PO Box 173 Bangalow
NSW 2479 Australia
info@ntn.org.au

www.ntn.org.au

Working globally for a toxic free future

National Toxics Network Inc. Australia

Submission to UNEP on:
Draft guidance on best available techniques and best environmental practices (BAT/BEP) for controlling and where feasible reducing mercury emissions to the atmosphere. Article 8: Minamata Convention on Mercury.

Attention: The Coordinator
Interim secretariat of the Minamata Convention on Mercury
Chemicals Branch
Division of Technology, Industry and Economics
United Nations Environment Programme
Geneva

The following submission has been prepared by Lee Bell for NTN in response to requests for stakeholder input to the Interim secretariat of the Minamata Convention on Mercury, Chemicals Branch, Division of Technology, Industry and Economics, United Nations Environment Programme for stakeholders to comment on the Draft BAT/BEP guidelines for reducing mercury emission from point sources.

General comments:

Lack of balance: maintaining the polluting status quo.

The overall context of the BAT/BEP document appears to be narrowly defined in terms of how to improve the operation of existing facilities such as cement kilns, coal power stations and waste incinerators, to reduce mercury emissions or how to ensure new facilities of this type use the best techniques and practices to reduce mercury emissions. This approach narrows the focus of the document to 'how to best run and incinerator or coal fired power station to reduce mercury emissions'. This approach largely excludes the alternative technologies, practices and techniques that would have a far greater impact on reducing mercury emissions.

As an example the chapter entitled; *Guidance on Best Available Techniques and Best Environmental Practices to Control Mercury Emissions from Coal-fired Power Plants and Coal-fired Industrial Boilers,* does not canvas renewable energy generation technology as an alternative to burning coal for energy. The chapter on incineration is similarly flawed in that its underlying assumption is that we must manage incinerators better instead of reducing mercury by highlighting alternatives to incineration of waste which minimal mercury emissions. This simply entrenches the status quo, and

maintains a focus on incremental improvements to known polluting technology instead of highlighting alternative technology and practices that minimise or eliminate mercury emissions and releases.

The framing of the issue should be *'what are the best techniques and practices to generate energy with minimal mercury emissions'* or *'what are the best techniques and practices to manage waste with minimal mercury emissions'*. Instead, the guidance document entrenches the view that incineration of waste and coal fired power are inevitable and enduring technologies that must be better managed into the future. In reality, both have far more environmentally sound alternatives (Zero Waste practices in a circular economy and renewable energy respectively). As these practices and technology gain increasing market share and carbon disincentives increase, the trend for construction of polluting technologies such as coal fired power and incinerators will decrease and more closures will occur. In this sense the guidance reads as a blinkered defence of these old polluting technologies when it could be far more progressive and consider the wider trends gathering pace in energy production and waste management that inherently have low or no mercury emissions or releases.

Unbalanced focus on stack emissions not emissions from solid and liquid releases

The guidance has a tendency to focus on stack-based airborne emissions from incinerators, coal fired power plants and cement kilns to the exclusion of emissions arising from the solid waste residues (coal ash, incinerator bottom ash and fly ash, cement product and scrubber residue).

The greater the amount of mercury that is scrubbed from the exhaust gases of these facilities using improvements in APC, the greater the amount of mercury that becomes entrained in the filter media which eventually becomes waste. There is virtually no discussion on BAT/BEP for minimising emissions from solid or liquid waste arising from the operation of these plants. While elemental mercury is poorly contained in gaseous form by APC such as ESP or baghouses the addition of activated carbon can, in some cases, capture a significant proportion the mercury vapor. The management, handling, storage and disposal of these considerable quantities of residues can exacerbate mercury emissions and releases from the waste. The contaminated sites created by the disposal of these combustion residues may also, in turn create further emissions. This has not been adequately addressed in the guidance beyond the suggestion on page 20 of the incineration chapter that it 'should be handled with care.' and then only in regard to leaching.

A full analysis of the mercury leaching and emission potential of residues from all stationary sources should be documented in the guidance.

Specific chapter comments

- Introduction and Summary

There is no discussion of cross-cutting issues in relation to waste management in the Introduction. There are a range of cross cutting issues that affect both mercury and POPs in waste and it seems appropriate to draw upon the section *(ii) Waste management considerations* in *SECTION III. BAT/BEP: Guidance, principles and*

cross-cutting considerations of the Stockholm Convention support documentation. The text could be largely transposed to this Guidance with some adjustment to reflect the focus on mercury instead of POPs. However in most respects the text is largely relevant en bloc.

The addition of some overarching narrative between the cross cutting issues and the overall 'Introduction section' would assist in bringing some balance to the Guidance. Other cross cutting issues to consider include the relative impact of waste management practices on climate change. Both coal fired power and incineration. (where energy is generated from burning waste) have very high carbon footprints with incineration exceeding CO2 emissions of coal fired power per unit of energy produced. Highlighting renewable energy as an alternative technique to coal fired power is a way to address reduction in both mercury and CO2 emissions simultaneously.

While the guidance on cross cutting issues in the waste management section of the Stockholm BAT/BEP mentions 'zero waste' strategies, it could provide more detail and references on this approach which has rapidly gained global support and increased implementation. The adoption of that text in this draft guidance provides an opportunity to update and more fully describe this practice in the context of the circular economy framework emerging in the EU and elsewhere.

- **Waste incineration facilities chapter**

Almost 50 pages of this chapter are dedicated to the better operation of waste incinerators compared to half a page of alternatives to incineration of waste. This lacks a balanced representation of available options. There is virtually no detail on alternative technologies for the treatment of medical wastes which are generally high in mercury content due to the co-mingling of broken medical measurement devices containing mercury. Developing countries have a specific need for guidance on alternative technologies, practices and techniques as they often lack the regulatory environment and financial capacity to operate incinerators according to BAT/BEP guidelines. Many medical facilities in developing countries operate small scale incinerators that are incapable of being operated according to best practice or with modern complex APC units. The section on alternatives to medical waste incineration should be more fully developed. Four dot points on this subject on page 28 of the incineration chapter is clearly insufficient. Incineration of mercury wastes should be discouraged due to the high potential for mercury vapor release under situations other than optimal operating conditions (which are frequent in terms of start up, shut down, trips and outages).

Again there should be more development of alternatives to incineration of municipal waste and hazardous waste. The former contributes significant quantities of mercury to incinerators in the form of e-waste, broken CFLs, batteries and broken domestic medical devices such as thermometers. Developing countries are often struggling with waste management approaches and guidance on Zero Waste strategies should be included in this section or in a more fully developed annex to this chapter of the guidance document more generally.

Dot point 2 on page 40 is inappropriate; *"Creating and maintaining public goodwill towards a waste incineration project is critical to the success of the venture."* Most incinerator projects have an extreme deficit of public goodwill due to their history of mismanagement and pollution. This reads like a public relations 'how to' guide for incinerator operators and adds little to this document except a sense that it promotes incineration over other techniques. Suggest delete that dot point.

The text box under the heading **WASTE INCINERATION FACILITIES – SUMMARY** contains the text, *"With a suitable combination of primary and secondary measures, mercury emission levels in air emissions not higher than 1-10 µg /m3 (at 11 per cent O2) are associated with best available techniques."* However, the graph at Fig. 9 demonstrates a German (Hamburg) incinerator emissions as significantly exceeding this level of mercury emission for several months to the point where they leave the graph at 50 µg /m3. It is not clear if this graph is supposed to represent BAT/BEP operation of the Hamburg incinerator. If so, it would appear that the Hamburg incinerator experiences problems with excessive mercury emissions and perhaps is not the best example of mercury emission reduction in practice.

Dot point 2 on page 46 suggests *"adding bromine to the combustion to enhance the oxidation of mercury"* (and thereby reduce elemental mercury emissions) however addition of bromine to an operating incinerator raises the problem of generating POPs emissions in the form of PBDD and PBDF. This should not be included in the guidance. Incinerators are a well known source of polychlorinated dioxins and furans and promoting brominated dioxin and furan production through addition of bromine cannot be regarded as BAT/BEP in any sense.

As mentioned previously incineration should not be promoted as a suitable technology for treatment, destruction or disposal of mercury waste due to its essentially open process and high potential for release of volatilised mercury vapour via emissions and releases. The focus of this chapter should be balanced toward the numerous, well proven and commercially available non-combustion alternatives. It is worth noting that a recent expert review of mercury contamination remediation technologies noted that, "Incineration can be considered as not applicable for mercury.[1]"

- **Draft guidance on cement clinker production facilities chapter**

This chapter acknowledges that cement production is a significant source of mercury emissions and potentially releases due to the mercury load in conventional raw materials (and alternate materials which are industrial wastes) and conventional fuels and alternate fuels (waste derived fuels). Table 1 at page 6 indicates the average mercury concentration of inputs to the cement facilities in terms of materials and fuels. It also clearly indicates that mercury concentrations *in waste materials* used as alternatives to natural raw materials are a magnitude of order higher than naturally occurring raw materials while waste derived alternate fuels have a mercury concentration of a similar level to conventional fuels. It should be noted in the text that a method to reduce mercury emissions is to *avoid the use of waste derived raw*

[1] Merly, C., and Hube, D., (2014) Remediation of Mercury Contaminated Sites. Prepared for the Snowman Network - Enhanced knowledge in mercury fate and transport for Improved Management of Hg soil contamination. Project No. SN-03/08 Bureau de Recherches Géologiques et Minières

materials in cement facilities due to their relative high mercury concentration (which are in turn converted to mercury emissions by the combustion process).

Table 1 also lists municipal sludge as an alternate fuel with a maximum concentration of 2.5 ppm. It is not clear if this is a term that also includes sewage sludge which has much higher recorded values for mercury concentrations between 5ppm (Glass et al 1990) and 16ppm[2]. This should be reflected in the table and a recommendation to avoid the use of high concentration mercury alternate fuels included in the text. The statement directly under Figure 1. is misleading;

"The use of alternative fuels and/or alternative raw materials will not necessarily increase (or decrease) mercury emissions. It simply depends on the relative mercury contents of such materials."

It is clear from Table 1 and other sources that waste derived alternative materials are almost universally a magnitude of order higher in mercury concentrations than natural raw materials. The text should read *"The use of alternative fuels and/or alternative raw materials may increase mercury emissions depending on the relative mercury contents of such materials. Alternative raw materials have significantly higher mercury concentrations than natural raw materials. Some alternative fuels such as sewage sludge have been identified with much higher concentrations of mercury than other fuels (either conventional or alternative) and may result in higher mercury emission when combusted.."*

In para 5 of section 3.1.1 the sentence *"In cases where alternative raw materials lead to a significant increase in the mercury intake into the system they may have to be replaced by another alternative material."* obscures the obvious conclusion that alternative (waste derived) raw materials are significantly higher in mercury than natural raw materials (according to Table 1) and should be avoided by plant operators if they are serious about reducing mercury emissions. This guidance document should not seek to disguise the fact that high mercury concentration waste derived materials are used as a cost cutting measure in cement production at the expense of environmental pollution through increased mercury output. It is not enough to suggest selecting low mercury content fuels and materials. The Guidance should make a distinction between these categories of materials on the obvious mercury content difference and recommend against the use of those materials known to have high mercury content.

- Draft *Guidance on Best Available Techniques and Best Environmental Practices to Control Mercury Emissions from Coal-fired Power Plants and Coal-fired Industrial Boilers*

As mentioned earlier in this submission this chapter is bereft of any consideration of alternative methods of generating energy that minimise mercury emissions. Moving forward as a society we need to share critical information on the best methods to

[2] Zabaniotou, A., and Theofilou, C., (2008) Green energy at cement kiln in Cyprus--Use of sewage sludge as a conventional fuel substitute *Renewable and Sustainable Energy Reviews*, 2008, vol. 12, issue 2, pages 531-541

generate, store and use energy with minimal environmental impacts. This chapter simply reads as a manual on the better operation of coal fired power plants to reduce mercury emissions. Any benefits gained from this approach may be limited if the total number of coal fired power stations continues to rise. The aggregate emissions of an ever increasing global inventory of coal power stations will eclipse the relatively marginal mercury emission reductions achieved through the technical innovations in this chapter. In most cases these methods of restricting airborne emissions will transfer the mercury into releases via solid and liquid residue disposal with negligible net benefit to the environment over time. This chapter clearly requires a renewable energy generation section if it is not to appear anachronistic or worse.

Conclusion

In order for the BAT/BEP Guidance of the Minamata Convention to serve the objectives of the treaty and provide advice to minimise anthropogenic emissions and releases of mercury it is essential that the guidance highlight the alternatives to combustion practices for waste management and energy generation. Specifically the guidance should compare the mercury output of coal fired power and renewable energy technologies. Many developing countries still have an opportunity to leap frog the energy generating technology entrenched in industrialised societies which are dependent on fossil fuels and would find broader guidance on alternatives useful. If energy generation technology should be required to have least mercury output possible then renewable energy technologies clearly have a role and should be described in this guidance or an annex to it.

In terms of waste management, new paradigms including Zero Waste and the circular economy are rapidly gaining policy traction world-wide. This guidance devotes far too much attention to operating waste incinerators at the expense of other techniques for eliminating mercury emissions from the waste sector. The central issue is the need for balance within the guidance which is currently heavily skewed towards operating technologies whose future utility and social acceptability are rapidly diminishing.

Please direct any further inquiries to:

Dr Mariann Lloyd-Smith PhD (Law)
Senior Policy Advisor, IPEN - International POPs Elimination Network
Senior Advisor, National Toxics Network Inc.
PO Box 173 Bangalow NSW 2479
(612) 66815340 / 0413 621557
biomap@oztoxics.org
Skype - mariannls
www.ntn.org.au
www.facebook.com/ntn
www.ipen.org / www.ipen-china.org
@toxicsfree

Lee Bell
Senior Researcher
National Toxics Network Inc.
leentn@bigpond.com