

# **Report of the Task Force on Heavy Metals 2010**

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# Focus of the Work in 2010

## Meeting of the Task Force on Heavy Metals

- Held from 1st to 2nd June '10 in Stockholm
- Hosted by the Swedish EPA
- Participants from 9 countries

## Two informal papers:

- On manganese and secondary aluminium industries
- On mercury-containing products in the EECCA region

# Technical reviews of the proposal for mercury-containing products

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## Track A

- **Products or product groups intentionally containing Hg**
- **They have the potential to lead to a bioavailable form**
- **They contribute significantly to transboundary atmospheric emissions**

## Track B

- **Do the measures reduce emissions?**
- **What are the costs and benefits?**
- **Assessment of efficacy and risks or extent to which suitable alternative measures exist**

# Results: Track B Work - 2010

- **Information from Canada and the U.S.A.**
- **Conduct socio-economic studies to assess and develop regulations on products**
- **Introduction of measures, such as:**
  - **Labelling and annual reporting**
  - **Granting permits and specific exemptions, limiting or prohibiting sale and import**
  - **Regulations exist, e.g. Canada-wide standards, regulatory controls by states and localities**
- **No regulatory actions currently considered for:**
  - **U.S: dental amalgam, fluorescent lamps, vehicles**
  - **Canada: no viable alternatives for some lamps and dental amalgam**

# Results for Batteries

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- **U.S. : 33% decline of Hg contained in batteries (2001 to 2007)**
- **Canada: release of 2.5 t (2008); 14% to air**
- **Mercury-free alternatives widely available**
- **The Battery Act prohibits the sale of most Hg-containing batteries**
- **Commitment of the battery industry to eliminate Hg-containing button cells by June 2011**
- **Collection and recycling systems in place in some states and provinces**

# Results for Measuring Devices

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- **U.S.: 81% decline in domestic consumption (2001-2007)**
- **Canada: 0.5 t released (2008), 28% to air**
- **Alternatives widely available at comparable costs**
- **U.S: participates in domestic and international voluntary partnership to substitute those devices with mercury-free alternatives in health care facilities**

# Results for EEE

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- **U.S.: 54% decline in domestic consumption (2001 to 2007), 31.4 tonnes contained**
- **Canada: total releases 2t, 14% to air (2008)**
- **Hg-free alternatives widely available**
- **Costs are generally equivalent**
- **Hg-free alternatives might not meet all retrofitting situations so far**
- **Collection and recycling systems in place in some states and provinces**
- **U.S.: regulatory measures under discussion**

# Results for Fluorescent Lamps

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- **U.S.:** slight increase of consumption due to number of lamps and novelty products (e.g. Crystal displays, flat tv, projectors)
- **Canada:** 80% reduction in average content (1990 to 2010), total releases 1.4 t with 20% to air
- **Alternatives are more expensive (LED) or inefficient incandescent bulbs (energy-efficiency requirements!)**
- **Other measures:**
  - **Voluntary increase of recycling**
  - **Capping of maximum Hg-content**
  - **End-life-management**



# Results for Dental Amalgam

- **U.S.:** 46% decline in use (2001 to 2007), 15 t in 2007
- **Canada:** release 4 t in 2008 with 19% to air
- **Alternatives seen generally as more expensive**
- **Alternative measures:**
  - **Guidance documents for dentists**
  - **Best management practices for handling amalgam waste**
  - **Dentistry teaching modules for students**
- **Study from Canada: Not only collection needs to be efficient also the handling of waste is important (e.g. down the drain, in the trash, sharps container, biomedical waste); 95% reduction (base year 2000)**

# Results for Vehicles

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- **Switches have been phased-out already in North America and Europe (decrease of emissions expected during the next 10 to 15 years)**
- **Alternatives on the market for all switches**
- **Alternative measures: removing all mercury-containing switches before melting**
- **Switch management and recovery programmes for recyclers and steel mills (capture rate 80 to 90%)**

# Other Products of Concern

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- **Fluorescent lamps (back lights) and switches contained in EEE or vehicles**
- **Tyre balance weights as possible source of mercury**
- **Most of the mercury consumed in batteries not covered by the EU proposal (i.e. button cells and military equipment)**
  - **Mercury-free cells are available at comparable costs**
  - **Market restrictions would lead to further reductions of mercury consumption and emissions**

# Product-specific Conclusions (1)

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- **Alternatives widely available at comparable costs**
  - Batteries including button cells
  - Switches and relays
  - Flame sensors
  - Thermostats
  - Barometers, manometers, psychrometers
- **Sometimes alternatives seen as not economically feasible for specific products**
- **Fluorescents lamps**
  - Content per unit decreasing
  - Mercury consumption increasing
  - Alternatives exist: more expensive (LED) or less efficient

## Product-specific Conclusions (2)

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- **Amalgam separators are a cost-effective measure**
  - Considerable amounts of Hg removed
  - Efficiency of 95% required in some countries
  - Ban of new amalgam fillings
  - Voluntary approaches
  - EECCA region: use of up-to-date materials in many countries
  - Mercury-free alternatives exist: in some countries costs were comparable
  - Indirect benefits for environment, health and cosmetics

# General Conclusions on Track B (1)

- **The proposed measures could reduce the amount of atmospheric emissions of mercury entering air ,water and soil**
- **For most products reviewed, Hg-free alternatives are widely available at comparable costs**
- **Most releases occur during disposal phase**
- **Removing mercury from waste stream before incineration is much more cost-effective than capturing Hg from flue gas**
- **Waste collection and recycling systems help to reduce emissions**

# General Conclusions on Track B (2)

- **Waste collection and recycling systems**
  - Vary widely in effectiveness and efficiency
  - Effective systems could be costly and difficult to achieve
- **Proposed sales prohibitions would affect new sales and imports but not products already in use**
- **Measures could result in cost benefits to society**
  - Reduced costs associated with human health and environment
  - Preventing loss of income in commercial fisheries
  - Reduced administrative costs for scientific research and development, control and risk communication

# Information on Secondary Aluminium Industry

- Raw material from process, swarf and scrap
- Same quality but consumes only 5% energy
- 60% of Al in Germany and EU is already secondary Al
- Source of HM mainly colour pigments and stabilisers
  - (Cadmium, Lead, organic tin compounds)
- Dust range: 0.6 – 10 mg/Nm<sup>3</sup> of which is 10% metals
- 0.03 kg dust/t sec.Al -> 2gPb/t -> 1.4% Pb in Germany
  - New emission factor 8.7 mg/t
- Cd: 36 mg/t (single reading)
  - Worst case calculation -> 1.1 % Cd in Germany
- **Various trends for the future. Not sufficient data!**



# Information on Manganese Industry

- **Different sources of ore in the world, some contain quite a lot of mercury**
- **Hg-emissions from Norwegian manganese plants 10t/a ->600 to 1000 t/a (doubled national emissions)**
- **Multi step cleaning process**
  - **Wet scrubbing**
  - **Wet electrostatic precipitation**
  - **Special Hg absorption**
- **Revised permits: 36kg/a and 15 kg/a (1mg Hg/Nm<sup>3</sup>)**
- **Cleaning efficiency for mercury 99 %**

# Information on Products in the EECCA region (1)

- **Data from Russia, Serbia, Ukraine, Kirgizia, Belarus**
- **Batteries:**
  - Hg-free batteries are available
  - In Russia about two thirds are of all batteries are Hg-free
  - No restrictions so far
  - Serbia: regulation in line with EU proposal
- **Thermometers**
  - Hg-free thermometers are available but about 5 times more expensive
  - Russia: 1 t out of 18t “used-up” is recycled
  - Serbia: restricted use , still available for the public
  - Belarus: collection and treatment facilities available

# Information on Products in the EECCA region (2)

- **EEE**
  - **Serbia and Ukraine: limited content in line with the EU proposal**
  - **Russia and Kirgizia: no regulation in place**
  - **Belarus: collection and treatment facilities in place**
- **Fluorescent Lamps and Tubes**
  - **Average content of Hg comparable to other regions of the world ( 3 – 5 mg/ lamp for CFLs)**
  - **Facilities to treat lamps in Ukraine, Belarus and soon in Serbia**
  - **Russia: regional regulations**
- **Dental Amalgam**
  - **Side chair traps in use, its use is voluntary**
  - **Russia: additional extraction hoods in dental practices required**
  - **Limited use of amalgam, dentists and patients prefer other mat.**
  - **Kirgizia: no use of amalgam**

# Conclusion on Products in the EECCA Region

- **Countries are aware of mercury in products**
- **Good choice of alternatives in several countries**
- **Collection and recycling not yet very common but examples for labelling and regional treatment**
- **Recycling facilities for Hg-containing lamps**
- **Belarus: recycling for different products and waste possible, 10 t Hg and 3.5 Mio lamps can be treated per year**
- **Limited use of amalgam therefore side chair traps would affect mostly old fillings; seen as costly**
- **Countries taking part in projects are often further developed**

**Thank you for your attention !**

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## Results Track A (2)

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- **Significant contribution to total trans-boundary atmospheric emissions of Hg**
  - **Estimation by the TFHM: 349 t total Hg**
    - (based on EMEP data)
  - **AMAP/UNEP best estimate: 377 t**
  - **Estimations for each product account for 81 – 102 tonnes, i.e. 23 to 29 % of total regional emissions**

# Conclusions on the Benefits of Reduced Mercury Emissions

- **Measures proposed lead to costs to society**
  - **Investment costs**
  - **IQ-loss (1 kg Hg to air, 8,000 Euro)**
  - **Emissions to water estimated as a factor of 1,000**
- **Impact assessment for all products in Europe states measures are cost-effective**
- **Canada: socio-economic study of Hg-containing products and their alternatives + risk management strategy**
- **USA: socio-economic study under way, i.e. products, substitutes, risk assessment, cost-benefit analysis. Results expected autumn 2010**