conduct and the OECD Guidelines are addressed not only to municipal governments but also to local officials, industry, workers, consumers, non-governmental organizations (NGOs), and the general public.

C33.S8

IV. REGULATION OF POLLUTANT RELEASES

C33.P22 Regulating the conditions under which pesticides and other toxic substances should be used is an effective strategy to reduce risks, but mainly addresses risks to workers and immediate users of chemicals. Many of the risks from toxic substances fall, however, on a wider population who may be exposed when the substances are released into the environment. Policies are needed to protect the public and the environment from harmful

[7] See 'Effectiveness Evaluation of the Stockholm Convention on Persistent Organic Pollutants Pursuant to Article 16' (10 November 2016) UN Doc UNEP/POPS/COP.8/22/Add.1, para 36.

[8] See 'Second Global Monitoring Report' (23 January 2017) UN Doc UNEP/POPS/COP.8/INF/38 21, 26.

[9] OECD, *Guidelines for Multinational Enterprises* (2000).

levels of pollutants released as by-products of industrial activities or electricity generation. Water and air pollution are the best known examples of these chemical releases.

C33.S9

A. Examples from Domestic and Supranational Law

C33.P23

There are several policies for regulating such releases that are evident in domestic law and the law of the EU. One approach is to establish a numerical limit on emissions from particular facilities. The quantitative limit usually reflects the emissions that facilities can achieve by application of 'best' pollution control technology or 'maximum' available control. This approach ensures that each facility is achieving the maximum possible reduction in pollution releases. One drawback to this approach is that it may be difficult to correlate the regulatory standard to real-world exposures. If there are enough sources, then even stringent emissions limitations on each source may still result in unacceptable ambient concentrations of a toxic pollutant.

C33.P24

Another approach is to establish limitations on environmental exposures directly. This strategy is typically articulated as an upper limit on ambient concentrations of a toxic substance. While this approach seeks directly to limit exposures, it faces many conceptual and practical difficulties. A regulatory authority must establish an 'acceptable' concentration or level of exposure, which may be politically controversial or scientifically difficult. Ultimately, the ambient exposure limitation must be implemented by reductions in emissions from sources, a process that requires complicated extrapolations or modelling to correlate source emissions with environmental concentrations. Regulators must implement extensive monitoring, moreover, to assure that the regulatory targets are actually achieved.

C33.S10

B. ECE Protocols on Toxic Air Pollution

C33.P25

The regional Convention on Long-Range Transboundary Air Pollution (LRTAP) was concluded in 1979 under the auspices of the UN Economic Commission for Europe (ECE), whose membership includes European states, all the states of the former Soviet Union including Central Asia, Canada, and the United States. The LRTAP regime is a 'framework' convention that anticipates the subsequent adoption of ancillary agreements or 'protocols'.[10]

C33.P26

LRTAP Convention parties have adopted several protocols governing specific air toxics. A protocol on POPs, adopted in 1998, addresses POPs in regional air pollution in a manner that is complementary to the globally-applicable Stockholm Convention. The protocol, which governs sixteen POPs, eliminates the production and use of some

[10] See Chapter 28, 'Transboundary Air Pollution', in this volume.

substances, restricts the uses of others, establishes emissions limitations, and specifies waste management practices.

C33.P27 The Protocol on Heavy Metals, also adopted in 1998, governs an additional category of hazardous air pollutants and addresses three toxics specifically: cadmium, lead, and mercury. This instrument relies primarily on an emissions reduction strategy for achieving its policy goals. The Agreement requires parties to reduce emissions of those three heavy metals by reference to a base year, an international regulatory technique frequently encountered in the regulation of toxics. The instrument also specifies numerical technology-based emissions limitations and target dates for new and existing stationary sources in eleven enumerated categories. The Agreement likewise sets out technology- and process- based emissions limitations for major industrial categories, including iron and steel, non-ferrous metals, power generation, road transport, and waste incineration.

C33.S11

V. HAZARDOUS PROCESSES AND INDUSTRIAL ACCIDENTS

C33.P28 Another regulatory strategy for controlling risks from toxic chemicals is to establish safety standards and design requirements for industrial facilities. Several major industrial accidents in the latter part of the twentieth century highlighted the need for this approach. In 1976, a factory in the Italian town of Seveso released a cloud of dioxin, requiring the evacuation of more than 600 people and the treatment of several times that many for dioxin poisoning. In 1984, a pesticide plant in Bhopal, India operated by a subsidiary of Union Carbide, a United States-based corporation, released methyl isocyanate, killing ~~2~~,000 people. In 1986, water used to combat a fire at the Sandoz Chemical Company plant near Basel, Switzerland resulted in the release of mercury compounds, pesticides, and other agricultural chemicals into the Rhine River. These chemicals spread downstream to Germany, France, and the Netherlands, causing a massive fish die-off.

C33.P29 To reduce the risk of such industrial accidents, regulators have established design requirements for manufacturing facilities and standards for specific manufacturing processes and for chemical storage. They have also encouraged shifts to less toxic materials in manufacturing processes.

C33.P30 The EU's Seveso Directive, the first and most influential instrument in the field, was adopted in 1982 and was most recently amended in 2012 (Seveso III).[11] The Seveso III Directive addresses both the storage of hazardous substances in industrial installations and hazardous processes themselves. Under the directive, operators of industrial

[11] Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC Text with EEA relevance, O~~j~~ 2012 L 197/1.

establishments must notify the competent national authority and establish a major accident prevention policy. In addition, operators of the most dangerous installations must file a safety report, a safety management system, and an emergency plan.

C33.S12

A. ECE Convention on the Transboundary Effects of Industrial Accidents

C33.P31 The Convention on the Transboundary Effects of Industrial Accidents, negotiated and adopted in 1992 under the auspices of the ECE, is a multilateral effort similar to the Seveso Directives, but addressed more generally to Europe, Central Asia, and North America. Like the Seveso Directives, the Convention aims to reduce the likelihood of industrial accidents and mitigate the effects of those that do occur. The Convention promotes international cooperation among the parties before, during, and after an industrial accident.

C33.P32 The Convention obliges parties first to identify hazardous operations within their borders that could have transboundary effects in the event of an accident. After identification, parties must inform the other parties that could be affected and consult with them. The Convention directs that new installations be sited in areas where the risks are minimized and requires parties to analyze potential transboundary effects of industrial facilities. Parties must ensure that operators of facilities prepare on-site and off-site contingency plans for accidents. In situations in which several parties to the Convention might be affected by a hazardous operation, it specifies that they work together. The Convention additionally articulates standards for public disclosure and administrative and judicial remedies in the event of an accident.

C33.P33 If an industrial accident occurs, it requires that parties provide early notice to any affected parties. The parties have established the UN/ECE Industrial Accident Notification System for this purpose. Additionally, parties must take action to minimize transboundary effects after an accident. Each party to the Convention must designate a competent authority as a focal point for communication and action with respect to the Convention's obligations.[12]

C33.S13

B. Multilaterally-Agreed Good Practice Standards for Industrial Accidents

C33.P34 As in other areas of international chemicals law, industrial accidents have been addressed through non-binding measures. For example, the OECD Working Group on

[12] ILO Convention No 174 on the Prevention of Major Industrial Accidents adopts an analogous approach at the global level.

Chemical Accidents has adopted Guiding Principles for Chemical Accident Prevention, Preparedness, and Response.[13] The Principles address planning, construction, management, operation, and review of the safety performance of industrial installations employing hazardous processes. The Principles also apply to industrial accident response, clean-up, and investigation.

C33.P35 The OECD Guidelines for Multinational Enterprises specify that private entities addressed by the instrument should maintain contingency plans to prevent and control accidents and emergencies, report accidents immediately to public authorities, and educate workers in the proper handling of hazardous materials so as to avoid accidents. A companion guidance document on Safety Performance Indicators is intended to help governments and industry reduce the risk of industrial accidents as well as their effects.[14]

C33.S14

VI. INTERNATIONAL TRADE IN HAZARDOUS SUBSTANCES, PRODUCTS, AND WASTE

C33.P36 It is often difficult for governments to take action to abate toxic risks that emanate from abroad. Therefore, the point at which something—a bulk shipment of a chemical, a finished product, or hazardous waste—crosses a national border assumes great importance as a regulatory juncture to reduce toxic risks. For this reason, many international instruments regulate the transboundary trade in hazardous substances and hazardous waste.

C33.P37 Such regulatory interventions raise significant North-South equity issues.[15] After banning or severely restricting toxic substances to protect health and the environment within their territories, industrialized states have in some cases continued to allow those same substances to be exported. In response, developing states have objected to a 'double standard' in which private enterprises in the industrialized world may profit at the expense of poorer states. Developing countries may not have the technical capacity, resources, or governmental infrastructure to control the entry of these substances into their territory or to regulate their domestic use. They sometimes charge that they are the 'dumping ground' for the toxic detritus of the North. When developed and developing states come together to negotiate treaties regarding trade in toxic substances, the negotiations often involve tense arguments about equity and morality.

[13] OECD, *Guiding Principles for Chemical Accident Prevention, Preparedness, and Response* (2003).
[14] OECD, *Guidance on Safety Performance Indicators* (OECD 2008).
[15] See Chapter 11, 'Global South Approaches', in this volume.

C33.S15 ## A. Basel and Bamako Conventions

C33.P38 The 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal was the first potentially universal, binding instrument addressing international trade in wastes. It has since matured into the principal multilateral instrument governing international trade and standards for disposal of both hazardous wastes and municipal trash, including an amendment specifically addressing plastics adopted in May 2019.

C33.P39 Among parties to the Agreement, the core regulatory approach of the Basel Convention is the establishment of a 'prior informed consent' (PIC) regime. Any party to the Convention may choose to ban the importation of hazardous or other wastes. If a party allows imports, then the government of the state of export must assure prior notification of the governments of the receiving state and any transit states in advance of a waste shipment. The shipment may not commence until the government of the proposed state of import has given its consent in writing. Based on the written consent of relevant states of import, states of export may allow exporters to use a 'general' notification procedure for up to one year for multiple shipments of the same types of wastes.

C33.P40 With respect to states not party to that instrument, the Convention establishes a limited ban. Specifically, the Convention prohibits exports from parties to non-parties and limits transboundary movements of wastes, both imports and exports, only to those states that are parties to the Convention. However, if a party has entered into a bilateral agreement on waste shipments with a non-party pursuant to Article 11 of the Convention, and the provisions of that bilateral agreement are 'not less environmentally sound' than the requirements of the Convention itself, then the trade can take place.

C33.P41 The third Conference of the Parties to the Convention, held in Geneva in September 1995, adopted an amendment to the Agreement, the so-called 'Basel Ban Amendment',[16] that ~~could impose a wider ban on waste shipments once it enters into force. Specifically,~~ the amendment bans *all* shipments of hazardous waste from wealthy countries, mostly OECD members listed in a new Annex VII of the Convention, to states not on that list. In the case of shipments of waste intended for recycling or recovery, the amendment imposes a phase-out of such shipments from states listed in Annex VII to destinations outside that group.

C33.P42 Critics of the Basel Ban Amendment argue that it is paternalistic and environmentally counterproductive because it may limit recycling and the development of developing economies' capacities to manage hazardous wastes. There is also concern the Ban Amendment could limit the ability of developing economies to choose for themselves what types of waste they want to import. ~~At the time of writing, the Basel Ban Amendment has been ratified or accepted by ninety-five states, an insufficient number to enter into force.~~

[16] Basel Convention, Decision III/1, 'Amendment to the Convention' (22 September 1995) UN Doc UNEP/CHW.3/35 ~~(not in force)~~.

C33.P43 Even before the Basel Convention was adopted, many negotiating states charged that it was not sufficiently rigorous and served to perpetuate the global waste trade. African states expressed concern over the Basel Convention's failure to impose a ban on transboundary movements of hazardous and other wastes, and no sub-Saharan African country signed the Convention at the time of its adoption. Under the auspices of the Organization of African Unity, now the African Union, those states in 1991 adopted a stronger regional agreement, the Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa. The Bamako Convention imposes a total ban on imports of hazardous waste into Africa and creates a PIC procedure for trade in such wastes within Africa.

C33.S16 B. Rotterdam Convention

C33.P44 The 1998 Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade establishes a legally binding PIC regime for international shipments of hazardous chemicals and pesticides. The Rotterdam Convention applies to goods in the form of useful chemicals in international commerce, in contrast with the Basel Convention, which applies to presumptively harmful wastes or 'bads'. As with the Basel Convention, the principal motivation for the Agreement was to assist developing economies that might have limited regulatory capacity or difficulty controlling imports to implement their own domestic environmental and public health policies.

C33.P45 The Rotterdam Convention applies to pesticides and industrial chemicals that parties have domestically banned or severely restricted for health or environmental reasons. The parties have also added additional chemicals for inclusion in the PIC procedure. The Convention requires that any import ban be universal and non-discriminatory. That is, a party cannot refuse to import a chemical from another party while continuing to permit domestic production, or allow imports from other parties or from non-parties.

C33.P46 With respect to the covered substances, the Convention requires the formal, written consent of the government of the state of import before export may take place. In response to a notification from the Convention secretariat, a state of import that is a party to the Convention may decide to allow importation of the chemical, to prohibit importation, or to allow importation subject to specified conditions. Alternatively, the Convention provides that states of import may provide an interim response.

C33.P47 Like the Stockholm POPs Convention, the Rotterdam Convention contains a mechanism for subsequent additions to the list of covered substances. At the time it was adopted, the Rotterdam Convention's requirements applied to twenty-two pesticides and five industrial chemicals, now increased to thirty-five pesticides and sixteen industrial chemicals. The Convention also contains provisions for exchange of information concerning potentially hazardous chemicals, and establishes channels for providing technical assistance to developing economies to manage toxic chemicals and pesticides.

C33.S17

VII. DISPOSAL OF TOXIC WASTE

C33.P48 The lifecycle of a hazardous substance may result in release to the environment, typically to air or water, at which juncture regulatory requirements such as emissions limitations may apply. Alternatively, a particular toxic substance may ultimately find its way into industrial waste as a component of the detritus remaining at the conclusion of a manufacturing process. Similarly, household or consumer products consisting of or containing hazardous materials may enter the waste stream. As with releases of toxics to the environment, the treatment, storage, and disposal of hazardous waste presents risks to public health and the environment that have been addressed by regulatory policies.

C33.S18

A. Basel Convention Disposal Requirements

C33.P49 The Basel Convention requires that parties manage and dispose of hazardous wastes and other wastes under the rubric of Environmentally Sound Management (ESM). In order to ensure that the wastes are disposed of under ESM principles, the parties must take all practical steps to ensure that hazardous wastes or other wastes are managed in a manner which will protect human health and the environment. The states of export and import must understand the hazards of the particular wastes they are dealing with and communicate that information among private parties and public authorities involved in management or disposal of the chemical waste. For specific chemicals, such as POPs and mercury, ESM standards are detailed in technical guidelines issued under the Basel Convention.[17]

C33.P50 Notably, the Basel Convention states that the ~~exporting~~ state has the ultimate responsibility to ensure that the disposal is performed consistent with ESM criteria. That is, the consent of the ~~importing~~ state to import the waste, standing alone, is insufficient to satisfy the treaty, and the ~~exporting~~ state bears responsibility for ensuring ESM disposal within the ~~importing~~ state. Undercover research by the Basel Action Network and other NGOs has shown, however, that a large portion of international hazardous waste shipments are not disposed of pursuant to ESM standards and that national import bans are widely flouted.

[17] See Basel Convention, Latest Technical Guidelines <http://www.basel.int/Implementation/Publications/LatestTechnicalGuidelines/tabid/5875/Default.aspx#> accessed 2 January 2020 (listing technical guidelines for specific chemicals).

C33.S19 ## B. IAEA Agreements and Standards

C33.P51 Nuclear safety, along with technology transfer and verification, is one of the three pillars of the International Atomic Energy Agency (IAEA). After the Chernobyl accident, four binding multilateral agreements in the area of nuclear safety were adopted under IAEA auspices. One of those agreements, the 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, is the first binding international agreement to address management and storage of radioactive waste and spent fuel.

C33.P52 The Joint Convention requires parties to establish and maintain a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management through a system of facility licensing. The Agreement sets out standards for siting, design, construction, operation, closure, and safety assessment of spent fuel management and radioactive waste management facilities. Both existing and proposed facilities are covered by the Joint Convention, which also articulates general requirements for safe operation. Additionally, the Joint Convention sets out a regime of notification and consent for transboundary movements of radioactive waste based on the 1990 IAEA Code of Practice on the International Transboundary Movement of Radioactive Waste.

C33.P53 Other IAEA agreements are designed to further the goal of nuclear safety. The 1986 Convention on Early Notification of a Nuclear Accident and the 1986 Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency are intended to facilitate international preparedness for and responses to nuclear and radiological emergencies. The 1994 Convention on Nuclear Safety obliges parties to operate nuclear power plants consistent with high standards of safety. It requires each party to develop and enforce safety standards, but it does not actually prescribe the standards. Consequently, there is no internationally binding instrument that sets minimum safety standards for nuclear reactors.

C33.P54 The IAEA has also adopted hundreds of safety standards, which are not binding on IAEA member countries, intended in part to serve as models of good practice for states in crafting their own legislation and regulations. These safety standards are further categorized as fundamental principles, mandatory requirements, and recommended guidance. Published IAEA standards in the area of radioactive waste management include those addressing classification of radioactive waste, predisposal management of radioactive waste, and management of radioactive waste from medicine, industry, research, agriculture, and education.[18]

[18] <https://www.iaea.org/resources/safety-standards> accessed 2 January 2020.

C33.S20

VIII. INTEGRATED APPROACHES TO POLLUTION PREVENTION

C33.P55 In recent years, governments have increasingly focused on pollution prevention and toxics use reduction because of the difficulty of managing hazardous substances and products once they have been produced. This approach necessarily targets the entire product lifecycle, from making better design choices to using different materials, improving recyclability, and minimizing waste. The US state of Massachusetts was a leader in promoting the reduction of toxics use. The 1989 Toxics Use Reduction Act[19] encourages reductions in use of approximately 1,400 chemicals by setting out specific, numerical reduction targets by comparison with a reference baseline. The EU's 2010 Industrial Emissions directive adopted a similar approach for certain volatile organic compounds. It allows member states to require that facilities adopt toxics use reduction plans as an alternative to end-of-pipe emissions limitations.[20]

C33.S21

A. Minamata Convention

C33.P56 The 2013 Minamata Convention on Mercury, the most recent global treaty addressing toxic chemicals, relies heavily on an integrated approach to reduce pollution. Unlike many of the other multilateral instruments analyzed in this chapter, the Minamata Convention addresses toxic substances containing only one element, but in a holistic manner specifically crafted to address those specific risks. The Convention is named after the town of Minamata, Japan, where industrial wastewater containing mercury poisoned thousands of people in 1956.

C33.P57 Mercury is a highly toxic heavy metal associated with severe risks to the environment and human health by damaging the central nervous system, thyroid, kidneys, lungs, immune system, eyes, gums, and skin. There is no safe level of mercury exposure. Mercury is globally transported through air and water, and in its organic form of methylmercury, it accumulates in the food chain. It can damage human health and the environment in areas of the world, such as the Arctic, that are far from emissions sources. Consequently, it is difficult for one state independently to control the transboundary effects of mercury.

C33.P58 The Minamata Convention takes an integrated approach to controlling mercury from various sources, rejecting an alternative approach in which each party must achieve a certain numeric reduction in mercury emissions. The integrated approach requires parties to implement policies and measures to control mercury throughout its lifecycle,

[19] Toxic Use Reduction Act of 1989, Mass Gen L ch 21I, ss 1–23.

[20] Directive 2010/75/EU of 24 November 2010 on industrial emissions (integrated pollution prevention and control) Text with EEA relevance, OJ 2010 L 334/17, art 59.

including reductions across various products, processes, and industries where mercury is used, released, or emitted. For example, the Convention prohibits any new mercury mines and requires existing mines to be phased out within fifteen years. It also requires the progressive elimination of products that use mercury, such as measuring devices and batteries.

C33.P59 The Convention targets certain mercury-intensive industries. It requires a phase-out of mercury use in chlor-alkali production, the elimination of mercury in artisanal and small scale gold mining, and a significant reduction in mercury in PVC (polyvinyl chloride) and polyurethane manufacturing. For dental amalgam, which enters the environment through flushing down drains or cremation of human remains, the Convention requires parties to reduce emissions by selecting at least two measures from a list of nine options.

C33.P60 The largest source of mercury emissions is the combustion of coal, and reducing emissions from that source proved to be controversial. Parties must require that new sources of mercury emissions to the air, such as coal-fired power plants, install pollution controls within five years. For existing sources of emissions, however, parties are given ten years within which they must require pollution controls. These existing sources include coal-fired power plants as well as industrial boilers, certain smelters, cement plants, and waste incinerators.

C33.P61 The Minamata Convention is widely considered to be a landmark achievement in international environmental law because it addresses all the principal sources of a single toxic substance in the environment, and more than 100 states are now parties. Because it takes decades for mercury to cycle through the environment, however, ambient concentrations of mercury are not expected to decrease significantly until the latter half of this century.

C33.S22 B. OECD Recommendation on Pollution Prevention

C33.P62 The OECD in 1990 adopted a non-binding recommendation on Integrated Pollution Prevention and Control.[21] The recommendation contains an Appendix entitled 'Guidance on Integrated Pollution Prevention and Control' which identifies basic principles, including consideration of the entire life cycle of substances and products; anticipation of environmental effects in a variety of environmental media, including consideration of multiple pathways to exposure and movement through the environment; and minimization of waste. The recommendation also identifies the desirability of zero- or low--waste technology, recycling, and alternative manufacturing strategies designed to reduce the use of toxic substances. The form of this instrument, a non-binding recommendation adopted by wealthier industrialized countries, is perhaps

[21] 'Recommendation of the Council on Integrated Pollution Prevention and Control' OECD Doc C(90)164.

indicative of the emerging nature of pollution prevention as a regulatory strategy on the international level.

C33.S23

IX. OTHER RELATED POLICIES

C33.P63 There are several other legal approaches in international environmental law that are relevant to controlling toxic substances. Most of these are procedural in nature and apply to toxic chemical risks as well as to other public health and environmental hazards.

C33.S24

A. Right to Know

C33.P64 One public policy approach to reducing risks from hazardous substances and activities is to inform the public of the release of potentially toxic substances, the presence of potentially dangerous activities, or the nature or magnitude of associated risks. Public information approaches can complement other substantive regulatory approaches, such as those related to industrial accidents. Provision of information can also comprise a complete public policy in itself. Governments can design policies to allow consumers, workers, and members of the public to make informed choices about the products they purchase and risks in their communities, and information disclosure can often prompt industry to voluntarily reduce risks.

C33.P65 ~~The Aarhus Convention parties have adopted a Protocol on Pollutant Release and Transfer Registers to the 1998 Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters.~~ The Kyiv Protocol requires that parties establish registers to track industrial toxic emissions into air and water as well as off-site transfers of waste. The national registers must be searchable by location and facility and must be publicly accessible. The protocol also mandates that parties require facility operators to submit information, at least annually, on the names and amounts of chemicals released or transferred off-site.

C33.S25

B. Environmental Impact Assessment

C33.P66 Environmental impact assessment (EIA) is a component of a planning process through which environmental considerations are integrated into governmental decision-making. A process-oriented technique distinct from substantive environmental standards and requirements, EIA facilitates informed decision-making through thorough scrutiny of anticipated environmental effects. Decision-makers can use this information to assess whether projects should go forward and whether they can be modified to mitigate adverse environmental effects.

C33.P67 While not confined to the field of toxics, EIA is useful for identifying and analyzing potential adverse effects from hazardous substances and activities. For example, an EIA could project the potential effects of toxic emissions from a new facility on the environment and public health. It might characterize populations that would be exposed to emissions, identify mechanisms to lower exposures, and model expected impacts. Several international instruments encourage or mandate the application of the EIA methodology at the municipal level. Examples include the 1991 ECE Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) and the IAEA Joint Convention. The 2003 Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context provides for strategic environmental impact assessment (SEA), expanding the methodology from the discrete project level to programmatic and policy initiatives.

C33.S26

X. CONCLUSION

C33.P68 Presently there is no single, overarching international framework for addressing environmental and public health risks from hazardous substances and activities. Public policy has been implemented at the national, supranational, regional, and global levels, sometimes simultaneously, with considerable interaction among various settings. Like-minded countries, such as members of the OECD, may coordinate policies among themselves, or a universal strategy such as that found in the Stockholm POPs Convention may be adopted. International instruments, as in the case of the Basel and Rotterdam Conventions, may be consciously targeted to address equity and informed consent issues.

C33.P69 From the perspective of international policy, this multiplicity of efforts and approaches is beneficial. Governments face many difficulties in effectively reducing risks from hazardous substances at the domestic and supranational levels, and the impediments are even more imposing at the international level. The wider the array of options, the greater the potential for creatively meeting new challenges. Given the scope of the problem, humankind can hardly afford to ignore any realistic options to reduce health and environmental risks from toxic chemicals and hazardous processes.

C33.S27

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