Research Articles

Global Environmental Law and Treaty-Making on Hazardous Substances: The Minamata Convention and Mercury Abatement

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In global environmental cooperation, legally binding agreements have come under increased scrutiny. Critics are discouraged by a lack of progress, as many ecological trends remain negative despite the proliferation of treaties designed to reverse them.[1] A number of high-profile examples provide evidence of this. The slow evolution of international agreements on climate change mitigation and adaptation is much debated, as many scholars and activists have started to examine alternative ways to move forward.[2] The international community also failed to meet the target of significantly reducing rates of biodiversity loss by 2010 that was adopted by the parties to the Convention on Biological Diversity and included in the Millennium Development Goals.[3] However, progress in institution building varies considerably across issue areas. Importantly, several treaties on hazardous substances and wastes central to safeguarding human health and the environment have been negotiated since the 1970s.[4]

The international environmental politics literature has long analyzed the creation of treaty regimes. Starting in the 1990s, as early environmental treaties matured, analytical focus shifted from negotiations to implementation and treaty effectiveness.[5] There is nevertheless a need to examine treaty making, as states negotiate new agreements. The Minamata Convention on Mercury—a major addition to the institutionally fragmented treaty landscape on hazardous

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1. UNEP 2012a.
2. Eckersley 2012; Victor 2011.
3. Morgera and Tsioumani 2011.
4. Selin 2010.
5. Andresen 2013.

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substances—was adopted in October 2013. This first global agreement focusing on the life cycle of a heavy metal is a significant milestone in addressing environmental and human health risks from toxic compounds. It is also an interesting case for analyzing contemporary treaty-making in institutionally complex issue areas. As many environmental issue areas grow more institutionally dense, there is a need for more analyses of how institutional linkages influence actors' interests and collective problem solving.[6]

The Minamata Convention sets out to "protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds" (Article 1). Toward this goal, it covers a large set of political and technical issues related to the production, use, trade, emissions, and releases of mercury. Mercury is naturally present in the Earth's crust and is released through natural processes such as volcanic eruptions and the weathering of rocks. However, for the past few centuries humans have also released large amounts of mercury. It is estimated that anthropogenic activities have resulted in 350,000 tons of mercury being emitted into the atmosphere over the past 4,000 years.[7] Once mercury is out of the ground, it can take more than 2,000 years to return to permanent storage in deep ocean sediments.[8] Centuries ago, people believed mercury was a safe and beneficial substance, but its toxicity is now well established.

This article addresses three questions. First, how did linkages to earlier agreements shape the Minamata Convention negotiations? Second, what were the main legal and political issues during the negotiations? Third, what are the major issues moving forward with treaty implementation and mercury abatement? The analysis is informed by participant observations during the negotiations, interviews with delegates, reviews of documents by UN agencies and governments, and meeting reports. The article begins by discussing international law and treaty-making related to mercury, including linkages between the Minamata Convention negotiations and other agreements. The next section outlines the mercury issue and the political process leading to the start of treaty negotiations. This is followed by an examination of five sets of issues critical during negotiations, including how institutional linkages shaped decisions. The article ends with a discussion about the future of mercury abatement and suggestions for future research.

International Law and Treaty-Making in the Era of Mercury

International environmental law has been criticized for being ineffective. Bodansky, however, argues that it is neither a panacea nor a sham, but a "thirty-percent solution."[9] The negotiation and implementation of environmental agreements is a process that encourages and enables, but does not require,

6. Alter and Meunier 2009; Selin 2010.
7. Streets et al. 2011.
8. Selin 2009.
9. Bodansky 2010, 15.

cooperation. Treaties can play a constructive role in establishing common rules and standards, but they cannot be the sole problem solving mechanism. Further, a singular focus on treaty compliance cannot adequately address how treaties affect state and nonstate actor behavior.[10] Legal effectiveness defined narrowly in terms of direct compliance should be supplemented by broader notions of problem-solving effectiveness (the extent to which an environmental problem is mitigated) and behavioral effectiveness (the degree to which states and individuals are moved to change relevant practices).[11] In addition, the goals and provisions of environmental agreements may shape international norms and decisions by a wide range of actors extending well beyond the confines of the treaty process.

Recent years saw several important developments in multilateral treaty-making and international environmental law.[12] Since the 1980s, the international community has established several legally freestanding but politically and practically related agreements on hazardous substances. The Minamata Convention continues this strategy of developing legally separate treaties covering different but partially overlapping issues.[13] Many governance and actor linkages with earlier treaties influenced negotiation of the Minamata Convention, and such linkages will remain important during treaty implementation. Governance linkages include legal, policy, and management connections with other agreements on, for example, waste management, capacity building, and technology transfer. Actor linkages are facilitated by the fact that many of the same states, as well as IGO and NGO representatives, engage within multiple treaty processes.[14]

In certain instances, institutional linkages and previous adoption of principles and mandates under other treaties facilitated the mercury negotiations. Legal experts involved with negotiating earlier conventions on hazardous chemicals drew from those texts to draft treaty language, and existing agreements on combining phase-outs with restrictions on chemical use facilitated adoption of a similar approach to mercury-containing products and processes. Likewise, a review led by the United Nations Environment Programme (UNEP) of lessons learned regarding reporting obligations and the preparation of national action plans from other multilateral agreements helped negotiators finalize similar provisions in the Minamata Convention.[15] Negotiators also sought to improve upon the language of previous agreements. For example, countries unhappy with the vague definition of best available techniques (BATs) in the Stockholm Convention on Persistent Organic Pollutants (POPs) developed a more focused definition of BATs for the Minamata Convention.

10. Bernstein and Cashore 2012; Hafner-Burton Victor and Lupa 2012.
11. Bodansky 2010; Young 1999.
12. Chasek and Wagner 2012.
13. Selin 2010.
14. Selin and VanDeveer 2003.
15. UNEP 2012b.

However, not all institutional linkages made the mercury negotiations easier to conclude. Politically contentious discussions underway simultaneously under multiple treaties were sometimes *de facto* linked, as parties recognized that a concession under one treaty may shape debates and outcomes elsewhere. In such cases, long-standing political disagreements carried over from other fora. This raised the political costs of compromising during the mercury negotiations, as doing so might have important ramifications for state interests under other treaties. For example, developing country frustration about a lack of mandatory funding mechanisms under many other agreements on hazardous substances carried over into the mercury area. Industrialized countries that rejected such demands in the past were reluctant to change their positions. Similarly, contentious discussions on implementation review, monitoring, and compliance were influenced by parallel debates and outcomes in other fora.

In addition, the proliferation of stand-alone treaties raises concerns about policy fragmentation.[16] Contradictory mandates across treaties may reduce the clarity of legal obligations. Regulatory ambiguity can further weaken parties' sense of responsibility and commitment to conscientious implementation.[17] However, institutional fragmentation can also provide flexibility over time. In institutionally dense issue areas, parties may have more opportunities to adapt governance to changing physical and political conditions than in smaller and more rigid regimes.[18] Furthermore, just as the initial setting of a regulatory or technical standard may be highly political, the harmonization of standards across multiple fora can lead to significant disagreements between parties seeking different outcomes. States (and other stakeholders) may, for example, want to harmonize emission controls, technical guidelines, and national reporting requirements under multiple treaties in different ways.

Mercury and the Development of the Minamata Convention

Humans have mined cinnabar for mercury for millennia, and some of the first known uses of mercury go back more than 3,500 years.[19] Early applications included mercury mixed with traditional medicines, and applied in mining processes to separate gold from ore. With the industrial revolution, demand for mercury increased for use in a multitude of manufacturing processes and consumer products, including fishing lures, thermometers, batteries, switches, and light bulbs. During mining, manufacturing, and the disposal of goods, large amounts of mercury are discharged into the environment. Furthermore, coal burning emits considerable amounts of mercury into the atmosphere. In its elemental form, mercury can travel long distances through the atmosphere after its

16. Kanie 2007; Zürn and Faude 2013.
17. Alter and Meunier 2009.
18. Keohane and Victor 2011.
19. Nriagu 1979.

release, before oxidizing and being deposited in ecosystems. In aquatic systems, mercury from both distant and local sources can convert by biological activity into methylmercury, a potent and well-recognized neurotoxin.[20]

A 2013 UNEP mercury assessment estimated that anthropogenic atmospheric emissions of mercury reached 1,960 tonnes in 2010, with at least another 1,000 tonnes released into water.[21] The four largest sources of atmospheric emissions were artisanal and small-scale gold mining (ASGM) (37 percent), coal burning (24 percent), primary production of non-ferrous metals (10 percent), and cement production (9 percent). An important difference between this UNEP assessment and earlier estimates is that ASGM emission levels ranked ahead of those from coal burning. This can in part be explained by an increase in ASGM due to rising gold prices, but it also reflects large uncertainties in emissions data. Geographically, Asia (mainly China and India) was by far the main mercury-emitting region, with 47.6 percent of global emissions, followed by Africa (16.8 percent) and South America (12.5 percent). North America and the European Union (EU), historically large mercury emitters, are now only minor contributors, with 3.1 percent and 4.5 percent of global atmospheric emissions, respectively.

High-dose mercury exposure drew scientific and political attention in Minamata, Japan, in the 1950s, when a chemical company released waste mercury into local waters. Many people died, and others suffered serious neurological damage from eating contaminated seafood. Recognizing the symbolism of Minamata, the mercury convention is named for the city (where it was also formally adopted). Nevertheless, many people who handle mercury, especially in developing countries, remain unaware of the risks.[22] In addition to damage from high-level exposure, developmental delays and neurological damage associated with low-dose mercury exposure, affecting brain and muscle capacity, especially in children, are well established.[23] People who are not in direct contact with mercury are exposed to methylmercury primarily through fish consumption.[24] Authorities in some countries have issued dietary recommendations, especially for pregnant women and small children, trying to balance warnings with acknowledged health benefits of fish consumption.[25]

The Minamata Convention addresses both long-range and local aspects of the mercury problem. It is the result of a series of political and scientific events dating back to the early 2000s. Based on a US proposal, the UNEP Governing Council launched a global mercury assessment in 2001, which concluded one year later that there "was sufficient evidence of significant global adverse im-

20. Selin 2009.
21. UNEP 2013a.
22. Sippl and Selin 2012.
23. Arctic Monitoring and Assessment Programme 2011.
24. Selin 2009.
25. Mahaffey et al. 2011.

pacts to warrant international action to reduce the risks to human health and/or the environment."[26] Citing this conclusion, the EU, Norway, and Switzerland called for a legally binding agreement.[27] This was based on concerns about long-range atmospheric transport of mercury and a wish to see others follow their lead in reducing mercury use and emissions, including measures agreed to under the 1998 Heavy Metals Protocol to the Convention on Long-Range Transboundary Air Pollution (CLRTAP).[28] In doing so, they hoped to replicate the earlier policy trajectory on POPs, when Arctic assessments and regional regulations—including the 1998 CLRTAP POPs Protocol—were used as a springboard to negotiate the Stockholm Convention.[29]

However, work on other international chemicals agreements and differences in national priorities delayed the start of the mercury negotiations. Many non-European industrialized countries, including the US, Canada, Japan, Russia, and Australia, as well as most developing countries, were wary of another round of treaty negotiations on hazardous substances, because of treaty fatigue after having adopted the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade in 1998 and the Stockholm Convention in 2001. They preferred to focus on implementing the two new conventions and concluding negotiation of the Strategic Approach to International Chemicals Management (SAICM), intended to coordinate activities across major chemicals agreements and fora.[30] Many developing countries were also unsure of the extent of their domestic mercury problems. Furthermore, some industrialized and developing countries opposed internationally mandated mercury controls to protect their domestic mining, manufacturing, and energy sectors.

As a compromise, the UNEP Governing Council launched an international voluntary effort to reduce mercury pollution in 2003, and created a formal Global Mercury Partnership program in 2005. After SAICM was adopted in 2006 and mercury received increasing political attention in the wake of UNEP's global assessment, a growing number of developing countries came out in support of a mercury convention—some siding with European countries that wanted a broader heavy metals agreement also covering lead and cadmium. At the UNEP Governing Council meeting in 2007, countries agreed to establish a working group to assess options for enhanced voluntary measures, as well as the possible role of existing and new legal instruments. Two working group meetings in 2007 and 2008 identified one legally binding option and three voluntary options. By the time the UNEP Governing Council considered these options in 2009, enough of a political shift had occurred to start treaty negotiations on mercury (but not the other two metals).

26. UNEP 2002, paragraph 139.
27. Selin and Selin 2006.
28. CLRTAP covers North America, Europe, and Russia.
29. Selin 2010.
30. Earth Negotiations Bulletin 2005.

The new Obama administration's reversal of the earlier Bush administration's opposition to starting negotiations was a major political trigger, influencing first Canada and Australia and subsequently India and China to withdraw their objections.[31] The United States had passed a mercury export ban in 2008, taking effect in 2013. In addition, the US issued federal mercury regulations in 2011, setting relatively strict standards for emissions from power plants (currently subject to legal challenges). Furthermore, most of the mercury entering US ecosystems is not from domestic sources, but from long-range transport through the atmosphere, creating an added incentive to seek international controls.[32] The first meeting of the international negotiating committee (INC) for the mercury convention was held in Stockholm in June 2010. The fifth and final INC meeting was organized in Geneva in January 2013. The convention, officially adopted at a diplomatic conference in Minamata in October 2013, seems likely to become operational around 2016 (it enters into force upon the 50th ratification).

Analyzing Minamata Convention Debates and Compromises

The Minamata Convention recognizes mercury as a substance of global concern, as it highlights important health issues associated with mercury use, especially in developing countries and among women, children, and future generations. It notes, in language similar to that used by the Stockholm Convention, the particular vulnerabilities of Arctic ecosystems and indigenous communities because of contamination of traditional foods. It further recognizes the lessons of "Minamata Disease" and the need to prevent such events from occurring again. The convention covers mercury sources collectively responsible for 96 percent of the atmospheric emissions included in the 2013 UNEP assessment, but the stringency of different mandates varies considerably.[33] This section analyzes the convention negotiations, focusing on five sets of legal and political issues, rather than providing an article-by-article outline of the treaty. These five issue sets cover supply and trade, products and processes, emissions and releases, ASGM, and resources and compliance.

Supply and Trade

To reduce mercury supply, many countries and environmental advocacy groups proposed a ban on primary mercury mining, arguing that secondary sources of mercury, including recycling, were sufficient to meet demand. This proposal was in line with the trend of major mercury mine closings in past decades, but a few countries, including China and Chile, resisted a mining ban. China was the

31. Earth Negotiations Bulletin 2009; Poldervaart 2009.
32. Selin and Jacob 2008.
33. Selin 2013. Two main sources included in the UNEP assessment but not covered by the convention are primary production of ferrous metals and oil and natural gas burning.

world's largest producer of mined mercury in 2009, with 73 percent of global production (1,400 of 1,920 tonnes).[34] This was principally for domestic use in manufacturing processes and consumer goods. By the early 2010s, only one major exporting mercury mine was left in the world: the Khaidarkan mine in Kyrgyzstan, producing approximately 250 tonnes of mercury in 2009 (13 percent of global production).[35] Early in the negotiations, Kyrgyzstan agreed to close this mine in exchange for financial and technical assistance to re-structure mining activities and invest in alternative livelihood sources. These efforts will build on ongoing work by UNEP and the United Nations Institute for Training and Research (UNITAR), supported by Norway, Switzerland, and the United States.[36]

In a compromise, Article 3 prohibits mercury mining not begun before the treaty enters into force for a party while countries with existing mining may continue for up to 15 years after joining the treaty. Such mercury, however, may only be used in permitted products (Article 4) and manufacturing processes (Article 5), and should be disposed of in ways that do not lead to continued re-use. As mining decreases, secondary supply sources become relatively more important. Parties should identify individual stocks exceeding 50 tonnes as well as sources of mercury supply generating over 10 tonnes per year. Specifically, excess mercury from the decommissioning of chlor-alkali facilities, the largest secondary source of mercury, cannot be re-used. All mercury wastes should be disposed of in an environmentally sound manner. Benefiting from linkages with existing treaties, parties to the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal should follow its relevant waste definitions, while parties to the Minamata Convention that are not parties to the Basel Convention should follow the similar definition in Article 11.

Because the convention allows for continued use of mercury, there was a need to address trade. Some advocacy groups called for a mercury export ban, but countries focused instead on how to manage rather than prohibit trade (similar to the Basel and Rotterdam Conventions). To this end, some countries, including Norway and Switzerland, as well as the African Group, argued in favor of a prior informed consent (PIC) procedure, building on earlier trade policy solutions. Under the Rotterdam Convention PIC scheme, which also covers mercury compounds, an exporting party must first receive explicit permission from the importing party before the shipment can proceed. Others, including Canada, opposed a formal PIC scheme for individual mercury trades, believing it would be too administratively burdensome, preferring instead a less rigid mechanism. Further, the Philippines supported a licensing scheme and public registry for mercury traders under the treaty. In addition, countries discussed whether trade with parties and non-parties should be subject to uniform or separate requirements.

34. UNEP 2013b.
35. UNEP 2013b.
36. UNEP and UNITAR 2009.

In the end, the supporters of expanding the PIC scheme were largely successful. Article 3 prohibits mercury export from one party to another unless the importing party first provides written consent, and mercury can be exported only for permitted uses or environmentally sound storage. Export to a non-party also requires prior consent. In acquiescing to the African Group and others calling for more stringent requirements for trade with non-parties as a way to encourage ratification, importing states that are not party to the convention must demonstrate that they have measures in place to protect human health and the environment, and that they will follow convention provisions on allowed uses, storage, and disposal. Further, a party should only allow imports from an exporting non-party if that country certifies that the mercury comes from a permitted source. Based on a US proposal, however, a party submitting a general notification of consent to the secretariat can decide to not require such certification for each separate import from non-parties. This option is available until the second conference of the parties to the convention (COP-2), unless extended by the parties at that time. The secretariat is required to keep a public record of all export and import notifications.

Products and Processes

On products and processes, the EU in particular called for comprehensive controls, arguing that many mercury-free alternatives already exist. In contrast, China, India, and other developing countries stressed the need to allow specific mercury uses. On the design of controls, participants discussed pros and cons of "negative" versus "positive" lists.[37] Some, including the African Group, Norway, Switzerland, and many advocacy groups, preferred a "negative list" model where the treaty would introduce a general ban on mercury use but list specific exemptions to this ban. They argued a default ban would send a strong message about the necessity to severely limit mercury use. Other countries, including the United States and Canada, preferred the "positive list" approach used by most chemicals agreements. In this case, mercury use would be allowed except in explicitly listed products and processes. Those preferring this less restrictive strategy argued that it allowed more efficient prioritization of controls. These debates benefitted from previous discussions in other fora, and were also aided by a UNEP paper reviewing control strategies in earlier environment and trade agreements.[38]

Settling on a hybrid, the convention applies a mix of positive and negative lists for products (Article 4). With respect to the positive list, it borrows from the Stockholm Convention in combining phase-outs and restrictions to reach initial agreement among countries. Annex A, Part I of the mercury convention lists nine product categories subject to mercury phase-out for which parties shall not

37. Söderholm 2013.
38. UNEP 2010a.

allow manufacturing, import, and export after 2020.[39] However, parties may register a five-year exemption under Article 6, which the COP may extend for another five years (e.g., up to 2030). This system of allowing party-specific exemptions to placate countries that see the 2020 deadline as too soon also follows a similar strategy under the Stockholm Convention. Dental amalgam is the only product listed in Annex A, Part II (mercury-added products subject to restrictions), specifying measures that parties wanting to limit its use can take. Whereas Norway, Switzerland, and the World Alliance for Mercury-Free Dentistry called for a phase-out out of dental amalgam, the Minamata Convention reflects the positions of most countries, the World Health Organization (WHO), and World Dental Federation in merely promoting reduced use.[40]

In accordance with a negative list approach, Annex A explicitly excludes five product categories from controls, including the mercury-containing thimerosal vaccine, a high-profile issue. The WHO supported use of thimerosal in multi-dose vaccines, stating that there are no scientific data raising concern and that restricting access would have negative health effects (thimerosal is added as a preservative to vaccines to remove the need for refrigeration, hence facilitating use in remote areas). In contrast, the Coalition for Mercury Free Drugs called for a phase-out, arguing that (more expensive) mercury free vaccines should be made more readily available.[41] In this case, negotiators again followed existing WHO policy. Additionally, some countries, including China and Sri Lanka, sought and gained an exemption for mercury use in "products used in traditional or religious practices." The other exemptions are products essential for civil protection and military use; products for research, calibration of instrumentation, and use as reference standards; and for uses where no feasible mercury-free alternative is available, switches and relays, fluorescent lamps for electronic displays, and measuring devices.

Controls on industrial manufacturing processes use only a positive list approach, combining phase-outs and restrictions (Article 5). Annex B, Part I (mercury use subject to phase-out) covers two processes. It sets a 2025 deadline for mercury use in chlor-alkali production and a 2018 limit on mercury use as a catalyst in acetaldehyde production. Here too parties can apply for five-plus-five year exemptions (Article 6). Annex B, Part II (mercury use subject to restrictions) lists three manufacturing processes: vinyl chloride monomer (VCM), sodium or potassium methylate or ethylate, and polyurethane. Of these, VCM was the most controversial. While industrialized countries that have switched to us-

39. The nine product categories are batteries; switches and relays; compact fluorescent lamps; linear fluorescent lamps; high pressure mercury vapor lamps; cold cathode fluorescent lamps and external electrode fluorescent lamps; cosmetics; pesticides, biocides, and topical antiseptics; and non-electronic measuring devices including barometers, hygrometers, manometers, thermometers, and sphygmomanometers.
40. Dentistry uses approximately 340 tonnes of mercury every year, with 20–30 percent of this entering the solid waste stream (UNEP 2013a).
41. Some critics of thimerosal argue there is a connection between its use and autism in children, but there are no valid scientific data to support this claim.

ing ethylene instead of mercury called for a set phase-out date for mercury use, supported by environmental advocacy groups, several developing countries resisted this. Because China in particular, the main user of mercury in VCM production, stood firm, parties are merely obligated to reduce mercury use by 50 percent of per unit VCM production by the year 2020 compared to 2010 levels. The other two Annex B, Part II processes are also subject to individual measures aimed at reduced use.

In addition, Article 4 stipulates that parties should discourage the manufacturing and commercial distribution of new mercury-added products. Similarly, Article 5 states that a party should not allow mercury use in processes listed in Annex B in a facility that did not exist before the convention became legally binding for that party. Parties should also discourage the development of any facility that intentionally uses mercury in a manufacturing process that is not covered by Annex B. Any party may submit a proposal to amend Annexes A and B, including regulating additional products and processes. The COP is obligated to review the annexes and consider amendments no later than five years after the convention has entered into force. All amendments shall generally be adopted by consensus, but can as a "last resort" be passed by a three-fourths majority vote of parties (Article 26). Adopted amendments to annexes will be legally binding to all parties, but a party has the right to submit a notification of non-acceptance for specific changes (Articles 27 and 30). An amendment to all other parts of the convention will become legally binding for consenting parties after it has been ratified by three-fourths of those that that were parties at the time when the amendment was adopted (Article 26).

Emissions and Releases

Most atmospheric mercury emissions outside ASGM come from just a few sectors. Of these, coal-fired power plants are particularly significant. Consequently, controls on air emissions are of much political and economic importance to countries that rely heavily on coal for generating electricity and energy. Currently, China and India are the world's largest mercury emitters from stationary combustion, together being responsible for almost 50 percent.[42] The negotiations did not focus on restricting coal use per se, but on technological and other ways to reduce mercury emissions from coal-fired power plants (and other stationary sources). Beyond this national aspect of mandating controls, the transboundary transport of emissions makes setting reduction standards important for all the world's regions and countries. However, regulating existing and future stationary sources was one of the most contentious areas of negotiation. Some conflicts mirrored those under other environmental agreements, as they were carried over into the mercury area. Disagreements did not, however, reflect a

42. UNEP 2013a.

clear North-South divide, given notable differences in opinions among developing countries.

Industrialized countries, the African Group, and environmental and indigenous peoples groups called for mandatory regulations to curb long-range transport of emissions from stationary sources. In contrast, China and India argued for a voluntary approach (at least for developing countries), stating that they needed coal to meet growing electricity and energy demands as part of their development strategies. At INC-4, they also argued that there were no "commercially proven technologies" for separating mercury. This claim is dubious given that several countries apply technologies that capture over 95 percent of mercury emissions, consistent with a 2010 UNEP guidance document.[43] BAT and best environmental practices (BEP) controls are also used in the CLRTAP Heavy Metals Protocol. While China is moving towards stricter controls on mercury and other pollutants under its current five-year plan (2011–2015) as domestic air quality worsens, India continues to rely on voluntary partnerships and requires few controls on its point sources.[44] There were further politically charged debates on whether parties should be obligated to "reduce" or merely "control" emissions.

Ultimately, Article 8 and Annex D cover five categories of point sources.[45] Similar to earlier international chemicals treaties, the convention distinguishes between existing and new sources. Because many countries stated that mandatory requirements were necessary, BATs and BEPs are required for new sources, but merely "to control and, where feasible, reduce emissions, as soon as practicable but no later than five years" after it enters into force for a party. The convention sets even less stringent requirements for "controlling and, where feasible, reducing" emissions from existing sources, which may include different forms of quantified goals, emission limit values, BATs, BEPs, or co-benefits from multi-pollutant strategies. Parties should take such measures no later than ten years after becoming party to the convention. The EU long insisted that BAT and BEP requirements needed to be accompanied by minimum quantitative emission reduction targets, but India and China in particular rejected this. Article 2 defining BAT and BEP furthermore gives parties much freedom to determine which specific techniques and practices they regard as "economically and technically viable"; significantly, the convention does not set any such common standards.

Many countries and advocacy groups seeking to limit the amount of mercury entering into ecosystems also highlighted the need to address mercury releases to other media besides the atmosphere to cover the full biogeochemical cycle. Consequently, Article 9 covers releases of mercury to land and water. Mir-

43. UNEP 2010b.
44. Minchener 2012.
45. The five categories are coal-fired power plants; coal-fired industrial boilers; smelting and roasting processes used in the production of non-ferrous metals (e.g. lead, zinc, copper, and industrial gold); waste incineration facilities; and cement clinker production facilities.

roring debates on mandatory versus more flexible approaches on emissions as well as how those issues were settled, parties are obligated to control and, where feasible, reduce releases from "relevant" point sources. These are defined as any significant anthropogenic point source of releases as identified by a party that is not addressed in other provisions of the convention. Parties may apply BATs and BEPs or alternative measures including those capturing co-benefits from multi-pollutant strategies. For both atmospheric emissions and releases to land and water, parties "may" prepare a national plan outlining control measures and expected targets, goals, and outcomes. Furthermore, each party should establish an inventory of releases from national sources, to be regularly updated.

Artisanal and Small-Scale Gold Mining

As one of the largest sources of anthropogenic mercury emissions, the provisions on the ASGM sector are a major part of the convention. Combining air emission and releases into local water bodies, ASGM may discharge well over 1,000 tonnes of mercury into the environment each year. Leading international mining corporations have already switched away from mercury amalgamation to more capital-intensive cyanide methods, but up to 30 percent of the world's mined gold comes from the ASGM sector. ASGM provides subsistence livelihoods to 15 million people in more than 60 countries, mainly in Asia, South America, and Africa.[46] Miners engaged in these simple, unregulated, and often illegal enterprises continue to use mercury because it remains the simplest and cheapest way to extract gold from ore. For many of the relatively poor people engaged in ASGM, such extraction represents a significant source of income. Consequently, responsible measures on ASGM must balance health and environmental benefits of reduced mercury exposure with efforts to create local sustainable livelihoods.

The discussions on ASGM benefitted from earlier collaborative efforts, including those under the UNEP Global Mercury Partnership that supported projects to reduce mercury emissions and releases from the ASGM sector. Building on this, there was broad agreement among industrialized and developing countries and major advocacy groups that ASGM should be covered by the treaty. As most industrialized countries do not have any major ASGM activities within their territories, efforts to address mercury issues in this sector focused primarily on developing countries, with the hope that ASGM abatement work would attract increased support from donor countries. Similar to the mandates on mercury emissions from the burning of coal, the convention does not regulate gold mining per se, but merely addresses the ways in which the ASGM sector uses mercury; mining provisions also do not apply to the extraction of any other metals than gold.

Despite the fact that mining practices touch upon sensitive sovereignty is-

46. Sippl and Selin 2012.

sues, Article 7 states that parties with ASGM "shall take steps to reduce, and where feasible eliminate, the use of mercury and mercury compounds in, and the releases to the environment of mercury from, such mining and processing." Further, countries with "more than insignificant" ASGM and processing shall develop a national action plan outlining objectives, reduction targets, and actions to eliminate whole ore amalgamation and open burning of amalgam as well as all burning of amalgam in residential areas (where much of it takes place), as detailed in Annex C. The national action plan is to be submitted to the secretariat to be reviewed every three years. Parties may continue to import mercury for use in ASGM if permitted under national law, but many countries have already banned the import of mercury for use in ASGM. However, other imports may be legal (for example, for use in dentistry), and this mercury is sometimes sold on the black market. Much mercury is also traded illegally.

The convention further encourages improved outreach and education, as many miners are unaware of, or have misconceptions about, risks posed by the handling and burning of mercury. Some of these hazards can be addressed through the use of so-called retorts in which the mercury amalgam is burned. These create a closed system that can capture up to 95 percent of mercury vapor, and enable mercury recycling as well as more gold extraction by reducing spattering. Currently, retorts cost $5 to $50, but total investment costs may be higher if gas burners or other equipment is needed.[47] Many cultural and socioeconomic factors, including attitudes of community leaders and education levels, influence the adoption of new technologies and methodologies.[48] Consistent with the goal to eliminate mercury use in ASGM "where feasible," the convention also promotes research into sustainable non-mercury alternative practices. Geological conditions furthermore shape the ability to phase out mercury; it is typically easier to transition to mercury-free mining for gold from particles in riverbeds, as opposed to underground veins.

Resources and Compliance

In addition to regulations on atmospheric emissions from stationary sources, resources and compliance issues posed some of the thorniest topics during the negotiations. These debates were linked to persistent North-South disagreements across multiple agreements, as decisions during the mercury negotiations could have significant implications for debates in other fora, making countries more hesitant to compromise. Taking a hardline position, developing countries insisted that provision of "adequate" financial and technical assistance should be a "condition for" implementation. This was rejected by industrialized countries, which argued that financial and technical assistance should merely be recognized as "essential to" implementation. Developing countries and advocacy

47. Sippl and Selin 2012.
48. Spiegel and Veiga, 2010.

groups like the Zero Mercury Working Group and the International POPs Elimination Network also insisted on a treaty-specific financing mechanism with mandatory contributions from donor countries. They frequently referred to the Montreal Protocol Multilateral Fund as a model for this. In contrast, industrialized countries preferred to rely on the Global Environmental Facility (GEF) as the primary funding mechanism for mercury abatement, similar to the GEF's role under the Stockholm Convention.

Industrialized countries were least willing to back down from their initial positions with regard to resource issues, but negotiators managed to reach a few compromises on funding mechanisms and sources (in general leaving industrialized countries more satisfied than developing countries). Article 13 states that the overall effectiveness of implementation by developing countries will be related to the effective implementation of the article on financial resources, as it establishes that the funding mechanism shall include the GEF Trust Fund as well as "a specific international Programme to support capacity-building and technical assistance." The GEF Trust Fund is mandated to provide "new, predictable, adequate and timely financial resources" to support treaty implementation. The additional international program demanded by developing countries will operate under the auspices of the COP. Donor countries insisted that an "existing entity" act as host institution so that no new body has to be established. This could be the secretariat, for example. However, financial resources for the international program are to be provided only on a voluntary basis.

The convention also highlights the importance of capacity and technology issues. Parties shall cooperate "to provide, within their respective capabilities, timely and appropriate capacity-building and technical assistance" to developing countries (Article 14). Such support can be provided through bilateral and multilateral channels, including the regional centers operating under the Stockholm and Basel Conventions.[49] Resource debates were also tied to discussions about national implementation plans (NIPs) covering all aspects of the convention. The US argued that NIPs should be developed *prior* to ratification. The EU and Canada believed that NIPs should be discretionary based on domestic circumstances, but stressed the importance of national plans on emissions, releases, and ASGM. Many developing countries viewed the NIPs as a continuous means to set domestic priorities and engage donor countries. Given a lack of support to make them obligatory, the convention merely states that countries that want to develop NIPs "may" do so (Article 20). Such a NIP could contain the separate plans on emissions and releases, but ASGM action plans are to be formulated and submitted separately.

In addition, many participants, including Canada, the EU, and the United States, insisted on including a clear mechanism for reviewing implementation and compliance in the treaty text. This was shaped in part by lessons from the Stockholm Convention, where compliance issues were left to the COP, resulting

49. Selin 2012.

in protracted and contentious negotiations. Developing countries argued that a "satisfactory" agreement on funding and capacity building was a prerequisite to including a compliance mechanism, but in the end agreed to establish an implementation and compliance committee despite the lack of mandatory funding (Article 15). However, the committee is tasked to merely "promote" implementation of, and review compliance with, the convention, similar to such mechanisms under other agreements. It shall be "facilitative in nature" and "make every effort to adopt its recommendation by consensus," but can pass a recommendation by three-fourths majority vote "as a last resort." In addition, the COPs should begin periodic effectiveness evaluations of the convention no later than six years after its entry into force (Article 22).

An Important New Convention?

The Minamata Convention starts a new chapter in global environmental governance by moving into the area of heavy metals. As a "thirty-percent solution," its legal and political importance is initially greater than its environmental impact. Mercury mining may continue into the 2030s. Trade rules help monitor official mercury shipments and strengthen the position of importers, but it remains difficult to combat illegal trade. Some mercury containing products will be phased out, but this could happen as late as 2030, and other applications are still allowed. Mercury use in two industrial processes will end in 2018 and 2025, but its use may continue in other sectors. Stationary sources are subject to mainly BAT and BEP requirements but lack numerical reduction targets. ASGM provisions seek to reduce, and in some cases phase out, mercury use and releases, but this requires building local capacity. Critical details on financing, capacity-building, technology transfer, and compliance are left to the COP. Taken together, treaty obligations, even if properly implemented in all major countries, may at best only limit future projected increases in mercury emissions and releases rather than bringing them down from current levels.[50]

UN organizers during the INCs played the song "Under Pressure" by Queen (and lead singer Freddie Mercury) as plenary adjourned and unresolved issues were sent to breakout groups for further deliberation. Political pressure will keep bearing down on countries as they move to treaty implementation. It is clear that future mercury abatement hinges on the COP's ability to move beyond the initial mandates on all five sets of issues examined in this article. Similar progress has occurred before, and some negotiators and observers think it is feasible.[51] The Stockholm and Rotterdam Conventions had similarly modest beginnings, but recent COPs have improved governance structures and added chemicals to each agreement. As countries seek to strengthen and harmonize standards across agreements, institutional linkages will continue to shape their

50. Selin 2013.
51. Earth Negotiations Bulletin 2013.

interests. For example, countries know that levels of financial support for mercury abatement are linked to funding decisions under other conventions and in the GEF Assembly. Institutional linkages will also influence decisions on capacity-building, monitoring, and compliance.

Significantly, the convention may be influential in several other ways beyond its immediate role as a legally binding instrument. The convention establishes mercury as an important political issue and calls for reducing, and where possible, eliminating its uses and discharges. As such, it can be a significant tool for a wide range of public, private, and civil society actors working on mercury abatement. For example, it establishes a clear reference point for organizations such as UNEP, WHO, UNITAR, and the GEF to expand their mercury-related work. National environmental and public health authorities may use convention goals to launch information campaigns and initiate regulatory reviews and changes beyond those mandated by the treaty. The high reliance on BAT may accelerate private sector-led technological development to capture mercury before it is released from stationary sources. Convention goals can also support civil society groups engaged in awareness-raising and capacity-building to reduce mercury exposure in ASGM communities, as well as private sector and civil society initiatives promoting "clean gold" extracted in mercury-free ways.

Moving forward, there are many convention-related areas ripe for further empirical research. These include the future operations of the secretariat, the COP, and other treaty bodies, as well as the interplay between their activities and related bodies and policy developments under other conventions. Studies can also focus on how treaty implementation connects (or not) with other mercury abatement efforts, and the implications of this for multilevel governance across geographical scales. In addition, the EU, some developing countries, and advocacy groups may try to use the Minamata Convention as a means for expanding controls on additional heavy metals (initially cadmium and lead), but this will meet with significant resistance from several other industrialized and developing countries, at least in the short term. Moreover, if global mercury politics evolves gradually into policy-making on heavy metals more broadly, institutional density will increase even further. As global governance of hazardous substances grows more complex, comparative analyses with other issue areas experiencing similar institutional trends can contribute significantly to the global environmental politics literature.

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