



Mercury Emissions from Crematoria

**Great Lakes Binational Toxic Strategy
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Source and Quantity

Main source of mercury is dental amalgam

US flow model has cremation as third largest source of air emissions of mercury from products at 2436 kg a year in 2005

Canadian 2001 report to UNEP puts air emission of mercury at 6% of total from incineration; 120 kg a year in 1995

Data have high levels of uncertainty

Background Data

Nearly 1,900 crematoria in US. Canadian number not known

710,000 cremations in US in 2004, just under 30% of all deaths

Mississippi: < 9% of deaths

Hawaii: 68% of deaths

121,000 cremations in Canada, 56% of deaths

Background Data (cont'd)

Rate of use of crematoria varies widely

Delaware: 137 cremations per unit

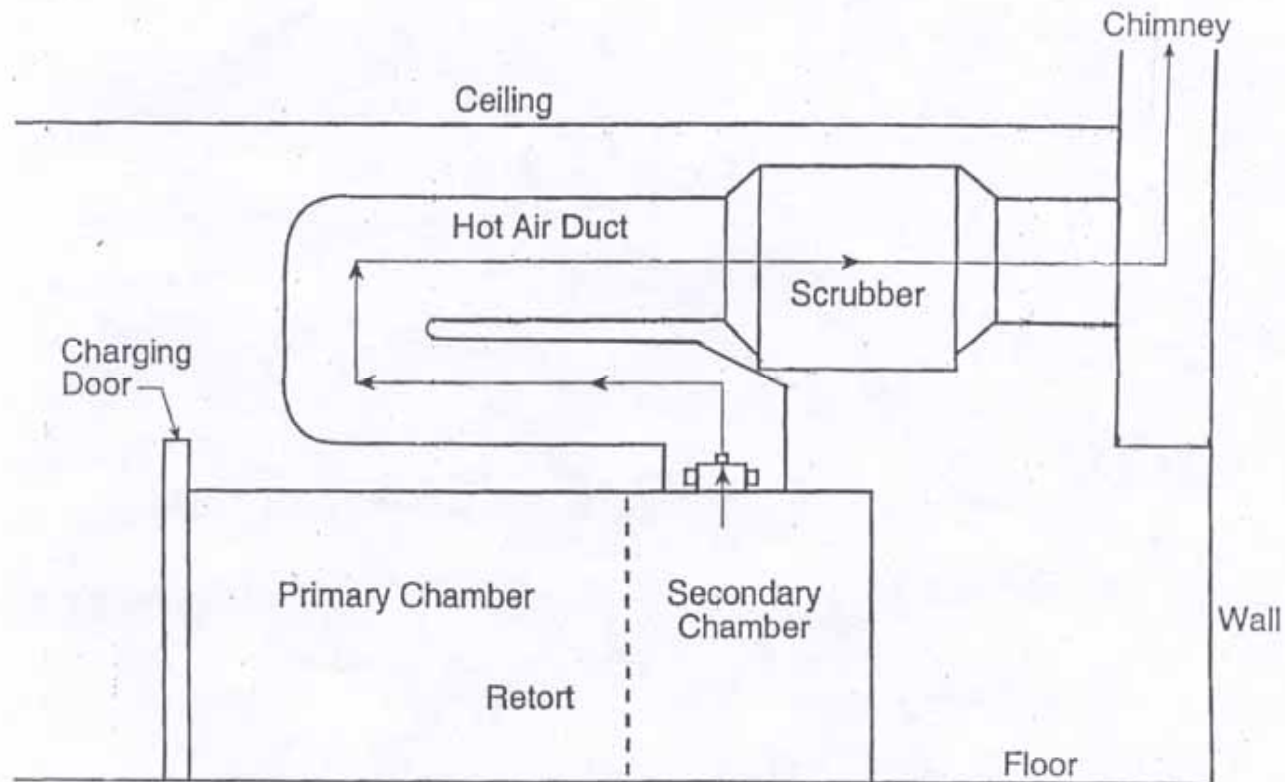
Maine: 1,059 cremations per unit

Use rate affects economics of scale, including for control systems

Typical Crematorium



Crematorium Schematic (with Scrubber)



Outside View of Cremation Area



Cremation Process

Corpse put in cardboard container on gurney

Pacemakers, jewelry and possibly other products removed

Fed into primary chamber, temperature raised to 1650 F (900 C)

Process lasts 2-3 hours

Environmental Fate of Emissions

Effects are probably most global; emissions appear to be mostly (if not all) in a metallic form

Swiss study found elevated levels in soil; New Zealand and Norwegian data show the opposite

Emission Standards

No known standards in North America

European standards include:

Concentration limits of 0.050 to 0.2 mg/Nm³

Total limit of 150 mg per 4 cremations

BAT without specific numerical standards

Control Methodologies

Removal of restored teeth prior to cremation

Stack controls

- Co-flow filters

- Solid-bed filters

- Traditional gas scrubbing

- Honeycomb catalytic absorbers

Barriers to Control Methodologies

Lack of recognition of the need to control

For removal prior to cremation, cultural values for the handling of corpses

Costs and physical challenges of stack controls

Industry tradition – only one crematorium in the US is said to have stack controls

Recent Legislation in the US

Washington state in 2003 – exemption industry in comprehensive legislation

In 2005, Maine and Minnesota had bills introduced, failed in both states

Data Uncertainties, Future Forecasts

There are significant uncertainties in North American data – few studies exist

North American demographics may be different than European for restoration sizes, composition and number

Forecast for the future is for an increase in emissions for the next several decades, followed by a decrease

Recommended Informational Needs

Amount of mercury released per cremation

Mass balance – air, ash, deposited on crematorium surfaces

Speciation of air emissions

More expertise among researchers, regulators

For a Copy of the Literature Review

Electronic or paper version available

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