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ON MERCURY



Overview of the key provisions under Article 8 of the Minamata Convention and key decisions

Provisions of Article 8

- Article 8 concerns controlling and where feasible reducing emissions of mercury and mercury compounds through measure to control emissions from the point sources falling within the source categories listed in annex D
- For new sources, each Party shall require the use of best available techniques and best environmental practices
- For existing sources, each Party shall implement one or more of the measure:
 - A quantified goal
 - Emission limit values
 - BAT/BEP
 - Multi-pollutant control strategy
 - Alternative measures



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Coverage of Article 8

- Article 8 covers sources in 5 categories listed in Annex D
 - Coal-fired power plants
 - Coal-fired industrial boilers
 - Smelting and roasting processes used in the production of non-ferrous metals (lead, zinc, copper and industrial gold)
 - Waste incineration facilities
 - Cement clinker production facilities



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Guidance on emissions within the convention

Article 8 refers to four guidance documents to be adopted by the Conference of the Parties:

- Best Available Techniques and Best Environmental Practices (7/6/Add1)
- Support for Parties in implementing measures for existing sources, in particular guidance on determining goals and setting emission limit values (7/6/Add2)
- Guidance on criteria relating to relevant sources (7/6/Add3)
- Guidance on the methodology on preparing inventories of emissions (7/6/Add4)



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Diplomatic Conference

- *Established* a group of technical experts, as a subsidiary body from all UN regions, with 2 co-chairs and made up of experts in pollution control and/or one or more of the source categories in Annex D,
- Group to take into account experience gained through, inter alia, the UNEP Global Mercury Partnership,
- Invited the participation of eight experts from industry and civil society as observers.
- Invited input from other governments, intergovernmental organizations, industry and civil society organizations to assist it in completing its work;



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Overview of the group of technical experts – membership, meetings and intersessional work and overview of the BAT/BEP guidance document

Members of the expert group

- Regional representation:
 - eight from African States,
 - eight from Asia-Pacific States,
 - three from Central and Eastern European States,
 - five from Latin American and Caribbean States
 - seven from Western European and other States.
- Membership list published at:
 - <http://www.mercuryconvention.org/Portals/11/documents/meetings/EG1/Members%20of%20the%20Group%20of%20Technical%20Experts%20on%20Air%20Emissions.pdf>



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Observers to the expert group

- Observers
 - Three from relevant industry sectors
 - Five from non-governmental organization
- Resource persons
 - Secretariat of the Basel, Rotterdam and Stockholm Convention
 - Global Mercury Partnership



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Meetings of the expert group

- Four meetings held:
 - February 2014 – Ottawa, Canada
 - September 2014 – Montreux, Switzerland
 - March 2015 – Pretoria, South Africa
 - September 2015 – Stockholm, Sweden.
- Intersessional work
 - Chapter groups developed technical content intersessionally for discussion at the meetings
 - Secretariat developed additional documents
 - One intersessional meeting of co-chairs and co-leads of chapters held in June 2015 in Geneva prior to public consultation phase



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Public consultation on BAT/BEP guidance

- Co-chairs draft guidance document published for public comment on June 18 2015
- Document open for comment for 6 weeks
- All comments reviewed by experts at their fourth meeting and considered in the final draft of the document
- Comments submitted and the group's response are available as INF 1



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Overview of BAT/BEP guidance

- Guidance includes some common sections relevant to all source categories:
 - Introduction
 - How to select the «best available techniques»
 - Common techniques
 - Monitoring
- Also includes chapters specific to each source category (note that the two ‘coal’ source categories are presented as a single chapter)



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Nature of guidance

- It's guidance, to help Parties: it's not mandatory, and it doesn't limit national discretion.
- It doesn't define what is BAT: it provides information about a range of techniques to help Parties make decisions
- Parties' decisions will need to take account national circumstances
- The guidance reflects the knowledge and information available to the group now: the guidance should be a living document, which improves and develops over time.



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Coal-fired power plants and coal-fired industrial boilers

- Mercury emission control technologies are generally similar for all coal-fired boilers.
- Mercury emissions from coal-fired combustion plants are affected by a number of variables:
 - ① mercury concentration and speciation in coal
 - ② coal type and composition
 - ③ type of combustion technology
 - ④ control efficiency of existing pollution control systems



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Coal-fired power plants and coal-fired industrial boilers

➤ BAT/BEP

- Primary measures to reduce the mercury content of coal
 - Coal washing, selection or blending (itself it does not constitute BAT)
- Measures to reduce mercury emissions during combustion
 - Use of a fluidized bed boiler (itself it does not constitute BAT)
- Mercury removal by co-benefit of conventional APCSS
 - Combination of SCR, ESP and FGD can remove mercury up to 95% and result a concentration of less than 1 µg/Nm³ of mercury in the flue gas.
 - Combination of SCR, FF and FGD can remove mercury up to 99% and result a concentration of <0.5 µg/Nm³ of mercury in the flue gas.



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Coal-fired power plants and coal-fired industrial boilers

➤ BAT/BEP

➤ Dedicated mercury control technologies

- Activated carbon injection technology has been adopted for coal-fired power plants in the United States.
- The operations of activated carbon injection technology in the United States show that the mercury concentration in flue gas after activated carbon injection and fabric filters may be lower than 1 µg/Nm³.

➤ BEPs

- Improving the energy efficiency for whole plant
- improving the efficiency of APCs
- environmentally sound management of the plant
- environmentally sound management of coal combustion residues



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Coal-fired power plants and coal-fired industrial boilers

- Major issues raised in public comment phase
 - Performance levels of BAT
 - Cross-media effects of control measures
 - Costs of the control measures
 - Emerging techniques
 - Mercury monitoring issues

*as a daily average, or average over the sampling period, at reference conditions 273 K, 101.3 kPa, 10 per cent oxygen and dry gas



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Smelting and roasting processes used in the production of non-ferrous metals

- Guidance limited to smelting and roasting
- Non-ferrous metals refers to lead, zinc, copper and industrial gold
- Ores and concentrates are processed to extract valuable products; smelting and roasting often the initial process to remove sulfur and other components
- Mercury emissions to air originate from the raw materials where it is present in variable concentrations



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Smelting and roasting processes used in the production of non-ferrous metals

➤ BAT/BEP

➤ Primary measures

- Blending feedstocks to control mercury emissions when smelter feed materials have extremely variable or higher than desirable mercury concentrations;
- Use of environmental management systems including preventative, predictive and corrective maintenance;
- Optimizing process design to reduce emissions;
- Environmentally sound management and disposal of air pollution control wastes



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Smelting and roasting processes used in the production of non-ferrous metals

- BAT/BEP (continued)
 - Secondary measures
 - Proprietary systems
 - Boliden-Norzink
 - Selenium filters
 - Activated Carbon Filter Beds
 - DOWA
 - Jerrit
 - In some cases difficult to determine if some were in current operation
 - Multi-pollutant control measures for SO₂, particles
 - Acid plants



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Smelting and roasting processes used in the production of non-ferrous metals

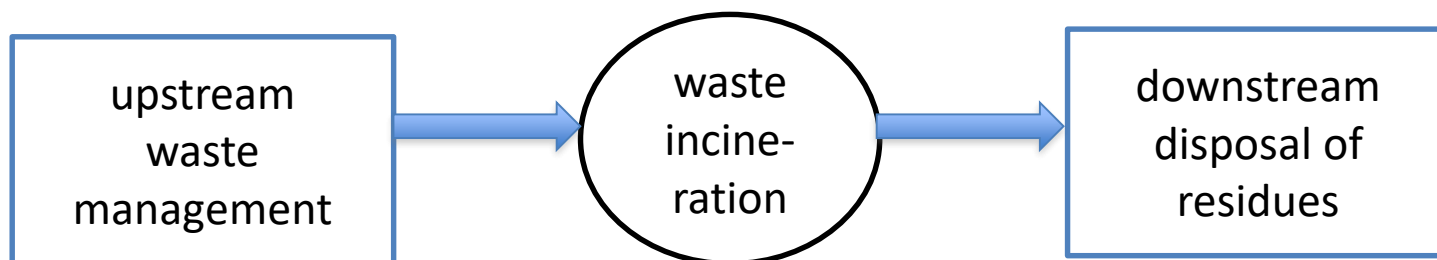
- BAT/BEP (continued)
 - Guidance benefited from input from industry, government and community groups
- Major issues raised in public comment phase
 - Secondary smelting as a source
 - Management of wastes



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Waste Incineration (1)

- Emissions from waste incineration $\approx 5\%$ of anthropogenic emissions (≈ 95 t)



- BAT:
 - Pretreatment, waste input and control
 - Incineration process
 - Flue-gas treatment
- BEP:
 - Waste management practices
 - Prevention of fire risks



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Waste Incineration (2)

BAT

➤ Emission control techniques for flue gas treatment

- Dust removal techniques
- Wet scrubbing techniques
- Activated carbon injection
- Boiler bromide addition
- Static bed filters

Control measures	Reduction efficiency
High efficiency scrubbers with ingredients in scrubber liquor	> 85%
Injection of bromine-containing chemicals into the incineration chamber + Scrubber	> 90%
Activated carbon injection + fabric filters	> 95%

➤ Performance associated with the use of BAT

- Combinations of techniques described in chapter 5.5 deliver **Hg-concentrations below 10 µg/m³**
- Techniques using activated carbon below 1 µg/m³



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Waste Incineration (3)

BEP

- Different types of waste can influence mercury emissions (e.g. electronic waste, sewage sludge, hazardous substances)
- **Input control and source separation!**
- Waste management practices
 - Source separation and recycling
 - Inspection and waste characterization
 - Proper handling and storage
 - Good incineration operating and management practices
 - Site selection for new installations (to minimize potential risk to public health and environment)
 - Regular inspection and maintenance
 - Operator training
- Prevention of fire risk



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Waste Incineration (4)

Special Aspects of the Sector

- Monitoring
 - Continuous monitoring **preferred**
 - Proper functioning of flue gas treatment installation
 - Prompt detection of changes in Hg-content in waste
 - Detection of improper input and fast reaction
 - Discontinuous
 - Surveillance of functioning of flue gas treatment
 - No detection of high mercury levels
 - Indirect methods **not suitable** for waste incineration
- Open burning and use of small simple kilns are **Bad**
Environmental Practice – not effective with regard to Mercury!
- Recovered energy can be an important benefit!



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Cement clinker production facilities

- Limestone and other mineral components are burned to produce clinker
- Clinker is then ground and mixed with certain additives to form the final product, cement
- Different types of fuels are used to provide the necessary heat for the production process
- Mercury emissions to air originate from the raw materials and fuels



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Cement clinker production facilities

➤ BAT/BEP

➤ Primary measures

- Use of limit requirements on mercury content in *raw materials and fuels*;
- Use of a quality assurance system for input materials, especially for waste-derived raw materials and fuels, for the control of mercury content in input materials;
- Use of input materials with low mercury content when possible, and avoiding the use of waste with high mercury content;
- Selective mining if mercury concentrations vary in the quarry, when possible;
- Choice of location for new facilities that takes mercury content in the limestone quarry into account.



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Cement clinker production facilities

- BAT/BEP (continued)
 - Secondary measures
 - Dust shuttling and collecting the dust instead of returning it to the raw feed
 - Dust shuttling combined with sorbent injection
 - Sorbent injection with a polishing bagfilter
 - Multi-pollutant control measures
 - Wet scrubbers – sulfur dioxide emissions control
 - Selective catalytic reduction – nitrogen oxides emissions control
 - Activated carbon filter – multiple pollutant emissions control



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Cement clinker production facilities

- BAT/BEP (continued)
 - Indicative performance level associated with BAT/BEP in new and existing facilities for control of mercury emissions to the air is below 0.03 mg Hg/Nm³*
- Major issues raised in public comment phase
 - Use of alternative fuels (e.g., waste-derived fuels)
 - Indicative performance level of BAT/BEP
 - Costs of the control measures
 - Mercury monitoring issues

*as a daily average, or average over the sampling period, at reference conditions 273 K, 101.3 kPa, 10 per cent oxygen and dry gas



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Other guidance required under Article 8

Support for Parties in implementing measures for existing sources, in particular guidance on determining goals and setting emission limit values (7/6/Add2

Guidance provides information on the technical aspects of existing sources

Guidance does not give information on other elements of support at this stage, as the group only considered technical aspects.



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Guidance on criteria relating to relevant sources (7/6/Add3)

- Paragraph 2b of Article 8 defines relevant sources
- It indicates that a Parties may determine that individual point sources are not included as a relevant source, provided these make up less than 25% of emissions from the category
- Guidance is provided on criteria related to this decision



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Guidance on the methodology on preparing inventories of emissions (7/6/Add4

Guidance on how to prepare an inventory

Includes references to the UNEP Mercury
Inventory Toolkit as a methodology which is
available for use.



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Questions

<http://www.mercuryconvention.org/Convention/Formsandguidance/tabid/5527/language/en-US/Default.aspx>