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**THE MINAMATA CONVENTION ON MERCURY –
A NEW ERA OF REGULATION AND ACCOUNTABILITY
FOR THE GLOBAL REDUCTION OF MERCURY
EMISSIONS**

**KONWENCJA MINAMATA – NOWA ERA REGULACJI
I ODPOWIEDZIALNOŚCI NA RZECZ
GLOBALNEGO OGRANICZENIA EMISJI RTĘCI**

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ABSTRACT

Minamata Convention on mercury is the answer to the threat of global emissions of mercury and its impact on human health and the environment. On 19th January 2013, at the fifth session of the

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International Negotiating Conference in Geneva (INC5), which comprised representatives of 140 governments belonging to the United Nations, the final version of the Convention aimed at reducing environmental pollution by mercury was determined. Formal acceptance of the Convention took place on October 10th 2013, during the Diplomatic Conference in Minamata, Japan. It was agreed, that mercury is a substance of worldwide interest due to its spread in the atmosphere over long distances, persistence in the environment after the result of human activity, the ability to bioaccumulation in ecosystems and significantly harmful effect on human health and the environment. This newly established, legally binding instrument provides comprehensive solutions to reduce emissions of mercury to the atmosphere, reduce the demand for mercury in products and industrial processes, reduce international trade of mercury, as well as the handling of wastes containing mercury, the use of methods of storage of mercury. It also regulates issues relating to the sites contaminated by this metal and the adoption of guidelines on the use of BAT/BEP in such cases. Existing measures limited to the geographical area of the European Union proved to be insufficient to solve the global mercury problem. The new rules, once implemented, will have a potential impact on the different industrial sectors, such as municipal waste with the largest sources of Hg (batteries) of hazardous dental waste (amalgams), industrial (pesticides, paints), non-ferrous metals. The aim of this article is to emphasize the importance and significance of the Convention which applies a coherent community strategy concerning mercury in the short and long term, which will also allow for further verification of the problem and the effectiveness of the policy.

Keywords

Chemical pollution; environmental treaties; régime evaluation; mercury emissions.

STRESZCZENIE

Konwencja Minamata w sprawie rtęci stanowi odpowiedź na globalne zagrożenie emisją rtęci oraz jej wpływu na zdrowie człowieka i środowisko. W dniu 19 stycznia 2013 roku na piątej sesji Międzynarodowego Komitetu Negocjacyjnego w Genewie (INC 5), w skład którego wchodziłi reprezentanci 140 rządów państw należących do Organizacji Narodów Zjednoczonych, doszło do ustalenia ostatecznej wersji konwencji mającej na celu redukcję zanieczyszczenia środowiska rtęcią. Formalne przyjęcie Konwencji nastąpiło w dniu 10 paź-



dziennika 2013 roku podczas Konferencji Dyplomatycznej w Minamata w Japonii. Potwierdzono tym samym, że rtęć jest substancją o ogólnościowym znaczeniu z uwagi na jej rozprzestrzenianie się w atmosferze na dalekie odległości, utrzymywanie się w środowisku po wprowadzeniu na skutek działalności człowieka, zdolności do bioakumulacji w ekosystemach oraz znacząco szkodliwy wpływ na zdrowie ludzi i środowisko. Ten nowo powstały, prawnie wiążący instrument zawiera kompleksowe rozwiązania na rzecz zmniejszenia emisji rtęci do atmosfery, ograniczenia zapotrzebowania na rtęć w produktach i procesach przemysłowych, ograniczenia międzynarodowego handlu rtęcią, jak również postępowania z odpadami zawierającymi rtęć, stosowania metod składowania rtęci oraz reguluje kwestie odnoszące się do terenów zanieczyszczonych tym metalem i przyjęcia wytycznych dotyczących stosowania BAT/BEP. Dotychczasowe środki ograniczone do obszaru geograficznego Unii Europejskiej okazały się niewystarczające do rozwiązania ogólnościowego problemu rtęci. Nowe regulacje, po ich wdrożeniu, będą miały potencjalny wpływ na różne sektory przemysłowe, takie jak: odpady komunalne z największymi źródłami Hg (baterie), niebezpiecznymi odpadami dentystycznymi (amalgamaty), przemysłowymi (środki ochrony roślin, farby), metali nieżelaznych. Celem artykułu jest zaakcentowanie doniosłości i znaczenia wprowadzonej Konwencją spójnej strategii wspólnotowej w zakresie rtęci w perspektywie krótko i długoterminowej, która umożliwi również dalszą weryfikację problemu i skuteczności polityki.

Słowa kluczowe

Zanieczyszczenia chemiczne; traktaty środowiskowe; ocena systemu ochrony; emisja rtęci.

1. INTRODUCTION

1.1. MERCURY – CHARACTERISTICS AND APPLICATION

Mercury¹ is an element from the group of metals, liquid at room temperature, is not biodegradable. It is characterized by high toxicity. It occurs worldwide in soil, plants, water, air,

¹ Mercury is a chemical element with symbol Hg and atomic number 80.



sediments and organisms. Mercury emission to the environment occurs as a result of natural processes such as, for example: volcanic activity, forest fires, weathering of rocks, evaporation from land and oceans. Mercury is used in various industries inter alia: mining, metallurgy, electronics, industrial chlorine alkali, as well as in agriculture. The largest anthropogenic source of mercury emissions to the environment arises from combustion of fuels and processing of mineral raw materials used to produce heat and electricity. It is also emitted to the environment through the production of chlorine and gold by amalgamation process for obtaining cement and calcium, production of tar and asphalt, as well as production of coke. One of the organic compounds of mercury is methylmercury (sometimes methyl mercury), known for its high toxicity and ease of penetration into the body. It occurs as a by-product of industrial production and as a result of the process performed by methylation of mercury microorganisms².

1.2. MINAMATA CASE

The period of dynamic economic development, the growth of chemical and heavy industries in the world in the 1950s and 1960s, and the lack of adequate legal regulations taking into account the environmental aspect have contributed to serious pollution. The pollution caused by mercury emitted to the atmosphere is on a global scale, as it, then, by going into the water or soil can undergo various transformations (methylmercury)³. The toxic effects of methylmercury led to mercury poisoning

² N. Pirrone, P. Costa, J. M. Pacyna, R. Ferrara, *Atmospheric mercury emissions from anthropogenic and natural sources in the Mediterranean region*, "Atmospheric Environment" 2001 (35), p. 2999-3006; AMAP/UNEP 2008, Technical Background Report to the Global Atmospheric Mercury Assessment. Arctic Monitoring and Assessment Programme, UNEP Chemicals Branch, p. 159.

³ ENAP, *The Global Atmospheric Mercury Assessment: Sources, Emissions and Transport*. Geneva. Switzerland 2008.



(mercurialism) of thousands of people in the 50s of the twentieth century.

Minamata is a town located in the prefecture of Kumamoto in Japan, known as a place of ecological disaster caused by industrial pollution. Since 1932 until 1968 label plastics belonging to the group Chrisso Corporation used mercury as a catalyst in the production of acetaldehyde, which was used to produce acetic acid and vinyl chloride. The result of these activities was discharge of effluent containing methylmercury, which was then accumulated in fish and shellfish. After ingestion of contaminated food by the local population resulted in more than 2,000 people poisoned and 1,784 dead.

Minamata disease, the existence of which was officially confirmed by the government of Japan in 1956, is an example of mass poisoning caused by mercury pollution of wastewater containing methylmercury derived from a local chemical plant. This event gave rise to intensified action preventing destruction of the natural environment and human health, and drew attention of the international community to the problem of toxicity of this element. In the seventies of the twentieth century Japan undertook intensive efforts to improve the environment. In subsequent years, the country massively increased the number of regulations. It enacted 14 new laws in the field of environmental protection, during the so-called “Pollution Diet Session” in the 1970s, including the law on water pollution and the introduction of toxic substances to the environment. Expenditure on environmental protection increased twice. At that time, Japan had the most restrictive laws in the field of environmental protection in the world.

Similar events of mass mercury poisoning took place also in, eg. Iraq in 1971, and in the prefecture of Niigata in Japan in 1965⁴.

⁴ P. Houeto, P. Sandouk, F.J. Baud, P. Levillain, *Elemental mercury vapour toxicity: treatment and levels in plasma and urine*, “Hum. Exp. Toxicol.” 1994 (13), p. 848; Q. Wang, D. Kim, D.D. Dionysiou, G.A. Sorial, D. Timberlake, *Sources and remediation for mercury contamination in aquatic systems – a literature review*, “J. Environmental Pollution” (2004) 131, p. 323.



1.3. HEALTH EFFECTS

Mercury and its compounds have strong toxic effects on the human body. System most sensitive to mercury in small doses is the nervous system. The changes arise within the cardiovascular system⁵. According to the International Agency for Research on Cancer (IARC, 1993), methylmercury compounds are considered possibly carcinogenic to humans. Furthermore, inhalation of elemental mercury vapor causes dry symptoms as tremors, insomnia, memory loss, neuromuscular changes, and headaches. Kidney and small thyroid may be affected⁶. Minamata disease (Chisso-Minamata-BYO) is a neurological syndrome caused by severe mercury poisoning. Symptoms include damage to hearing and speech, numbness in the hands and feet, ataxia, general muscle weakness, narrowing of the field of vision. In extreme cases, insanity, paralysis, coma, and death following within weeks of the onset of symptoms. The most subtle effects of mercury as a neurotoxin are becoming clearer to researchers who have Identified subtle large-scale population impacts on cognitive ability and IQ as a result of global mercury pollution⁷.

2. MERCURY EMISSIONS: THE GLOBAL SCALE PROBLEM. PREPARING AND NEGOTIATING AN INTERNATIONAL LEGAL INSTRUMENT.

Mercury emissions are a global problem of no national or continental boundaries, because it released into the atmosphere

⁵ M. Cyran, *Effect of environmental exposure to Mercury on the functioning of the human body*, "Medycyna Środowiskowa" 2013, No. 3, p. 55-58.

⁶ D. Chand, D. Jaffe, E. Prestbo et al., *Reactive and particulate mercury in the Asian marine boundary layer*, "Atmos. Environ." 2008 (42), p. 7988-7996; X. Fain, C. P. Ferrari, A. Dommergue et al., *Mercury in the snow and firn at Summit Station, Central Greenland, an implications for the study of past atmospheric mercury levels*, "Atmos. Chem. Phys." 2008 (8), p. 3441-3457.

⁷ P. Grandejean, P.J. Landrigan, *Developmental neurotoxicity of industrial chemicals*, "Lancet" 2006 (368), p. 2167-2178.



can be transported over long distances. Therefore, the 70-tenths of the efforts of international organizations focused on regional cooperation in the protection against mercury pollution. Such cooperation was established, for example, around the Baltic Sea, the North-East Atlantic, the Mediterranean Sea and the North American Great Lakes. In Addition, the European Economic Community (EEC) introduced water quality standards That covered mercury.

At the United Nations Conference on the Human Environment in Stockholm in 1972 heavy metals were identified as pollutants of high concern. The Declaration that was adopted stated that countries “should take all possible steps to prevent pollution of the seas” by hazardous substances⁸. Stockholm Conference contributed to a change in policy towards the problem of mercury pollution, and mercury was seen as a substance which should be subject to common regulations with other hazardous substances. A recommendation by the Organization for Economic Cooperation and Development (OECD) in 1973 urged its members to reduce anthropogenic releases of mercury to the environment is the lowest possible levels⁹. In the 1972 International Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter prohibited the dumping of mercury in the open sea¹⁰. Then, respectively in 1972 and 1974, the Convention for the Prevention of Marine Pollution by dumping from Ships and Aircraft (the Oslo Convention) and the 1974 Convention for the Prevention of Marine pollution from Land-Based Sources (the Paris Convention) were adopted¹¹. Until the end of 1973 all EEC countries were signatories to the

⁸ Declaration of the United Nations Conference on the Human Environment (Stockholm, 16 June 1972), Principle 7.

⁹ Organization for Economic Cooperation and Development (OECD), Recommendation of the Council on Measures to Reduce All Man-Made Emissions of Mercury to the Environment (C(73)172/Final, 18 September 1973).

¹⁰ International Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London, 13 November 1972).

¹¹ Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (Oslo, 15 February 1972); Convention for the Prevention of Marine Pollution from Land-Based Sources (Paris, 4 June 1974).



Oslo Convention and the first Community action program on the environment was adopted in November 1973 giving priority to mercury pollution of fresh water by placing the substances on the black list¹². In 1976 was the adoption of a directive on dangerous substances discharged into the aquatic environment, the aim of which was to eliminate all substances on the black-list¹³. The Oslo Convention was supplemented respectively in 1982 and in 1984 by directive which set limit values and quality objectives for the elimination of mercury emissions from the chlorine-alkali industry¹⁴, and similar directive set limit values and quality objectives for mercury discharges from other industrial sectors¹⁵.

In 1974 the Baltic Sea littoral states adopted the Convention on the Protection of the Marine Environment of the Baltic Sea Area (the Helsinki Convention) and established the Helsinki Commission (HELCOM)¹⁶, which limited the emission of mercury into the Baltic Sea. By contrast, in 1975 under the auspices of the United Nations Environment Programme (UNEP) was adopted the Mediterranean Action Plan (MAP), the tangible aspect of the law was the Barcelona Convention of 1976 and its related protocols¹⁷. Under the 1976 Dumping Protocol, states pledged to ban the dumping of mercury in the Mediterranean

¹² L.D. Guruswamy, I. Papps and D.J. Storey, *The Development and Impact of an EEC Directive: The Control of Discharges of Mercury to the Aquatic Environment*, "Journal of Common Market Studies" 1983 (1), p. 70.

¹³ Council Directive 76/464/EEC of 4 May 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community, [1976] OJ L 129/23.

¹⁴ Council Directive 82/176/EEC of 22 March 1982 on limit values and quality objectives for mercury discharges by the chlor-alkali electrolysis industry, [1982] OJ L 81/29.

¹⁵ Council Directive 84/156/EEC of 8 March 1984 on limit values and quality objectives for mercury discharges by sectors other than the chlor-alkali electrolysis industry, [1984] OJ L 74/49.

¹⁶ Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki, 22 March 1974).

¹⁷ Convention for the Protection of the Mediterranean Sea Against Pollution (Barcelona, 16 February 1976).



Sea¹⁸. The result of Mediterranean Sea cooperation on hazardous substances under the MAP and the Barcelona Convention was to work to minimize, and where possible eliminate, the generation of hazardous waste, as well as the transboundary movement of these wastes in Mediterranean Sea area¹⁹. Importantly, this agreement defined the mercury-containing waste as dangerous waste, and stated total elimination of all input of mercury into the Mediterranean Sea²⁰.

A document of a similar range was the Protocol on Land-Based Sources of 1980, which required the parties to eliminate inflow of land mercury to Mediterranean Sea²¹. Convention on the Protection of the Rhine Against Chemical Pollution of 1976 obliged the Rhine countries to “eliminate pollution from the surface waters of the Rhine basin”²².

International regional policy on hazardous substances was also conducted in relation to the Great Lakes Region. And so, in 1972, Canada and the United States signed an agreement, updated in 1978, under which pledged to “restore and Maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem”, including the “virtual elimination” of all of discharges of persistent toxic substances²³.

In the 80s and 90s existing legislation regarding the elimination of mercury pollution was implemented and reinforced.

¹⁸ Protocol for the Prevention of the Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft (Barcelona, 16 February 1976).

¹⁹ Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal (Izmir, 1 October, 1996), Article 5.

²⁰ United Nations Environment Programme, Operational Document for the Implementation of the Strategic Action Programme to Address Pollution of the Mediterranean Sea from Land-Based Activities (SAP.UNEP(DEC)/MED WG.183/6, 7 May 2001).

²¹ Protocol on the Protection of the Mediterranean Sea Against Pollution from Land-Based Sources (Athens, 17 May 1980).

²² Convention on the Protection of the Rhine Against Chemical Pollution (Bonn, 3 December 1976), Article 1 and Annex I.

²³ The Great Lakes Water Quality Agreement (Ottawa, 15 April 1972); Great Lakes Water Quality Agreement of 1978 (Ottawa, 22 November 1978), Article 2.



In laboratories and offices, a permanent research on the effects of mercury and its compounds on the human body and the environment took place²⁴. According to the conducted research, despite the implementation of so many contracts and regulations, preventing pollution of mercury, the goal has not been reached. Although some progress in controlling mercury emissions can be seen, mercury pollution is still problematic in parts of Europe and North America. In addition, mercury is a growing problem particularly in Asian countries which often lack the capacity of the national classes mercury pollution and contamination.

In 1988, the Baltic Sea countries established the HELCOM (Baltic Marine Environment Protection Commission – Helsinki Commission) Ministerial Declaration by which they stated their intention to reduce the total discharges of mercury and a number of other hazardous substances by 50% by 1995. HELCOM has adopted a series of binding recommendations on mercury uses and emission sources²⁵. Baltic Sea action plan is updated regularly at ministerial meetings. The plan adopted by all the littoral states and the EU in 2007 takes into account the innovative approach to strategic management in implementing the policy of cooperation in the Baltic Sea region. Baltic Sea Action Plan (BSAP) entails the restoration of the good ecological status of the Baltic marine environment by 2021.

Particular attention was drawn to transport of mercury to the atmosphere. Under the Convention on Long-Range Transboundary Air Pollution (CLRTAP), European and North American countries conducted extensive assessments of heavy metals pollution between 1989 and 1995. These ratings were decisive after the adoption of the CLRTAP Protocol on Heavy Metals covering lead, cadmium and mercury in 1998²⁶. Currently, the

²⁴ *Kryteria zdrowotne środowiska. Rtęć*, Wydawnictwo Instytutu Medycyny Pracy w Łodzi, Warszawa 1983; R. A. Goyer, *Toxic effect of heavy metals*, In: *Casarett and Donll's Toxicology. The Basic Science of Poisoning*, M.O. Amadur, J. Donll, C.D. Klaassen (eds.), Pergamon Press 1991, p. 623-680.

²⁵ Declaration on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki, 15 February 1988); <http://www.helcom.fi>

²⁶ Protocol on Heavy Metals to the Convention on Long-Range Transboundary Air Pollution (Aarhus, 24 June 1998).



Protocol, which entered into force in 2003, is so far the largest international treaty on mercury. It aims to reduce emissions from industrial sources, combustion processes and waste incineration, and requires the adoption of the reduction of emissions from stationary sources to the level of 1990, through the application of best available techniques.

In addition, in 2005 the EU banned or severely restricted the use of mercury in various products, including batteries, dental amalgam, wood preservatives, textile treatment agents and cosmetics²⁷.

The framework directive on ambient air quality adopted in 1996 identified mercury as a pollutant of high concern²⁸. The aim of the Directive was to determine common methods and criteria for assessing concentrations and deposition of mercury ambient air, as well as ensuring that such data were publicly available. The directive also admitted the right of the Member States to maintain or introduce protective measures for mercury pollution, as long as they were compatible with the Treaty on the European Community²⁹.

The EU is currently engaged in the implementation of the Directive on waste electrical and electronic equipment (WEEE) and the Directive on the restriction of use of certain hazardous substances in electrical and electronic equipment (RoHS)³⁰.

²⁷ European Commission, *Questions & Answers on the Mercury Strategy* (MEMO/05/03, 31 January 2005); Communication from the Commission to the Council and the European Parliament of 28 January 2005 on a Community Strategy Concerning Mercury, SEC(2005)101.

²⁸ Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management, [1996] OJ L 296/55, Annex I.

²⁹ Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air, [2005] OJ L 023/3.

³⁰ Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE), [2003] OJ L037/24; Directive 2003/108/EC of the European Parliament and of the Council of 8 December 2003 amending Directive 2002/96/EC on waste electrical and electronic equipment (WEEE), [2003] OJ L 345/106; Directive 2002/95/EC of the European Parliament and of the Council of 27 January



The objective of WEEE is to prevent electronic waste by increasing recycling and producer responsibility. RoHS is that mercury (along with other identified toxic substances) is strictly restricted in electrical and electronic equipment, which entered the common market after 1 July 2006. In addition, the EU strives for more extensive control of mercury goods and their international trade.

In February 2001, the UNEP Governing Council agreed on the global scientific assessment of mercury and its compounds. The Global Mercury Assessment report was submitted to the UNEP Governing Council in December 2002 included the review of mercury in the environment, impact on the environment and human health and the prospects for the reduction of releases to environment.

And so, during the meeting of the UNEP Governing Council in February 2003, on the Global Mercury Assessment report, the EU and Norway initiated the creation of a global legally binding instrument on limiting mercury pollution.

Preparations for the creation of an international convention on mercury were supported by the EU, which regarded it as a complement to its regional policy in terms of mercury emissions. The case of mercury has been so far regulated by adding mercury, its compounds and phenylmercury to Annex XVII to EC Regulation 1907/2006 REACH³¹ containing restrictions on the production, marketing and use of these substances, as well as through EC Regulation 1102/2008 on the banning of exports

2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, [2003] OJ L 037/19.

³¹ Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No. 793/93 and Commission Regulation (EC) No. 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.



of metallic mercury and certain mercury compounds and mixtures and the safe storage of metallic mercury³².

The European Union adopted a Strategy on Mercury in January 2005, which among its main elements included: to reduce the entry of mercury into the environment by cutting the demand and supply, to protect against mercury exposure, to reduce mercury emissions, to resolve the long-term fate of mercury surpluses and reservoirs, to support and promote international action on mercury.

This program was further strengthened by the Governing Council in February 2005. In February 2009, the UNEP Governing Council agreed on the need to create a global legally binding instrument on mercury.

In 2009 the Governing Council requested UNEP to update the 2008 report (Decision 25/5). The Global Mercury Assessment 2013: Sources, Emissions, Releases and Environmental Transport and its accompanying and updated Technical Background Report were the response to that request. The inventory was based on national emissions data for the year 2010. In addition to atmospheric emissions, the report also provides, for the first time, the recent and available information on releases to the aquatic environment and aquatic pathways and transport. The “Global Mercury Assessment 2013” of the United Nations Environment Programme (UNEP) estimates that 1,960 tons of anthropogenic mercury emissions are released into the atmosphere each year, although that figure comes with considerable uncertainties. Forty-four percent of these emissions result from activities in which mercury is utilized for specific purposes, including ore extraction, and especially, artisanal and small-scale gold mining (ASGM). The other 56 percent of mercury emissions are a by-product of industrial processes such as coal-fired power generation, operation of large ore and gold mines, and cement production. Mercury emissions are unevenly distributed across

³² Regulation (EC) No. 1102/2008 of the European Parliament and of the Council of 22 October 2008 on the banning of exports of metallic mercury and certain mercury compounds and mixtures and the safe storage of metallic mercury.



the globe. Asia is responsible for the largest share of emissions, with 39.7 percent. China alone accounts for one-third of the global emissions, which can be attributed to the rapid increase in energy consumption within the country, and the demand is met primarily with coal power. Africa is the second-largest regional emitter, accounting for 16.1 percent of emissions. It is followed by South America at 12.5 percent. The industrialized regions represent a relatively small share of global emissions, with the EU accounting for 4.5 percent and North America for 3.1 percent of global atmospheric emissions respectively³³.

3. THE SOLUTIONS ADOPTED IN THE CONVENTION

The solutions adopted in the Convention on mercury relate mainly to the reduction of emissions and the release of mercury to the environment, the reduction of the supply and demand of mercury containing products and processes using mercury waste storage, as well as health aspects and international co-operation of information exchange, research and development.

Industrial processes that emit the largest amounts of mercury to the environment should be gold mining, and the use of mercury catalysts in chemicals production and mercury-cell chlorine-alkali plants. In accordance with Article 7 of the Convention Minamata, in order to reduce the use of mercury in artisanal and small-scale gold mining (ASGM) governments should establish a National Action Plan (NAP). The NAP requires strategies to prevent foreign and domestic supplies of mercury, thereby providing a mechanism to restrict mercury supply which is not controlled under primary mining or chlorine-alkali closure provisions of the Treaty. In accordance with paragraph 1f of Annex C of the National Action Plan ASGM, in their national action plan, countries must include a chapter on management

³³ UNEP, Global Mercury Assessment 2013: Sources, Emissions, Releases and Environmental Transport. UNEP Chemicals Branch, Geneva, Switzerland 2013.



strategies, trade and preventing the use of mercury and mercury compounds from both domestic and foreign sources to be used in artisanal and small-scale gold mining. In case of the use of mercury-cell chlorine-alkali plants, the Treaty establishes a time schedule for the phase out of all mercury cell chlorine-alkali plants and requires that mercury recovered from those plants be kept off the market and put into long-term storage or treated in environmentally sound disposal.

Article 4 of the Treaty on mercury contains provisions that will eventually prohibit the manufacture, import and export of products containing mercury. A list of products (Annex A of the mercury Treaty) that will be subject these regulations has been created. The timing of these phase-outs is dependent on whether some parties seek exemptions, under Article 6, of up to 5 years with an option to seek further top exemptions of up to 10 years.

The provisions of the Convention require by 2020 total withdrawal from the production, import and export of equipment containing mercury (measuring devices, fever thermometers, sphygmomanometers or blood pressure measuring devices). However, these provision do not apply to dental amalgams, because in the absence of alternative solutions, the date of withdrawal may be extended until 2030. In the interim, the WHO also encourages hospitals to develop mercury clean-up, waste-handling and storage procedures³⁴.

Article 4 of the Treaty lists high-pressure mercury vapor lamps, mercury in a variety of cold cathode fluorescent lamps and external electrode fluorescent lamps for phase-out by 2020 with an option to extend this time limit is 2030. Austria, Germany, Finland Norway, and Sweden and the United Kingdom have advised dentists to specifically avoid mercury-containing amalgam fillings during pregnancy³⁵.

³⁴ *Mercury in Health Care*, WHO Division of Water Sanitation and Health, http://www.who.int/water_sanitation_health/medicalwaste/mercury/en.

³⁵ P. Hujuel et al., *Mercury Exposure from Dental Filling Placement During Pregnancy and Low Birth Weight Risk*, "American Journal of Epidemiology" 2005 (8), p. 734–740.



On the basis of Article 4, by 2020 vaccines containing thiomersal are to be removed. It is a mercury-containing preservative designed to prevent microbial spoilage. The withdrawal of thiomersal can cause problems with the change of the preparation of the licensed vaccine. Replacing thiomersal with a mercury-free alternative will require testing and a new licensing of preclinical and clinical process³⁶.

Products to be phased out by 2020 include batteries (except for zinc, silver, oxide button batteries with a mercury content of <2 percent, button zinc air batteries with a mercury content of <2 percent); bridge switches and relays. CFL bulbs equal to or less than 30 watts containing more than 5 mg of mercury per bulb (an unusually high amount). Linear fluorescent bulbs – triband lamps less than 60 watts and containing greater than 5 mg of mercury, and halophosphate lamps less than 40 watts and containing greater than 10 mg of mercury; high pressure mercury vapor lamps; mercury in a variety of cold cathode fluorescent lamps (CCFL) and external electrode fluorescent lamps (EEFL).

Certain mercury-added products are excluded altogether from the provisions of Article 4 including: vaccines containing thiomersal, military products, products essential for civil protection, products relating to religious and traditional practices, switches and relays, some forms of electronic displays. The Treaty uses the so-called approach of “positive list”. This means that products that are to be phased out are listed in the Treaty. The parties are being discouraged the production and distribution in commerce of new products containing mercury, before the Treaty enters into force for them, unless it turns out that the analysis of the risks and benefits shows the benefits to the environment or human health.

The mercury Treaty lists Biocides, and pesticides topic anti-septics containing mercury and its compounds for phase-out by 2020. Both inorganic and organic mercury compounds are used as pesticides for many applications. Compounds have been used in seed treatment to control algae and slime in cooling towers,

³⁶ *Thiomersal and Vaccines: Questions and Answers*, World Health Organization, 2006.



and pulp and paper, as additives for marine paints and water-based inks, and coatings in a tree, dressings, protection for seed potatoes and apples for fabrics and washing applications³⁷.

Treaty on mercury on the basis of Article 16 encourages the parties to the treaty to promote a series of actions relating to health. This provides an opportunity for NGOs to work with governments, universities, and health care sectors to conduct research and other activities in order to identify and protect those populations that are particularly vulnerable to mercury pollution because of the occupation, diet or other circumstances. Section 17 (exchange of information), an important sub-paragraph (5) states that “information on the health and safety of people and the environment, can’t be treated as confidential”.

The Treaty also specifies the laboratory uses of mercury, and indicates that only professional chemists and advanced students of chemistry should perform this type of study in laboratories of universities. However, elimination or significant reduction of the use of mercury in laboratories should occur as soon as possible, because there are alternatives that can effectively replace most uses of mercury, mercury compounds and products containing mercury. For example, laboratories sometimes use a mercury-filled apparatus to maintain an inert atmosphere over the reaction and to provide pressure relief. Similar laboratory equipment filled with mineral oil is available, and labs should use these instead³⁸.

The Treaty also envisages the phasing out of cosmetics and products for skin lightening containing mercury above 1 ppm by 2020. Exceptions are mascara and other cosmetics applied to the eye area because there are no effective and safe alternatives. Cosmetic products, such as creams, lotions and soaps used to

³⁷ *Use and Release of Mercury in the United States*, U.S. EPA, 2002, p. 64–65.

³⁸ *The Glassware Gallery: Bubblers, Lab and Safety Supplies*, <http://www.ilpi.com/inorganic/glassware/bubbler.html>.



lighten skin colour often contain mercury in the form of chloride of mercury and/or mercury ammonia. Both are cancerogenic³⁹.

Article 8 (3) of the Convention requires action to control emissions of mercury and mercury compounds from the sources listed in Annex D of the Convention, i.e.: coal fired power plants, coal-fired industrial boilers, smelting and roasting used in the production of non-ferrous metals, incineration of waste and manufacturing cement clinker. Article 8 (4) of the Convention calls for new sources, as parties shall use the best available techniques (BAT), or emission limit values (ELVs) reflecting BAT and best environmental practices (BEP). In the case of coal-fired power plants the Convention requires that BAT/BEP are applied to all new coal burning appliances no later than five years after the entry into force of the Treaty. At the same time, the Conference of Parties (COP) undertakes periodic reviews of the practical availability of technical and financial assistance, intended to support implementation of the guidelines BAT/BEP. The results of surveys can influence decisions by which the best available technology stand legally binding.

The provisions of Article 11 of the Convention oblige parties to “take measures” that mercury waste is managed in an environmentally sound manner and in accordance with the guidelines of the Basel Convention and the future guidelines to be added to the Minamata Convention. Mercury waste may only be recovered, recycled, reclaimed, or directly used for an usage allowed under the Convention. Parties to the Convention that are also parties to the Basel Convention (which is the case for the EU) are not permitted to transport waste across international boundaries, except for environmentally sound disposal (including recycling). The gap analysis showed that the EU Legislation covers these large parts of Convention Requirements, though some parts could not yet be determined as they are subject to future thresholds to be established under the Convention. As regards Article 11 (3b), reuse/recovery/recycling of mercury from

³⁹ *Super Jolly, Skin Lightening Products...*, *Black History 365*, http://www.black-history-month.co.uk/articles/skin_lightening_products.html.



mercury wastes other than those addressed in Article 2 of Regulation (EC) 1102/2008 are not covered by EU explicitly law⁴⁰.

The WHO Regional Office for Europe leads the Implementation of the UNEP/WHO project on the Development of a Plan for Global Monitoring of Human Exposure to and Environmental Concentrations of Mercury which aims to harmonize approaches for monitoring mercury in humans and the environment, and to strengthen the capacity for mercury analysis in humans and the environment to make an accurate determination of their concentrations globally⁴¹.

Minamata Convention provides for checks and reductions in the entire range of products, processes and industries, which contain mercury or its compounds, discharged or emitted into the environment. However, this publication presents only selected solutions and guidelines provided by the Convention.

4. CONCLUSIONS

Minamata Convention is a key tool for the global protection of human health and the environment from mercury pollution. After ratification by all parties to the Convention, actions for sustainable development will be catalysed. Institutional, legal, economic and technical capacity will need to be strengthened to the proper management of mercury throughout its production cycle, until the final disposal of the waste. The most important challenges faced by the parties to the Convention is the increase of the technical capabilities for monitoring and testing of mercury in different environmental matrices and indicators of human exposure, as well as promoting and implementing the use of best available techniques (BAT) and best environmental

⁴⁰ *Study on EU Implementation of the Minamata Convention on Mercury. Final Report*, A. Jarvis (ed.) U.K. 2015, p. 83–84.

⁴¹ Health sector involvement in the implementation of the Minamata Convention: assessment and prevention of mercury exposure, Report of a meeting Bonn, Germany 24-25 June 2015, World Health Organization 2016, p. 10–11.



practices (BEP), both in industrial processes using mercury or any part thereof or as a contribution to these processes that may result from unintentional emissions such as poor waste management, in order to prevent, reduce or eliminate fuel consumption and emissions, and emissions of mercury to the environment. Of great importance is the adoption of protective measures to minimize or eliminate worker exposure to mercury (occupational exposure to industrial workers, doctors or dentists). Importantly, all actions should be taken in connection with the conducted awareness campaigns and information on mercury exposure, use, production, trade, release and final disposal. The limited use of products containing mercury should also be supported by dental and medical environment, which vocational education provides detailed knowledge of the properties of mercury and toxic effects on humans and the environment.

In order to solve the mercury problem, the actions taken must be initiated and coordinated at various levels of management. For this purpose, the actions and standards related to the reduction of mercury emissions must be continuously reviewed and updated in view of the technological, political, economic and scientific changes. Only through an integrated international cooperation, the issue of mercury may be in the long term, effectively solved.

Implying the above, one have to agree with Jeffrey Smith that: “When it comes to chemical pollutants, international law is about to enter an era that will see its limits tested and its ability to encompass new approaches across the disciplines of international affairs and science revealed”⁴².

⁴² J. Smith, *The Minamata Effect: A new régime for the Global treaty Governance of chemical pollutants*, In: *International Environmental Law: Contemporary Concerns and Challenges in 2014*, V. Sancin M. Kovič Dine (eds.), Ljubljana 2014, p. 729.



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