



**UNITED NATIONS
ENVIRONMENT PROGRAMME
CHEMICALS**



**Overview and Summary of Outcomes from the Regional
Consultations on the Draft Guidelines on Best Available
Techniques (BAT) and Best Environmental Practices (BEP)
relevant to Article 5 and Annex C of the Stockholm
Convention on Persistent Organic Pollutants (POPs)**

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1 OVERVIEW

At the third meeting of the Expert Group on best available techniques (BAT) and best environmental practices (BEP) in Tokyo in October 2004, UNEP Chemicals foreshadowed a series of regional consultations on the draft guidance to assist countries prepare for the first meeting of the Conference of the Parties of the Stockholm Convention (COP-1) to be held in May of 2005. It was considered that successful COP consideration, and subsequent use of the guidelines, would depend on participants' understanding of the issues. It was important also that the guidance be representative of all regions.

The schedule of the consultations was as follows:

- 9-11 February 2005; For the Central and Eastern European region; Vienna, Austria.
- 2-4 March 2005; For the Asia Pacific region; Wellington, New Zealand.
- 7-9 March 2005; For the Central and South East Asia region; Bangkok, Thailand.
- 14-16 March 2005; For the GRULAC region; Buenos Aires, Argentina.
- 21-23 March 2005; For the West Asia region; Manama, Bahrain.
- 11-13 April 2005; For the Africa region; Nairobi, Kenya.

The objectives of the consultations were:

- to inform countries of all aspects of the draft guidelines;
- to identify where further guidance was needed to reflect regional needs;
- and to help prepare countries for COP-1 discussions relating to the possible adoption of and further work on the guidelines.

The term “consultation” rather than “workshop” was used to make clear that these were not training sessions – UNEP was seeking information from the regions, as well as providing them with information.

The aims of the consultations were thus:

- to set the scene for a constructive consideration of the BAT/BEP issue at the COP in Uruguay.
- to inform countries of the draft guidelines,
- to get feedback on where further guidance is needed to reflect regional needs, and
- to help countries prepare for COP-1 discussions relating to the adoption of and further work on the guidelines

Participants were expected to have read the “Draft Guidelines on best available techniques and provisional guidance on best environmental practices relevant to Article 5 and Annex C of the Stockholm Convention on Persistent Organic Pollutants”, which was available at the Conventions webpage http://www.pops.int/documents/batbep_advance/default.htm. Relevant language versions were available prior to each regional consultation.

Participants were also requested to be prepared to give short presentations of their experiences in addressing BAT and BEP in the development of their National Implementation Plans (NIPs), especially as they moved past the inventory stage into setting action plans.

From the UNEP perspective, answers to the following questions were being sought:

- Was the guidance document comprehensive? If not, what was missing?
- Was the guidance document user friendly?
- Was there room for improvement? Where does it need to be improved? From a National or Regional perspective?
- What ways and means can be used to provide any required additional input?
- What processes and mechanisms can be employed for the future development of the guideline document?

The consultations were organized by UNEP Chemicals in cooperation with the Secretariat of the Stockholm Convention, with financial support from the Governments of Switzerland, and New Zealand and the Canada POPs Fund.

2 REGIONAL CONCLUSIONS

The consultations followed an informal structure and no detailed record was made. However each consultation identified some key issues which are reflected in the following section. A synthesis of all the regional views is contained in Section 3-Summary.

2.1 CENTRAL AND EASTERN EUROPEAN REGIONAL CONSULTATION: 9-11 FEBRUARY 2005, VIENNA, AUSTRIA.

Structure of the Document

1. It was generally felt the draft guidelines and guidance were relevant, useful, practical and of high quality.
2. The scope of the guidance document was comprehensive enough, however it was too early to discuss its userfriendliness. The document would need improving and tightening of certain sections especially chapters 5 and 6.
3. There was general agreement that the inclusion (or interactive linking) of additional references and contact people (e.g., EGB authors) would be helpful in improving its userfriendliness.
4. Secretariat should maintain a Clearing House mechanism with respect to information and documentation of alternatives, substitution and relevant legislation. Also having this type of mechanism will essentially make the document more user-friendly and less bulky.

Suggestions for Further Work

1. Regionally Specific Issues:
 - Steelworks and incinerators of hazardous waste are priority activities were BAT/BEP issues are very important in the Central and Eastern European region. It would be useful to have more information on the use of hazardous waste as a fuel and an additional section on control measures with respect to the commissioning of industries.
 - More information on open burning of dumps and how best to apply BEP should be included.
 - The metallurgy industry is an important source of POPs emissions and is not well adapted for BAT/BEP. More information on this sector would be useful.
2. General Issues:
 - The guidance document should be clear regarding synergies with other multilateral environmental agreements. BAT/BEP should not be restricted to the unintentional emission of POPs but also for sound technologies.
 - Member States should be legally encouraged to use the guidance document.
 - An expert group should be convened to review the Dioxin and Furan Toolkit. The responsibility for reviewing the Toolkit should move away from UNEP Chemicals' armipits to that of a specific expert group. Expand POPs Toolkit to include unintentionally produced HCB, and PCBs.

- There was need to focus on monitoring for compliance and quality control.
 - (i) Analytical laboratory infrastructure – this was found to be very inadequate for most countries in the developing world.
 - (ii) Involvement of the Stockholm Convention regional centers in the issue of sampling and analysis of POPs would be desirable since this is a very expensive activity for most Member States.

Country Contributions and a Follow-On Process

1. There was need for more expertise in the EGB, and its use in the region. The regional distribution of the expert group was correct, but it however left out some countries with big and diverse industries like China, India, Brazil, Egypt Algeria and Iran. Their experiences would have been of benefit and greatly contributed to the guidance document.
2. There may be need to engage regional consultants to support the work of the EGB experts. If this was done on a regional basis then there would be need for allocation of resources to improve regional intercessional work.
3. It may not be reasonable to alter the core EGB experts but these may need to be supported by experts from the important industrial countries that were not properly represented, initially. Anyway it should be noted that countries have to be Parties to the Stockholm Convention for them to have input and contribute.
4. An open ended process could be engaged whereby – (a). The process could be time constrained and inputs to complete the guidance document would be presented at a specific COP or (b). The process could be product constrained in which case there is no time limit in which to complete the guidance document.
5. It may be good for specific deliverables to be targeted for specific COPs.
6. **Comments from EGB members :-**
 - More work was required with respect to sub-paragraph (c), (d) and (e) of Article 5. Further inter-session work was required to deal with the issue of “alternatives” and “substitution”. These issues were not well covered in the current form of the Guidance BAT/BEP document.
 - The Co-chairs reports should be made available at all the regional consultations.
 - Regional differences with respect to BAT/BEP resulting from technological differences needed to be addressed in the BAT/BEP guidance document.
 - The guidance document had been excellently edited and was the result of a lot of work input; however it should remain a dynamic living document.
 - More work needed to be done to accommodate concerns of the developing world.
 - The cement kiln section was not reflective of the EGB input. The choice of words was not the best and thus the wording needed improvement.
 - However, the draft guidance document had artfully tried to harmonize with the Dioxin and Furan Toolkit.
 - Information sources seem to have been left out or were inadequate e.g. on stack gas testing protocols specific for cement kilns.
 - There was need to differentiate between “operational” and “retrofit”.

2.2 ASIA PACIFIC REGIONAL CONSULTATION: 2-4 MARCH 2005, WELLINGTON, NEW ZEALAND.

Structure of the Document

1. Participants generally felt the draft guidelines and guidance were relevant, useful, and of high quality.
2. Suggestions were made for the addition of a glossary to provide plain English definitions of technical terms (SPREP, UNIDO, Australia)
3. There was general agreement that the inclusion (or interactive linking) of additional references and contact people (e.g., EGB authors) would be helpful.

Suggestions for Further Work

1. Regionally Specific Issues:
 - Inclusion of discussions on quarantine waste (airline and ship solid wastes as well as infected produce/shipments)
 - Inclusion of more information on BEP for regional domestic cooking practices (umu, hangi)
 - Inclusion of more information on stationary diesel engines for power generation and the implications of burning waste oils in such facilities.
 - Harmonization of the guidelines and UNEP Toolkit vis-à-vis asphalt and bitumen plants
2. General Issues:
 - The guidelines would benefit from more information on alternative technologies and practices
 - There was need to focus on monitoring for compliance and quality control (e-NGOs)
 - The section on managing fly ash needed more focus as a cross-cutting issue (e-NGOs)
 - Section on cement kiln needed re-working; conclusions not supported adequately; summary and text were somewhat at odds (e-NGOs)
 - Expansion of the POPs Toolkit to include unintentional HCB, PCBs (UNIDO) (or to deal with the lack of knowledge on releases of these chemicals) (e-NGOs)
 - Expansion of the section on building community awareness (e-NGOs)

Country Contributions and a Follow-On Process

1. There was general agreement that the issues of common interest among Pacific Island Communities suggested the need for a more targeted document. Proposals included a regional user's guide as well as a model action plan. It was suggested that SPREP might coordinate such an effort.
2. The use of workshops, including the conduct of case studies, was an effective means of educating countries on the use of the draft guidelines.
3. Work of the Expert Group:

- Contributions by Fiji, Australia, and New Zealand as members of the Expert Group in disseminating information and providing feedback during the development of the draft guidelines were acknowledged.
- There was general agreement that, in view of the further work needed; the group would need to continue after COP-1.
- There was some discussion of broadening or rotating membership in the EGB, while maintaining balanced representation and a transparent process. Participants also stressed, however, the need for fluency in the working language, familiarity with the technical issues, and experience working together as a group.

2.3 CENTRAL AND SOUTH EAST ASIA REGIONAL CONSULTATION: 7-9 MARCH 2005, BANGKOK, THAILAND.

Structure of the Document

1. It was generally felt the draft guidelines and guidance were well tailored, useful, and of high quality.
2. There was general agreement that the inclusion of some sort of interactive electronic format would help in making the guidance document more user friendly.
3. Issues directly affecting the informal sector and small to medium sized enterprises were not sufficiently covered in the guidance document.

Suggestions for Further Work

1. Regionally Specific Issues:
 - Guideline needed to properly cover the issue of medical waste disposal/incineration and the range of appropriate technologies that can be used by developing countries.
 - Inclusion of more information on BAT/BEP for regional activities like activated carbon manufacture, latex rubber smoking, and thermal processes in smoke processes, uncontrolled burning of body bags and small sector metals production.
 - Inclusion of more information on biomass/wood waste oils, charcoal and other unconventional sources of energy typical in the region. Rudimentary and primitive burning practices required examination.
 - Inclusion of a section on “the use of rice husks as an energy source”, in the guidelines.
2. General Issues:
 - The guidelines would benefit and become more comprehensive by the addition of more information on alternative technologies and practices.
 - Inclusion of a step-by-step plan to guide the developing countries in the application and improvement of BAT/BEP processes.
 - Additional information in the development and promotion of waste minimization techniques was requested by some countries in the region.
 - Expansion of the Dioxin and Furan Toolkit to include other unintentionally produced POPs like HCB and PCBs.
 - Other countries had queries as to whether they could use brick ovens to burn infectious medical wastes, and as to whether “encapsulation” could be regarded as some form of BAT?
 - Some participants would have liked the guidance document to contain a sort of checklist approach so as to guide countries in the implementation of BEP.
 - The need to harmonize legislation/regulations and international standards was seen as an issue by some participants.

Regional Contributions regarding the process of the future development of the Guidance document:

1. There was general agreement that the present EGB group of experts should be retained.
2. Work of the Expert Group:
 - Contributions by the EGB in the development of the draft guidelines were acknowledged.
 - There was general agreement that, in view of the further work needed; the group would need to continue after COP-1 to finish the work they started and also tidy, polish and refine the document by filling in all the gaps.
 - There was some discussion of broadening or rotating membership in the EGB. Some countries preferred the Open-ended Working Group Model where everyone could participate in the process. Others preferred the creation of a roster of regional experts that could be used by the Stockholm Convention Regional Centres to participate in closed working groups.

2.4 GROUP OF LATIN AMERICAN AND CARIBBEAN COUNTRIES REGIONAL CONSULTATION: 14-16 MARCH 2005, BUENOS AIRES, ARGENTINA.

Structure of the document

1. The guidelines were found to contain too much information, but unfortunately the document was not user friendly. The guidelines should have a mechanism for indicating linkages between chapter sections. There may be need to develop a flow chart on sequential steps for easy application of the guidelines.
2. Creation of an interactive CD-ROM which would easily provide the linkages between relevant sections.
3. Separation and clear identification between the measures that were considered BAT and those that were considered BEP in the guidelines.
4. There was found to be need for a glossary

Suggestions for further work

General issues:

- Training on the use of the guidelines should be made available for the users or Parties to POPs.
- Creation of a sectoral guideline to address specific activities and consider continued development of each sector by adding new sections as new technologies become available over time, and regional case studies (e.g. Economic or otherwise).
- There was need for general editing of the Guidelines.
- The region recommended that efficiency indicators should be developed for use with BAT and BEP applications.
- Emission levels achievable for each technology should be mentioned as a reference within the document.
- BEP needed to be developed more deeply in the guidelines.
- Considerations to include a section to define scale of investments in alternative technologies, identifying relative costs and benefits for each available alternative.
- Consideration of the size or scale of an enterprise for which the guidelines will be applied.

Regional Contributions regarding the process of the future development of the Guidance document:

1. Draft Guidelines were a good tool, nevertheless further work was needed and to be considered for adoption at a future session, but not beyond COP 2.

2.5 WEST ASIA REGIONAL CONSULTATION: 21-23 MARCH 2005, MANAMA, BAHRAIN.

Structure of the Document

1. It was felt that the document was not very user-friendly
2. There was general agreement with respect to the guide's non-existent applicability to small/medium-sized industries and the informal sector
3. Needed to harmonize the information and style, *e.g.*, Table 2 in Section III.C.(iii), achievable level for municipal waste incinerators (how to deal with present information <0.01 and 0.1 ng TEQ/Nm³)
4. Would have liked to see a division of the present document into thematic notes
5. Needed to eliminate duplication, *e.g.*, flue gas cleaning sub-sections within Sections V. and VI. (move all to Section III.C.(iii)), generalities on formation mechanism (included in Section III.C.(i))
6. Document needed more emphasis on behavioral methods
7. It was felt the document needed more details on practical aspects (technical aspects were covered)
8. Almost comprehensive document covering state-of-the-art technologies, however, these may not be available to all.
9. Inclusion of a step-wise approach for implementation of BAT/BEP on how to reach the long-term goal of continuous minimization of total releases of Annex C POPs (long-term approach and not one-step reduction)
10. Explanation and elaboration on substitution and modification of materials and processes ⇐ See article 5(c)
11. Inclusion of a flowchart to indicate sequential steps on how to use the guidelines
12. Creation of an interactive CD ROM to guide through the document
13. Inclusion of a complete bibliography (⇒ Clearing house)
14. Inclusion of a glossary (list of acronyms and abbreviations)
15. Improvement of the description of certain technologies, *e.g.*, reverberatories for metal production, pre-treatment options
16. Inclusion of BAT/BEP evaluation on alternatives, *e.g.*, POPs destruction technologies as listed in the Basel Convention Technical Guidelines on POPs as Wastes
17. Provision of specific description on alternatives that were indicated in the present document; plus the inclusion of examples, *e.g.*, green purchase, plastic-free alternatives

18. Troubleshooting measures to be included to ensure sustainability of the processes

Suggestions for Further Work

1. Regionally Specific Issues:
 - Inclusion of the following processes: asphalt production, brick and lime production, primary steel production (blast furnaces), use of shaft kilns in cement production, cupola and induction furnaces in metal industry
2. General issues:
 - Correction of errors in translation (to be submitted directly to the Secretariat)
 - Development of schemes for each industry to address what has to be considered for existing plants, for options to upgrade/improve existing plants, for new plants. What are the needs for testing/monitoring?
 - Revision of the guidelines to reflect the needs of developing countries including the economic implications of the implementation of the measures (investment and long-term operational costs and needs, including human resources)
 - Inclusion of information on scales, *e.g.*, on annual capacity, for a BAT plant (technologically, environmentally, and economically sustainable)
 - Incorporation of traditional and indigenous experiences/knowledge into the guidelines, *e.g.*, from Africa
 - Presently, the document only concentrates on PCDD/PCDF. Incorporate information on Annex C, POPs, other than PCDD/PCDF, into the guidelines as information becomes available
 - Addition of regional-specific information including socio-economic information, especially from developing countries
 - Standardization of units and presentation of the data in qualitative or quantitative form (*e.g.* as a percentage or as High, Medium or Low)

Regional Contributions regarding the Process of the future development of the Guidance document:

- There was general agreement that the review process should involve experts and regulatory authorities of the different regions.
- Initiation of a survey to identify the industrial infrastructural development of each country and the use of abatement technology, so as to update the dioxin/furan, PCB and HCB source categories.

Other recommendations from the West Asia region:

- The Secretariat/UNEP Chemicals should undertake training of trainers in the use and application of the Guidelines on a national and regional basis
- Development of tools/supporting programs to encourage countries to implement BAT/BEP practices, *e.g.*, cost-benefit analysis especially addressed to decision makers
- Each country/region had to adapt the guidelines to its specific situation
- Promotion of scientific research in developing countries to calibrate the processes listed in the guidelines
- Developed countries that manufacture the technology to facilitate technology transfer and provide capacity building to developing countries in application and use of these technologies

2.6 AFRICA REGIONAL CONSULTATION: 11-13 APRIL 2005, NAIROBI, KENYA.

Structure of the Document

1. It was generally felt that the draft guidelines and guidance contained useful and abundant information.
2. It was also agreed that the draft guidelines were not structured in a user-friendly manner.
3. There was general agreement that the inclusion of some sort of cross referencing mechanism within the document would be very appropriate in making the guidance document more user-friendly.
4. The guidance document was too technical and requested the creation of a companion document for non-technical people.
5. Needed to harmonize the information contained in the document, e.g., Table 1 in Section III. C. (iv). There was also need to correct translational errors so that all the versions in the different languages said the same thing.
6. The presence of a comprehensive index was viewed to be of paramount importance.
7. Currently the document was viewed as not to contain sufficient information on how to use it.
8. It was felt that there was need to eliminate duplications (e.g. from cross-cutting issues) and also avoid repetition of summaries in Sections V and VI.

Suggestions for Further Work

1. Regionally Specific Issues:
 - Needed to properly cover the issue of medical waste disposal/incineration and the range of appropriate technologies that can be used by the African region especially in remote rural areas.
 - Inclusion of more information on BAT/BEP for the African regional activities like charcoal production from wood, the use of bagasse as a fuel in industrial boilers, and coverage of relevant important cultural practices and other unconventional sources of energy typical in the region.
 - Inclusion of more information on the activities in the petrochemical industry.
2. General Issues:
 - Inclusion of cultural aspects under Section 2.C would make the guidelines better.
 - For new facilities, environmental impact assessment (EIA) should be taken up (Section III.B), and pollution prevention and control needs clarified. For existing facilities, environmental audits should be encouraged.
 - Lack of information as to the size of processes/plants in the guidance document
 - Socio-economic impacts were not sufficiently addressed in the document.
 - Training should go beyond decision makers and technical personnel.
 - Data given in the document should be more precise e.g., semi-quantitative information (how much are a few tonnes?).
 - Additional information on new emerging issues, for example, electronic waste handling, was requested by some countries in the region.
 - Indications of efficacy of the BAT/BEP measures to be clear, in the document.

- Training of trainers to disseminate the BAT/BEP information at local, national and regional levels.
- Establishment/strengthening of information exchange mechanisms, e.g., clearinghouse mechanism, at national and regional levels, (e.g., CIEN, UNITAR – not to duplicate efforts). Availability of financial and technical resources to realize this activity.
- Dissemination of information on successful BAT/BEP implementation from developing countries (e.g., the pulp and paper manufacture in Kenya).
- Having incinerators and laboratories that can be used and shared regionally and also including monitoring capacity for POPs.
- Due to the difficulties that may be confronting African countries with respect to BAT/BEP implementation, there should be research done to determine alternatives that are cost effective, practical and implementable in Africa. Work is also required to further develop alternatives especially to medical waste incineration, open burning and biomass burning. Availability of these technologies in remote rural areas should be considered.

Regional Contributions regarding the Process of the future development of the Guidance document:

1. There was general agreement that the present EGB group of experts should be retained.
2. Work of the Expert Group:
 - Participants acknowledged the contributions by the EGB in the development of the draft guidelines.
 - There was general agreement that, in view of the further work needed; the group would need to continue after COP-1 to finish the work they started and also tidy, polish and refine the document by filling in all the gaps.
 - Organization of regional workshops to diffuse the BAT/BEP guidelines through regional approach [through Basel Convention Regional Centers]
 - Undertaking some case studies to verify application/applicability of the proposed measures for BAT (e.g. applicability in prevention of agricultural or forest fires and medical waste).

This section contains a synthesis of the views expressed in the consultations. The first subsection (Table 1) contains comments on the draft BAT-BEP guidelines. The second subsection (Table 2) contains comments on the possible processes for further development of the guidance document.

Table 1: Comments on the draft guidance document.

REGION	STRUCTURE OF THE DOCUMENT	SPECIFIC REGIONAL ISSUES NOT COVERED IN THE DOCUMENT	GENERAL ISSUES
Central and Eastern Europe	<p>*It was generally felt that the draft guidelines and guidance were relevant, useful, practical and of high quality.</p> <p>*The scope of the guidance document was comprehensive enough, however it was too early to discuss its userfriendliness.</p> <p>*The document would need improving and tightening of certain sections especially chapters 5 and 6.</p> <p>*There was general agreement that the inclusion (or interactive linking) of additional references and contact people (e.g., EGB authors) would be helpful in improving its userfriendliness.</p> <p>*Secretariat to maintain a Clearing House mechanism with respect to information and documentation of alternatives, substitution and relevant legislation. Also having this type of mechanism will essentially make the document more user-friendly and less bulky.</p>	<p>* Steelworks and incinerators of hazardous waste are priority activities were BAT/BEP issues are very important in the Central and Eastern European region. It would be good if there was more information on the use of hazardous waste as a fuel and an additional section on control measures with respect to the commissioning of industries.</p> <p>*Inclusion of more information on open burning of dumps and how best to apply BEP.</p> <p>* The metallurgy industry is an important source of POPs emissions and is not well adapted for BAT/BEP. Therefore more information on this sector will be appreciated.</p>	<p>*The guidance document should be clear regarding synergies with other multilateral environmental agreements. BAT/BEP should not be restricted to the unintentional emission of POPs but also for sound technologies.</p> <p>*Member States should be legally encouraged to use the guidance document.</p> <p>*An expert group should be convened to review the Dioxin and Furan Toolkit.</p> <p>*The responsibility for reviewing the Toolkit should move away from UNEP Chemicals' armpits to that of a specific expert group. Expand POPs Toolkit to include unintentional HCB, PCBs.</p> <p>*There needs to be a greater focus on monitoring for compliance and quality control.</p> <p>*Analytical laboratory infrastructure – this was found to be very inadequate for most countries in the developing world.</p> <p>*Involvement of the Stockholm Convention regional centers in the issue of sampling and analysis of POPs would be desirable since this is a very expensive activity for most Member States.</p>
South Asia Pacific	<p>*It was generally felt the draft guidelines and guidance were relevant, useful, and of high quality.</p> <p>*Suggestions were made for the addition of a glossary to provide plain English definitions of technical terms (SPREP, UNIDO, Australia)</p> <p>*There was general agreement that the inclusion (or interactive linking) of additional references and contact people (e.g., EGB authors) would be helpful.</p>	<p>*Inclusion of a discussion on quarantine waste (airline and ship solid wastes as well as infected produce/shipments)</p> <p>*Inclusion of more information on BEP for regional domestic cooking practices (umu, hangi)</p> <p>*Inclusion of more information on stationary diesel engines for power generation and the implications of burning waste oils in such facilities.</p> <p>*Harmonization of the guidelines and toolkit vis-à-vis asphalt and bitumen plants</p>	<p>*It was suggested that the guidelines would benefit from more information on alternative technologies and practices</p> <p>*There was need to focus on monitoring for compliance and quality control (e-NGOs)</p> <p>*The section on managing fly ash needed more focus as a cross-cutting issue (e-NGOs)</p> <p>*Section on cement kiln needed re-working; conclusions not supported adequately; summary and text somewhat at odds (e-NGOs)</p> <p>*Expansion of the POPs Toolkit to include unintentional HCB, PCBs (UNIDO) (or to deal with the lack of knowledge on releases of these chemicals) (e-NGOs)</p> <p>*Expansion of the section on building community awareness (e-NGOs)</p>
Central and South East Asia	<p>*It was generally felt the draft guidelines and guidance were well tailored, useful, and of high quality.</p> <p>*There was general agreement that the inclusion of some sort of interactive electronic format would</p>	<p>*Need to properly cover the issue of medical waste disposal/incineration and the range of appropriate technologies that can be used by developing countries.</p> <p>*Inclusion of more information on</p>	<p>*It was suggested that the guidelines would benefit and become more comprehensive by the addition of more information on alternative technologies and practices.</p> <p>*Some countries were advocating for the</p>

REGION	STRUCTURE OF THE DOCUMENT	SPECIFIC REGIONAL ISSUES NOT COVERED IN THE DOCUMENT	GENERAL ISSUES
	<p>help in making the guidance document more user friendly.</p> <p>*Issues directly affecting the informal sector and small to medium sized enterprises were not sufficiently covered in the guidance document.</p>	<p>BAT/BEP for regional activities like activated carbon manufacture, latex rubber smoking, and thermal processes in smoke processes, uncontrolled burning of body bags and small sector metals production.</p> <p>*Inclusion of more information on biomass/wood waste oils, charcoal and other unconventional sources of energy typical in the region.</p> <p>Rudimentary and primitive burning practices should also be examined.</p> <p>*The inclusion of a section on "the use of rice husks as an energy source", in the guidelines.</p> <p>*</p>	<p>inclusion of a step-by-step plan to guide the developing countries in the application and improvement of BAT/BEP processes.</p> <p>*Additional information in the development and promotion of waste minimization techniques was requested by the region.</p> <p>*Expansion of the Dioxin and Furan Toolkit to include other unintentionally produced POPs like HCB and PCBs.</p> <p>*Other countries had queries as to whether they could use brick ovens to burn infectious medical wastes, and as to whether "encapsulation" could be regarded as some form of BAT?</p> <p>*The guidance document to contain a sort of checklist approach so as to guide countries in the implementation of BEP.</p> <p>*Harmonization of legislation/regulations and international standards was seen as an issue.</p>
Group of Latin American and Caribbean Countries	<p>*The guidelines were found to contain much information, but unfortunately the present document was not user friendly. And the guidelines should have a mechanism for indicating linkages between chapter sections. There may be need to develop a flow chart on sequential steps for easy application of the guidelines.</p> <p>* Creation of an interactive CD-ROM which would easily provide the linkages between relevant sections.</p> <p>*Separation and clear identification between the measures that were considered BAT and those that were considered BEP in the guidelines</p> <p>*There was need for a glossary</p>	<p>* Emission levels achievable for each technology should be mentioned as a reference within the document.</p>	<p>*Training on the use of the guidelines should be made available for the users or Parties to POPs.</p> <p>*Creation of a sectoral guideline to address specific activities and consider continued development of each sector by adding new sections as new technologies become available over time, and regional case studies (e.g. Economic or otherwise).</p> <p>*There was need for general editing of the Guidelines</p> <p>*The region recommended that efficiency indicators be developed for use with BAT and BEP applications.</p> <p>*BEP needed to be developed more deeply in the guidelines</p> <p>*Considerations to include a section to define scale of investments in alternative technologies, identifying relative costs and benefits for each available alternative.</p> <p>*Consideration of the size or scale of an enterprise for which the guidelines will be applied.</p>
West Asia	<p>*It was felt that the document was not very user-friendly</p> <p>*There was general agreement with respect to the guide's non-existent applicability to small/medium-sized industries and the informal sector</p> <p>*Participants expressed the need to harmonize the information and style, e.g., Table 2 in Section III.C.(iii), achievable level for municipal waste incinerators (how to deal with present information <0.01 and 0.1 ng TEQ/Nm³)</p> <p>*Some participants would have liked to see a division of the present document into thematic notes</p> <p>*Some felt there was need to eliminate duplication, e.g., flue gas cleaning sub-sections within Sections V. and VI. (move all to Section III.C.(iii)), generalities on formation mechanism (included in</p>	<p>*Include the following processes: asphalt production, brick and lime production, primary steel production (blast furnaces), use of shaft kilns in cement production, cupola and induction furnaces in metal industry</p>	<p>*Include BAT/BEP evaluation on alternatives, e.g., POPs destruction technologies as listed in the Basel Convention Technical Guidelines on POPs as Wastes</p> <p>*Provide specific description on alternatives that are indicated in the present document; include examples, e.g., green purchase, plastic-free alternatives</p> <p>*Explain and elaborate on substitution and modification of materials and processes – See article 5(c)</p> <p>*Include a step-wise approach for implementation of BAT/BEP on how to reach the long-term goal of continuous minimization of total releases of Annex C POPs (long-term approach and not one-step reduction)</p> <p>*Include a flowchart to indicate sequential steps on how to use the</p>

REGION	STRUCTURE OF THE DOCUMENT	SPECIFIC REGIONAL ISSUES NOT COVERED IN THE DOCUMENT	GENERAL ISSUES
	<p>Section III.C.(i))</p> <ul style="list-style-type: none"> *A few participants would have preferred more emphasis on behavioral methods *Some felt the document needed more details on practical aspects (technical aspects were covered) *Almost comprehensive document covering state-of-the-art technologies, however, these may not be available to all. 		<p>guidelines</p> <ul style="list-style-type: none"> *Create an interactive CD ROM to guide through the document *Include a glossary (list of acronyms and abbreviations) *Include complete bibliography (⇒ Clearinghouse) *Correct errors in translation (to be submitted directly to the Secretariat) *Develop schemes for each industry to address what has to be considered for existing plants, for options to upgrade/improve existing plants, for new plants. What are the needs for testing/monitoring? *Revise the guidelines to reflect the needs of developing countries including the economic implications of the implementation of the measures (investment and long-term operational costs and needs, including human resources) *Troubleshooting measures to be included to ensure sustainability of the processes *Include information on scales, e.g., on annual capacity, for a BAT plant (technologically, environmentally, and economically sustainable) *Improve description of certain technologies, e.g., reverberatories for metal production, pre-treatment options *Incorporate traditional and indigenous experiences/knowledge into the guidelines, e.g., from Africa *Presently, the document only concentrates on PCDD/PCDF. Incorporate information on Annex C POPs, other than PCDD/PCDF, into the guidelines as information becomes available *Add regional-specific information including socio-economic information, especially from developing countries *Standardization of units and presentation of the data in qualitative or quantitative form (e.g. as a percentage or as High, Medium or Low)
Africa	<ul style="list-style-type: none"> *It was generally felt the draft guidelines and guidance contained useful and abundant information. *It was also agreed that the draft guidelines were not structured in a user-friendly manner. *There was general agreement that the inclusion of some sort of cross referencing mechanism within the document would be very appropriate in making the guidance document more user-friendly. *The guidance document was too technical and requested the creation of a companion document for non-technical people. *Needed to harmonize the information contained in the document, e.g., Table 1 in Section III. C. (iv). There was also need to correct translational errors so that all the versions in the different 	<ul style="list-style-type: none"> *Needed to properly cover the issue of medical waste disposal/incineration and the range of appropriate technologies that can be used by the African region especially in remote rural areas. *Inclusion of more information on BAT/BEP for the African regional activities like charcoal production from wood, the use of bagasse as a fuel in industrial boilers, and coverage of relevant important cultural practices and other unconventional sources of energy typical in the region. *Inclusion of more information on the activities in the petrochemical industry. 	<ul style="list-style-type: none"> *Inclusion of cultural aspects under Section 2. C. would make the guidelines better. *For new facilities, environmental impact assessment (EIA) should be taken up (Section III.B), and pollution prevention and control needs clarified. For existing facilities, environmental audits should be encouraged. *Lack of information as to the size of processes/plants in the guidance document *Issue of socio-economic impacts was not sufficiently addressed and would have liked to see economic considerations included in the document. *Data given in the document should be more precise e.g., semi-quantitative information (how much are a few tonnes?). *Additional information on new

REGION	STRUCTURE OF THE DOCUMENT	SPECIFIC REGIONAL ISSUES NOT COVERED IN THE DOCUMENT	GENERAL ISSUES
	<p>languages said the same thing.</p> <p>*The presence of a comprehensive index was viewed to be of paramount importance.</p> <p>*Currently the document was viewed as not to contain sufficient information on how to use it.</p> <p>*It was felt that there was need to eliminate duplications (e.g. from cross-cutting issues) and also avoid repetition of summaries in Sections V and VI.</p>		<p>emerging issues, for example, electronic waste handling, was requested by some countries in the region.</p> <p>*Indications of efficacy of the BAT/BEP measures to be clear, in the document.</p> <p>*Training of trainers to disseminate the BAT/BEP information at, national and district levels.</p> <p>*Establishment/strengthening of information exchange mechanisms, e.g., clearinghouse mechanism, at national and regional levels, (e.g., CIEN, UNITAR – not to duplicate efforts). Make available financial and technical resources to realize this activity.</p> <p>*Dissemination of information on successful BAT/BEP implementation from developing countries (e.g., the pulp and paper manufacture in Kenya).</p> <p>*Having incinerators and laboratories that can be used and shared regionally and also including monitoring capacity for POPs.</p> <p>*Due to the difficulties that may be confronting African countries with respect to BAT/BEP implementation, there should be research done to determine alternatives that are cost effective, practical and implementable in Africa. Work is also required to further develop alternatives especially to medical waste incineration, open burning and biomass burning. Availability of these technologies in remote rural areas should be considered.</p>
EGB Members	<p>*More work required with respect to sub-paragraph (c), (d) and (e) of Article 5. *Further inter-session work required to deal with the issue of “alternatives” and “substitution”. These issues were not well covered in the current form of the Guidance BAT/BEP document.</p> <p>*The cement kiln section did not reflect of the EGB input. The choice of words was not the best and thus the wording needed improvement.</p> <p>*Information sources seemed to have been left out or were inadequate e.g. on stack gas testing protocols specific for cement kilns.</p>	<p>*Regional differences with respect to BAT/BEP resulting from technological differences need to be addressed in the BAT/BEP guidance document.</p>	<p>*The Co-chairs reports should be available at all the regional consultations.</p> <p>-The guidance document had been excellently edited and was the result of a lot of work input; however it should remain a dynamic living document.</p> <p>-More work needed to be done to accommodate concerns of the developing world.</p> <p>-The draft guidance document had artfully tried to harmonize with the Dioxin and Furan Toolkit.</p> <p>-There was need to differentiate between “operational” and “retrofit”.</p>

Table 2: Comments on the possible future developments of the guidance document.

REGION	CONTRIBUTIONS REGARDING THE PROCESS OF THE FUTURE DEVELOPMENT OF THE GUIDANCE DOCUMENT
Central and Eastern Europe	<p>*There was need for more expertise in the EGB, and its use in the region. *The regional distribution of the expert group was correct, but it however left out some countries with big and diverse industries like China, India, Brazil, Egypt Algeria and Iran. Their experiences would have been of benefit and greatly contributed to the guidance document.</p> <p>*There may be need to engage regional consultants to support the work of the EGB experts. If this was done on a regional basis then there would be need for allocation of resources to improve regional intercessional work.</p> <p>*It may not be reasonable to alter the core EGB experts but these may need to be supported by experts from the important industrial countries that were not properly represented initially.</p> <p>*An open ended process could be engaged whereby :</p> <p>(a). The process could be time constrained and inputs to complete the guidance document would be presented at a specific COP or</p> <p>(b). The process could be product constrained in which case there is no time limit in which to complete the guidance document.</p> <p>*It may be good for specific deliverables to be targeted for specific COPs.</p>
South Asia Pacific	<p>*There was general agreement that the issues of common interest among Pacific Island Communities suggested the need for a more targeted document. Proposals included a regional user's guide as well as a model action plan. It was suggested that SPREP might coordinate such an effort.</p> <p>*The use of workshops was applauded, including the conduct of case studies, as an effective means of educating countries on the use of the draft guidelines.</p> <p>*Work of the Expert Group:</p> <ul style="list-style-type: none"> -Participants acknowledged the contributions by Fiji, Australia, and New Zealand as members of the Expert Group in disseminating information and providing feedback during the development of the draft guidelines. -There was general agreement that, in view of the further work needed; the EGB would need to continue after COP-1. -There were some discussion of broadening or rotating membership in the EGB, while maintaining balanced representation and a transparent process. Participants also stressed, however, the need for fluency in the working language, familiarity with the technical issues, and experience working together as a group.
Central and South East Asia	<p>*There was general agreement that the present EGB group of experts should be retained.</p> <p>*Work of the Expert Group:</p> <ul style="list-style-type: none"> -Participants acknowledged the contributions by the EGB in the development of the draft guidelines. -There was general agreement that, in view of the further work needed; the group would need to continue after COP-1 to finish the work they started and also tidy, polish and refine the document by filling in all the gaps. -There was some discussion of broadening or rotating membership in the EGB. Some countries preferred the Open-ended Working Group Model where everyone could participate in the process. Others preferred the creation of a roster of regional experts that could be used by the Stockholm Convention Regional Centres to participate in closed working groups. -Continuing minimization of the unintentionally produced POPs should be viewed as the main objective of updating the guidance document.
Group of Latin American and Caribbean Countries	<p>*Draft Guidelines were a good tool, nevertheless further work was needed so as to be adopted at a future session not beyond COP 2.</p>
West Asia	<p>*There was general agreement that the review process should involve experts and regulatory authorities of the different regions.</p> <p>*Suggestions were made regarding the initiation of a survey to identify the industrial infrastructural development of each country and the use of abatement technology, so as to update the dioxin/furan, PCB and HCB source categories.</p>
Africa	<p>*There was general agreement that the present EGB group of experts should be retained and continue after COP-1 to finish the work they started and also tidy, polish and refine the document by filling in all the gaps.</p> <p>*The expert group should undertake some case studies to verify application/applicability of the proposed measures for BAT (e.g. applicability in prevention of agricultural or forest fires and medical waste).</p>

4 PROGRAMME FOR THE REGIONAL CONSULTATIONS

4.1 AGENDA

“Stockholm Convention: Regional Consultation on the Draft BAT/BEP Guidelines”

Day 1	
Opening	
Registration of participants	
Welcome – Opening remarks	UNEP
Introduction of participants	All
Objectives of the workshop, programme and structure	UNEP
INC-6 Mandate for the Expert Group on BAT and BEP (EGB)	UNEP
Introduction to the history and evolution of the Draft BAT/BEP Guidelines.	UNEP
Reports from the regional EGB experts	EGB
<i>Lunch</i>	
Brief Summary and How to use the Draft BAT/BEP Guidelines document.	UNEP
Experiences and case studies of BAT and BEP by countries in the region.	Countries
Experiences and case studies of BAT and BEP by countries in the region (continued).	Countries
Day 2	
Group work: -exercises on how to use the guidelines; -identification of issues/problems; -identification of future needs and opportunities for regional approaches.	UNEP/NGOs/Industry Experts and countries
Group work continuation	
<i>Lunch</i>	
Group work continuation	
Group work continuation	
Day 3	
Development of reports based on group exercises.	
Plenary discussion of group reports	
Development of conclusions and recommendations for the region with respect to the Draft BAT/BEP Guidelines.	All
Introduction to the Stockholm Convention First Conference of the Parties Agenda and Discussions.	UNEP

4.2 COMMON PRESENTATIONS FOR ALL THE CONSULTATIONS

4.2.1 Introduction: Aims and Objectives of the Regional BAT-BEP Consultations, *by UNEP Chemicals*

Slide 1

Stockholm Convention: Regional Consultation on the Draft BAT/BEP Guidelines

Bangkok 7-9 March 2005

John Whitelaw
Deputy
UNEP Chemicals

Slide 4

Format for the sessions

- Two sessions each day
 - 0900 – 1230
 - 1400 – 1730
- Aim to finish mid-afternoon on Friday

Slide 2

Aim of the consultations

- to set the scene for a constructive consideration of the BAT/BEP issue at the COP in Uruguay.
 - still work to be done, and
 - we need to engage all regions in that work so that the guidance is not seen as merely representative of the OECD situation.

Slide 5

Program – Day 1

- Context for BAT/BEP
 - Stockholm Convention
- Development of guidance
 - BAT/BEP Expert Group – mandate, composition
 - The evolution of the guidance
- EGB experts perspective and experience
- How to use the guidance – what is it?
- Experiences from the region – case studies

Slide 3

Aim of the Consultations (cont)

- to inform countries of the draft guidelines,
- to get feedback on where further guidance is needed to reflect regional needs, and
- to help countries prepare for COP-1 discussions relating to the adoption of and further work on the guidelines

Slide 6

Program – Day 2

- Group work:
 - exercises on how to use the guidelines;
 - identification of issues/problems;
 - identification of future needs and opportunities for regional approaches.

Slide 7

Day 3: Conclusions and follow-up

Issues:

➤ **Users**

- ❖ comprehensive? What is missing?
- ❖ Userfriendly?
- ❖ Room for improvement? Where?

➤ **Contributor**

- ❖ Do we have input?
- ❖ How to provide the input?
- ❖ Process for future development

Slide 8

Program – Day 3

- Conclusions and follow-up
 - Implications for the COP
 - Issues for further development of the guidance
- Next steps
- Closure

4.2.2 Draft BAT-BEP Guidelines: Context and Development, by UNEP Chemicals

Slide 1

**Draft BAT/BEP Guidelines:
Context and Development**

**Bob Kellam, Co-Chair
BAT/BEP Expert Group**

**Stockholm Convention:
Regional Consultation on Draft BAT/BEP Guidelines
Bangkok, Thailand
March 7-9, 2005**

Slide 4

**Article 5: Unintentionally Produced POPs:
Annex C Part II Sources**

- (a) Waste incinerators, including co-incinerators of municipal, hazardous or medical waste or of sewage sludge;
- (b) Cement kilns firing hazardous waste;
- (c) Production of pulp using elemental chlorine or chemicals generating elemental chlorine for bleaching;
- (d) The following thermal processes in the metallurgical industry:
 - i. Secondary copper production;
 - ii. Sinter plants in the iron and steel industry;
 - iii. Secondary aluminium production;
 - iv. Secondary zinc production

Slide 2

**Article 5:
Unintentionally Produced POPs**

- Goal is the continuing minimization and, where feasible, ultimate elimination of total releases of chemicals in Annex C derived from anthropogenic sources (dioxins, furans, HCB, PCBs)
- Parties must:
 - develop action plans within 2 years of entry into force, and implement their plans;
 - promote application of available, feasible and practical measures to achieve realistic and meaningful levels of release reduction or source elimination
 - promote development and, where appropriate, require use of substitute or modified materials, products and processes to prevent formation and release of POPs

Slide 5

**Article 5: Unintentionally Produced POPs:
Annex C Part III**

Parties must promote use of BAT & BEP for new and existing sources:

- Open burning of waste, including burning of landfill sites;
- Thermal processes in the metallurgical industry not mentioned in Part II;
- Residential combustion sources;
- Fossil fuel-fired utility and industrial boilers;
- Firing installations for wood and other biomass fuels;
- Specific chemical production processes releasing unintentionally formed persistent organic pollutants, especially production of chlorophenols and chloranil;
- Crematoria;

Slide 3

Unintentionally Produced POPs

- For sources with the potential for comparatively high formation & release of POPs to the environment (including but not limited to the industrial source categories listed in Annex C Part II), Parties must:
 - for new sources:
 - promote and, as provided for in an action plan, require use of best available techniques (BAT),
 - phase in any BAT requirements as soon as practicable but no later than 4 years after Convention enters into force, and
 - promote use of best environmental practices (BEP)
 - for existing sources, in accordance with its action plan, promote the use of BAT & BEP

Slide 6

**Article 5: Unintentionally Produced POPs:
Annex C Part III (continued)**

- Motor vehicles, particularly those burning leaded gasoline;
- Destruction of animal carcasses;
- Textile and leather dyeing (with chloranil) and finishing (with alkaline extraction);
- Shredder plants for the treatment of end of life vehicles;
- Smouldering of copper cables;
- Waste oil refineries.

Slide 7

Best Available Techniques (BAT)

- "Best available techniques" means the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for release limitations designed to prevent and, where that is not practicable, generally to reduce releases of chemicals listed in Part I of Annex C and their impact on the environment as a whole...

Slide 9

Expert Group on BAT/BEP

- Mandate and terms of reference established at INC6 (2003):
 - Manageable size
 - Members to represent their regions
 - Operate by consensus
 - 3 meetings authorized
- Experts selected by countries, countries selected by regional groups:
 - 18 from developing countries: (5 Africa, 5 Asia, 5 GRULAC) and economies in transition (3)
 - 18 from developed countries (WEOG)
 - 4 from e-NGOs
 - 4 from i-NGOs
 - 2 from IGOs

Slide 8

Best Environmental Practices (BEP)

- "Best environmental practices" means the application of the most appropriate combination of environmental control measures and strategies.

Slide 11

Expert Group on BAT/BEP

- Meetings:
 - 10-14 March, 2003 (RTP, USA)
 - 8-12 December, 2003 (Villarrica, Chile)
 - 11-16 October, 2004 (Tokyo, Japan)

Slide 10

Article 5: Unintentionally Produced POPs

- When applying best available techniques and best environmental practices for the above, Parties should take into consideration:
 - the general guidance on prevention and release reduction measures in Annex C and
 - guidelines on best available techniques and best environmental practices to be adopted by decision of the Conference of the Parties (see subparagraphs (d) and (e) of Article 5).

Slide 12

Expert Group on BAT/BEP

Additional material available to the Group included:

- Proceedings of regional workshop on BAT/BEP held in Bangkok, Thailand (13-15 March, 2002)
- Proceedings of regional workshop on BAT/BEP held in Buenos Aires, Argentina (23-25 October, 2002)

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Expert Group on BAT/BEP

Following the final meeting in Tokyo:

- endorsed and reached consensus to forward the draft guidelines and guidance to the Conference of the Parties for consideration and possible adoption *BUT*
 - "...noted that while best available techniques and best environmental practices for many of the specific source categories were complete and very well advanced, others needed additional work...."
- agreed to recommend that the Conference of the Parties adopt the draft guidelines and guidance on a provisional basis pending completion of any additional work.

Slide 16

Recommended Action by the Conference of the Parties

- The Conference of the Parties may wish to:
 - Consider the report by the co-chairs of the Expert Group & the EGB's draft guidelines & provisional guidance;
 - Identify further work to be undertaken and determine the modalities for completing the work;
 - Adopt for immediate use by Parties pending further development, and with any amendments, the draft guidelines and provisional guidance; and
 - Identify the modalities for the regular updating of the guidelines and provisional guidance.

Slide 14

Expert Group on BAT/BEP

- The Expert Group also agreed that its report to the Conference of the Parties should reflect :
 - **developing country concerns on the socio-economic impact of applying best available techniques and the lack of capacity to do so,**
 - **the concurrent need for technical and financial assistance; and**
 - **the need for further work to continue to develop the guidelines.**

Slide 17

Report by the Co-Chairs (Further Work)

- Clearinghouse mechanism/compendium
- Special needs of developing countries
- Additional Guidance material
- Emission limits/targets
- Monitoring
- Policy (inclusion of sustainable development strategies)

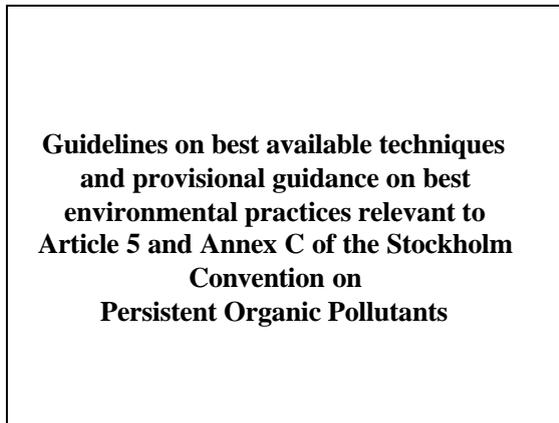
Slide 15

Expert Group on BAT/BEP

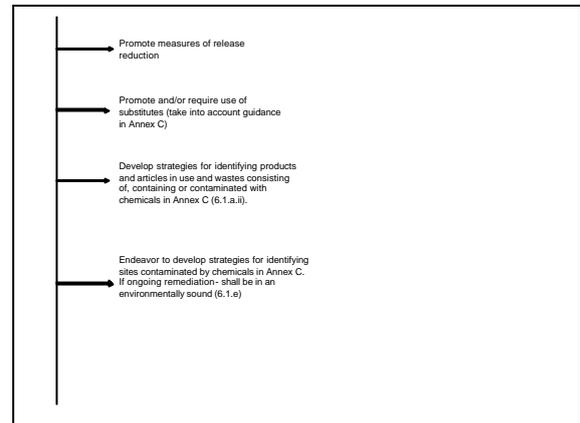
- With regard to developing country concerns, the Expert Group:
 - **agreed to recommend to the Conference of the Parties that it consider special support to these countries;**
 - **noted the special concerns of African countries regarding the lack of waste management capacity; and**
 - **agreed to highlight this concern for urgent consideration by the Conference of Parties**

4.2.3 Draft Guidelines on best available techniques (BAT) and provisional guidance on best environmental practices (BEP) relevant to Article 5 and Annex C of the Stockholm Convention on Persistent Organic Pollutants, by UNEP Chemicals

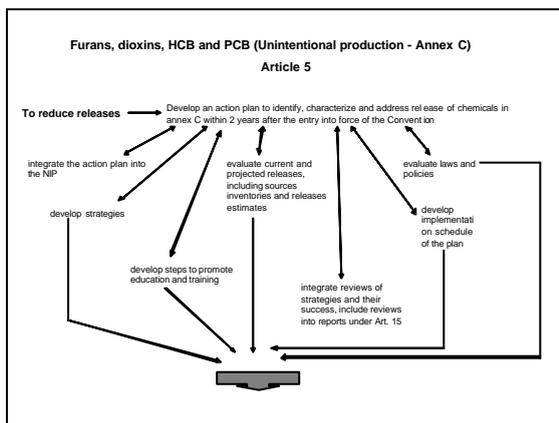
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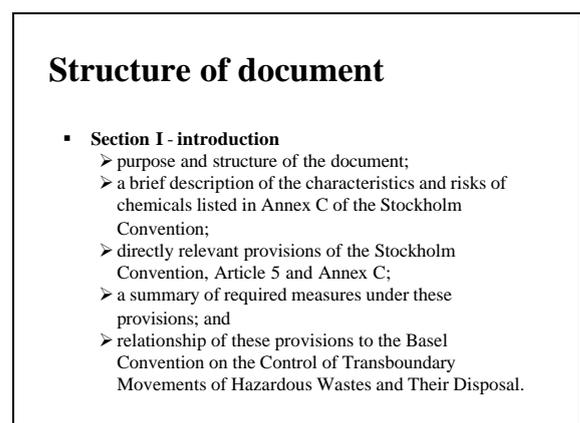
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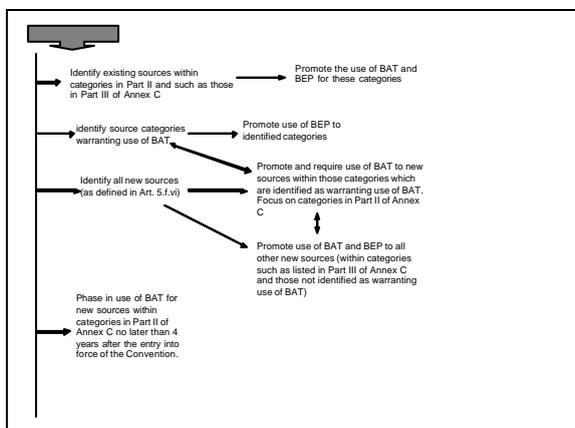
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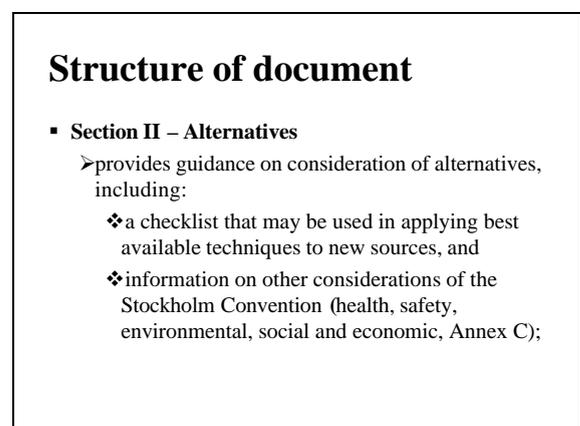
Slide 5



Slide 3



Slide 6



Slide 7

Structure of document

- **Section III** - general guidance, applicable principles and descriptions of considerations that cut across multiple source categories
- **Section IV** - a compilation of the summaries provided for each category sources in sections V and VI.

Slide 10

Section 1 – Relation to the Basel Convention

- The Basel Convention is the one other global agreement directly relevant to the application of best available techniques and best environmental practices to the control of chemicals listed in Annex C of the Stockholm Convention
- Article 6 – Stockpiles and wastes
- The Basel COP has developed guidance for use by the Stockholm COP in determining the best waste practices for POPs

Slide 8

Structure of document

- **Section V & VI** - contain specific guidelines for each source category listed in Part II and Part III of Annex C of the Stockholm Convention. For each of the source-specific guidelines, the following information is provided:
 - Process description;
 - Sources of chemicals listed in Annex C;
 - Primary and secondary measures;
 - Performance standards;
 - Performance reporting

Slide 11

Section II - Alternatives

- Article 5 and Annex C of the Stockholm Convention, when considered together, suggest that whenever Parties require the use of best available techniques for new sources, they should do so in a way that gives priority consideration to alternative processes, techniques or practices that have similar usefulness but which avoid formation and release of chemicals listed in Annex C of the Convention.
- guidance on the consideration of alternatives under circumstances requiring the use of best available techniques for new sources.

Slide 9

Structure of document

- References and bibliographic information are provided for each of the guidelines.
- The complete list of references and bibliographic information for the guidelines and guidance is available at: www.pops.int. This site can be updated as relevant new information becomes available.

Slide 12

Section II - Alternatives

- Keep in mind the overall sustainable development context, and they should take fully into account environmental, health, safety and socio-economic factors. Elements include:
 - Review the proposed new facility in the context of sustainable development
 - Identify possible and available alternatives
 - Undertake a comparative evaluation of both the proposed and identified possible and available alternatives
 - Priority consideration

Slide 13

Section III – guidance, principles & cross-cutting considerations

- General considerations:
 - timing, action plans & NIPs
- Policy, legal and governance issues:
 - Country specificity
 - Measures categorised as:
 - ❖ Shifting to alternatives
 - ❖ Primary measures to prevent the formation of Annex C POPs
 - ❖ Secondary measures that control or reduce the releases

Slide 16

Cross-cutting Considerations

- Chemicals listed in Annex C: Formation mechanisms
 - Thermal processes
 - Industrial-chemical processes
- Waste management considerations include
 - Reference to waste & hazardous waste strategies of the Basel Convention
 - Importance of source reduction
 - Avoidance of open burning

Slide 14

Section III – guidance, principles & cross-cutting considerations

- Scientific and technical issues
 - The Convention identifies the term “best” as “most effective in achieving a high general level of protection of the environment as a whole” Article 5 (f) (iv))
- Economic and social implications
 - Large scale enterprises similar worldwide
 - Small scale and diffuse vary from country to country
- New versus existing sources

Slide 17

Section III – Guidance, General Principles, and Cross-Cutting Considerations

Cross-cutting Considerations

- Chemicals listed in Annex C: Formation mechanisms
 - Thermal processes
 - Industrial-chemical processes
- Waste management considerations include
 - Reference to waste & hazardous waste strategies of the Basel Convention
 - Importance of source reduction
 - Avoidance of open burning

Slide 15

General Principles

- Sustainable development.
- Sustainable consumption.
- Development and implementation of environmental management systems.
- Precautionary approach.
- Internalizing environmental costs and polluter pays.
- Pollution prevention.
- Integrated pollution prevention and control.
- Co-benefits of controlling other pollutants.
- Cleaner production.
- Life cycle analysis.
- Life cycle management.
- Virtual elimination.

Slide 18

Section III – Guidance, General Principles, and Cross-Cutting Considerations

Cross-cutting Considerations (continued)

- Management of flue gases
 - Flue gas treatment techniques
 - Treatment of flue gas residues
- Training of decision makers and technical personnel
 - Importance recognised in Convention
 - Particularly relevant to BAT/BEP issue
- Testing, monitoring and reporting of releases
 - Important for evaluation of compliance

Slide 19

Cross-cutting Considerations

- Management of flue gases
 - Flue gas treatment techniques
 - Treatment of flue gas residues
- Training of decision makers and technical personnel
 - Importance recognised in Convention
 - Particularly relevant to BAT/BEP issue
- Testing, monitoring and reporting of releases
 - Important for evaluation of compliance

Slide 22

Section VI: Guidelines for Part III source categories

- Open burning of waste, including burning of landfill sites
- Thermal processes in the metallurgical industry not mentioned in Annex C, Part II:
 - Secondary lead production
 - Primary aluminium production
 - Magnesium production
 - Secondary steel production
 - Primary base metals production

Slide 20

Section IV: Compilation of Summaries

- Each summary may include the following, as appropriate:
 - A brief description of the source, its purpose and the processes involved;
 - Potential of the source for generation of chemicals listed in Annex C of the Stockholm Convention;
 - Best available techniques and best environmental practices to minimize emissions of chemicals listed in Annex C;
 - Primary and secondary measures that may assist in reducing emissions;
 - Alternatives, where applicable, that may be preferable to current processes and practices;
 - Achievable performance levels.

Slide 23

Section VI: Guidelines for Part III sources (cont)

- Residential combustion sources
- Fossil fuel-fired utility and industrial boilers
- Firing installations for wood and other biomass fuels
- Specific chemical production processes releasing chemicals listed in Annex C
- Crematoria
- Motor vehicles, particularly those burning leaded gasoline
- Destruction of animal carcasses
- Textile and leather dyeing and finishing
- Shredder plants for the treatment of end-of-life vehicles
- Smouldering of copper cables
- Waste oil refineries

Slide 21

Section V: Guidance for Part II Source Categories

- Waste incinerators
 - Municipal solid waste, hazardous waste & sewage sludge
 - Medical waste
- Cement kilns firing hazardous waste
- Production of pulp using elemental chlorine or chemicals generating elemental chlorine
- Thermal processes in the metallurgical industry
 - Secondary copper production
 - Sinter plants in the iron & steel industry
 - Secondary aluminium production
 - Secondary zinc production

4.2.4 Preview of the First Conference of the Parties of the Stockholm Convention, *by UNEP Chemicals*

Slide 1

Stockholm Convention: Regional Consultation on the Draft BAT/BEP Guidelines

Preview of the first Conference of the Parties

John Whitelaw
Deputy
UNEP Chemicals

Slide 4

COP1: Other Issues 1

- DDT – format for register & 3 yearly reports
- format for the Register of specific exemptions;
- BAT/BEP – guidelines, and process & scope for further work;
- toolkit for evaluating releases of chemicals in Annex C;
- levels of destruction and irreversible transformation
- environmentally sound methods for disposal of POPs;
- concentration levels of POPs in Annexes A, B and C in order to define the “low” POP content referred to in paragraph 1 (d)(ii) of Article 6;

Slide 2

COP1: Objectives and Possible Outcomes

Two factors:

- the requirements of the Convention for decisions that must be taken at COP1; and
- the need for COP1 to take action on practical measures for
 - timely implementation of the Convention and
 - successful operation of the COP in future years.

Slide 5

COP1: Other Issues 2

- NIPs – guidance; review and updating
- further development of the clearing-house mechanism;
- guidance on technical assistance for capacity-building;
- regional and sub-regional delivery of technical assistance
- terms of reference for the review of the effectiveness of the financial mechanism
- procedures and institutional mechanisms for determining non-compliance and for the treatment of Parties in non-compliance;
- arbitration and conciliation procedures ;
- location for the Secretariat; and
- liability and redress

Slide 3

COP1 must take a decision:

- continued need for DDT for disease vector control
- review process for entries in the Register of specific exemptions;
- guidance to the financial mechanism
- a memorandum of understanding with the Council of the Global Environment Facility;
- effectiveness of measures in meeting objectives of the Convention;
 - periodicity and format for reports to be submitted by Parties
 - arrangements to provide comparable monitoring data on presence, & regional & global environmental transport of POPs;
- rules of procedure and financial rules for the COP and any subsidiary bodies and financial provisions governing the functioning of the Secretariat (i.e., budget); and
- POPs Review Committee - terms of reference, organization, operation, members

Slide 6

COP1: Organisation of Work

- five days of meetings from 2- 6 May 2005 (*i.e.* Monday – Friday),
- regional meetings on May 1 (Sunday) (factored into travel arrangements by Secretariat)
- plenary meetings - two three-hour sessions per day (10:00 - 13:00 and 15:00 – 18:00).
- evening sessions of plenary - **no plans**.

Slide 7

COP1: Organisation of Work

Monday morning

- opening formalities
- organizational matters
- COP will be invited to apply provisionally the rules of procedure to permit
 - election of a President
 - adoption of the agenda for the session, amended as appropriate,
 - agreement on the organization of work.

Slide 10

COP1: Organisation of Work

Ministerial segment Thursday and Friday

- reports of the COW and the contact group on legal and budget issues
- opportunity for participants to give statements and for the meeting to take decisions
 - adopted on the basis of draft decisions submitted from the COW and any other subsidiary groups established by plenary.

Slide 8

COP1: Organisation of Work

The meeting may then wish to:

- establish
 - a contact group to consider legal and budget issues
 - Committee of the Whole (COW) to address substantive issues
- adjourn until Thursday morning

Slide 9

COP1: Organisation of Work

- COW would meet through the afternoon session on Wednesday.
- Contact group on legal and budget issues to meet as necessary through the week and address
 - remaining issues in the rules of procedure
 - financial rules,
 - budget of the Secretariat and
 - any other legal or administrative issues assigned

4.3 CONTRIBUTIONS FROM THE EXPERT GROUP ON BEST AVAILABLE TECHNIQUES AND BEST ENVIRONMENTAL PRACTICES, AND OTHERS.

4.3.1 Guidelines on best available techniques and provisional guidance on best environmental practices relevant to Article 5 and Annex C of the Stockholm Convention, *by Hans-Peter Fahrni (Vienna Consultation)*

Slide 1

Advance Draft*
Guidelines on best available techniques and provisional guidance on best environmental practices relevant to Article 5 and Annex C of the Stockholm Convention on Persistent Organic Pollutants

Slide 3

Which measures have to be taken in the application of Stockholm Convention?

Require BAT for new sources identified in Plan from Part II Annex C by May 2008 or 4 years after entry into force for Party.**

Promote BAT for existing sources Part II and Part III, Annex C.

Promote BEP for new and existing sources Part II and Part III, Annex C.**

Slide 2

Guidelines on best available techniques and provisional guidance on best environmental practices relevant to Article 5 and Annex C

The work of three sessions of international experts together with UNEP Geneva Chemicals

- Introduction
- Consideration of alternatives
- BAT and BEP Guidance principles and cross-cutting considerations
- Compilation of summaries by source categories
- Guidance/Guidelines by source categories
A combination of achievable emission limits with a presentation of the technical background.

Slide 4

Introduction

- I.A. Purpose
- I. B. Structure of document and using guidelines and guidance
- I.C. Chemicals listed in Annex C: Definition, risks, toxicity, characteristics, risks, toxic equivalency, tolerable intakes.
- I.D. Article 5 of Stockholm Convention
- I.E. Relationship to Basle Convention

Slide 5

Section II Consideration of alternatives in the application of BAT

- Each Party to the Stockholm Convention shall “promote and, in accordance with the implementation schedule of its action plan, require the use of best available techniques for new sources within source categories which a Party has identified as warranting such action in its action plan, with a particular initial focus on source categories identified in Part II of Annex C

(Waste incinerators, cement kilns firing hazardous waste, secondary copper production, sinter plants, secondary aluminium production, secondary zinc production).

Slide 8

III B General principles

1. Sustainable development
2. Sustainable consumption.
3. Development and implementation of environmental management systems.
4. Precautionary approach.
5. Sustainable development.
6. Internalizing environmental costs and polluter pays
7. Pollution prevention.
8. Integrated pollution prevention and control
9. Life cycle analysis
10.

Slide 6

Section II Consideration of alternatives in the application of BAT II

Under circumstances in which authorities determine best available techniques are to be applied, and when considering proposals to construct new facilities or significantly modify existing facilities using processes that release chemicals listed in this Annex, **priority consideration should be given to alternative processes, techniques or practices that have similar usefulness** but which avoid the formation and release of such chemicals

Slide 9

III C Cross-cutting considerations

- Formation of chemicals listed in Annex C Polychlorinated dibenzo-*p*-dioxins (PCDD), polychlorinated dibenzofurans (PCDF), polychlorinated biphenyls (PCB) and hexachlorobenzene (HCB)
- Waste management considerations “Prevent and minimize waste and maximize reuse, recycling and use of environmentally friendly alternative materials, with the participation of government authorities, and all stakeholders, in order to minimize adverse effects on the environment and improve resource efficiency, with financial, technical and other assistance for developing countries.

p. 30

Slide 7

III A Consideration of alternatives for new sources: A checklist approach

- Review the proposed new facility in the context of sustainable development
- Identify possible and available alternatives
- Undertake a comparative evaluation of both the proposed and identified possible and available alternatives

Slide 10

Cross Cutting Considerations What possibilities can BEP offer in the field of waste management ?

- Source reduction
- Integrated life cycle principle
- Minimization of toxicity and other hazard characteristics
- Separate collection and Recycling
- In some countries diversion from landfills and incinerator has reached 50 or even more percent

See waste management considerations advanced Draft page 28

Slide 11

Cross-cutting considerations: Management of flue gas and other residues

Control option	PCDD/PCDF removal efficiency	Indicative costs
Cyclones (only for pre-dedusting of flue gases)	Low efficiency	
Electrostatic precipitation	Medium efficiency	
Catalytic oxidation (selective catalytic reduction)	95–99%	High investment, low operating costs
Catalytic bag filters	High efficiency	
Fixed bed reactor, adsorption with activated charcoal or open hearth coke	> 98%	High investment, medium operating costs
Entrained flow or circulating fluidized bed reactor with added activated coke/lime or limestone solutions and subsequent fabric filter	> 90%	Low investment, medium operating costs

Slide 14

Section 4 Compilation of summaries Municipal solid waste, hazardous waste and sewage sludge Incineration II

- The potential purposes of waste incineration include volume reduction, energy recovery, destruction and minimization of hazardous constituents, disinfection and the reuse of some residues.
- The environmentally sound design and operation of waste incinerators requires the use of BAT and BEP to prevent or minimize the formation and release of chemicals listed in Annex C. BAT and BEP for incineration include practising proper waste handling, ensuring good combustion, avoiding formation conditions, capturing the chemicals listed in Annex C that are formed and handling residues appropriately.
- **Achievable performance levels for waste incinerator emissions to air are 0.01–0.1 ng TEQ/Nm³**

Slide 12

Section 4 Compilation of summaries

This compilation includes all of the summaries from the source categories in sections V and VI of the Draft Guidelines on BAT/BEP

- A brief description of the source, its purpose and the processes involved;
- Potential of the source for generation of chemicals listed in Annex C namely: PCDD, PCDF, PCB; and HCB;
- Best available techniques and best environmental practices to minimize emissions of chemicals listed in Annex C;
- Primary and secondary measures that may assist in reducing emissions;
- Alternatives, where applicable, that may be preferable to current processes and practices;
- Achievable performance levels.

Slide 15

Section 4 Compilation of summaries Example Open burning of waste + burning of landfill sites

Open burning is an environmentally unacceptable process that generates chemicals listed in Annex C of the Stockholm Convention and numerous other pollutant products of incomplete combustion. Consistent with Annex C, Part V, section A, subparagraph (f) of the Stockholm Convention, the best guidance is to reduce the amount of material disposed of via this method with the goal of elimination altogether.

Other techniques which may effect improvement include, with respect to the materials burned: avoid including non-combustible materials, such as glass and bulk metals, wet waste and materials of low combustibility; avoid waste loads containing high chlorine content, whether inorganic chloride such as salt, or chlorinated organics such as PVC; and avoid materials containing catalytic metals such as copper, iron, chromium and aluminum, even in small amounts. Materials to be burned should be dry, homogeneous or well blended, and of low density, such as non-compacted waste.

Slide 13

Section 4 Compilation of summaries Municipal solid waste, hazardous waste and sewage sludge Incineration I

- Waste incinerators are identified in the Stockholm Convention as having the potential for comparatively high formation and release of chemicals listed in Annex C to the environment.
- When considering proposals to construct new waste incinerators, priority consideration should be given to alternatives such as activities to minimize the generation of waste, including resource recovery, reuse, recycling, waste separation and promoting products that generate less waste. Priority consideration should also be given to approaches that prevent the formation and release of persistent organic pollutants.

Slide 16

Example: Inventory of Poland

Table 82: PCDD/PCDF release inventory for Poland, reference year 2000 * ** (Lassen *et al.* 2003)

Cat.	Source Categories	Annual Releases (g TEQ/a)				
		Air	Water	Land	Product	Residue
1	Waste Incineration	140				86
2	Ferrous+non-ferrous metal production	80	0.05?	?		140?
3	Power generation and heating	62		?	?	55
4	Production of mineral products	18				0.63?
5	Transport	3.6				?
6	Uncontrolled combustion processes	180		6.6?		2101.1??
7	Prod. of chemicals, consumer goods	0.07	0.04?		11	0.1?
8	Miscellaneous	1.7			0.14?	35
9	Disposal/Landfill	?	1.1?		0.03	?
1-9	Total	490	1.2?	6.6?	11?	530?

- * Most of the estimates were obtained through application of the Toolkit; a few base

Slide 17

A theoretical example to show the use of the toolkit

Hypothetical Country X, short description

- 200'000 t of municipal solid are burnt in five old incinerators,
- 2.4 Million tons of municipal solid waste

2 Million tons are landfilled or dumped,
100'000 t of the landfilled waste are burnt on the landfill

- 200'000 t of municipal solid are burnt in a uncontrolled way

Question What would be the impact of a new incinerator (according to BAT/BEP) with 200'000 t replacing the five old ones

Slide 20

**Landfills:
Emission factors from Toolkit p. 118**

Classification	Emission Factors - pg TEQ/L for Water Release and of Leachate Released				
	Air	Water	Land	Product	Residue
1. Hazardous wastes	0	200	NA	NA	NA
2. Non-hazardous wastes	0	30	NA	NA	NA

Slide 18

A first rough inventory

- Which is the contribution of the known sources to the total load of Dioxins in Country X ?
- Incinerators => p.16 Toolkit
- Landfills => p.159 Toolkit
- Landfill fires => p.118 Toolkit

Slide 21

Emission factors for waste burning from Toolkit p.118

Classification	Emission Factors - µg TEQ/t of Material Burned				
	Air	Water	Land	Product	Residue
1. Landfill fires	1,000	ND	NA	NA	ND
2. Accidental fires in houses, factories	400	ND	See residues	NA	400
3. Uncontrolled domestic waste burning	300	ND	See residues	NA	600

Slide 19

**Incinerators:
Emission factors from Toolkit**

Emission factors are given per activity rate (in this example per tons of waste burnt)

	Emission Factors - µg TEQ/t MSW Burned		
	Air	Fly Ash	Bottom Ash
1. Low technology combustion, no APC system	3,500	-	75
2. Controlled combustion, minimal APC	350	500	15
3. Controlled combustion, good APC	30	200	7
4. High technology combustion, sophisticated APC system	0.5	15	1.5

350 µg TEQ/t corresponds to a concentration of 60 ngTEQ/Nm³

Slide 22

A first inventory on waste management

Emission factors from Toolkit

Incinerators 200'000 t burnt/year

p.16 Toolkit, old incinerator	Air	Fly Ash	Bottom Ash
Emission factor in ug TEQ/t	350	500	15
Emissions in gTEQ/year	70	100	3

Residues

Landfill fires 100'000t burnt/year

P 118 Toolkit	Air	Water	Land	Product	Residue
Emission factor in ugTEQ/t	1000	-	NA	NA	ND
Emissions in gTEQ/year	100				

Uncontrolled burning of Waste 200'000 t/year

Emission factor in ugTEQ/t	300	-	600
Emissions in gTEQ/year	60		120

Total

	230	100	123
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Slide 23

The new incinerator

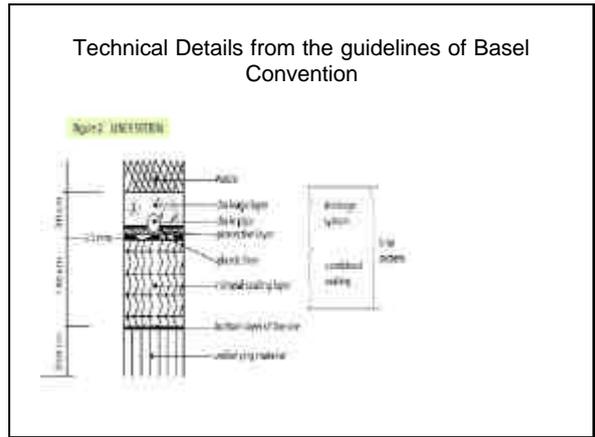
New Incinerator fulfilling European directive with 200'000t capacity

	Air	Fly Ash	Bottom Ash
Emission factor in ug TEQ/t	0.5	15	1.5
Emissions in gTEQ/year	0.1	3	0.3

The old ones

Emission factor in ug TEQ/t	350	500	15
Emissions in gTEQ/year	70	100	3
Reduction factor	700	30	5

Slide 26



Slide 24

- ### A look to the guidelines
- Waste management, alternatives
 - Minimization of toxicity and other hazard characteristics (ROHS directive)
 - Source reduction, use of low and non waste technologies, encourage the reuse of goods, reduce packaging...
 - improve recycling, (separate collection)
 - Offer possibilities for composting (ore even for anaerobic digestion)
 - Fight against open burning of waste on landfills "In principle, open burning should simply be prohibited." (Guidelines)
 - The Basel Convention Technical Guidelines offer basic guidance on alternatives to open burning and how to implement them

Slide 27

Last but not least

In some situations, the decision to construct a new large-scale waste treatment facility such as a new incinerator, a new sanitary landfill, or a new mechanical or biological treatment facility can tend to undermine efforts at waste minimization and waste-derived resource recovery.

Those who invest in these new facilities will often face pressures to assure sufficient incoming waste in order to recover their investments. When this happens, the new facility can sometimes serve as a counterforce and as a disincentive to effective waste minimization efforts.

Therefore, any such consideration should take place in the framework of holistic waste management policies.

Slide 25

Don't forget Basel Convention ?

2nd DRAFT
Technical Guidelines for Environmentally Sound Management of Wastes consisting of, containing or contaminated with the pesticides Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Hexachlorobenzene, Mirex and Toxaphene
28 December 2004

- **General Technical Guidelines for Environmentally Sound Management of Wastes Consisting of, Containing or Contaminated with Persistent Organic Pollutants**
- August, 2004
-

4.3.2 Basel Convention: Guidelines on the Environmentally Sound Management (ESM) of Persistent Organic Pollutants (POPs) as Wastes, by Andreas Arlt (Vienna Consultation)

Slide 1

Guidelines on the Environmentally Sound Management (ESM) of Persistent Organic Pollutants (POPs) as Wastes

Stockholm Convention: Regional Consultation for Central and Eastern European Countries on the Draft BAT/BEP Guidelines
Vienna, Austria, 08 – 11 February 2005
Andreas Arlt, UNEP/SBC

Slide 4

PCBs under the Basel Convention

Basel Convention, Annex VIII, A3180:

“Wastes, substances and articles containing, consisting of or contaminated with

- polychlorinated biphenyl (PCB),
- polychlorinated terphenyl (PCT),
- polychlorinated naphthalene (PCN),
- polybrominated biphenyl (PBB)

at a concentration level of **50 mg/kg (50 ppm)**”
are characterized as hazardous.

Slide 2

Overview

1. Mandate
2. Status of Preparation of POPs Technical Guidelines
3. Purpose and concept of the Technical Guidelines
4. Content of the technical guidelines

Slide 5

Mandate by the Stockholm Convention (Art.6,1)

Measures to reduce or eliminate releases from stockpiles and wastes: Each Party shall:

- Identify stockpiles of POPs
- Manage (handle, collect, transport, store) stockpiles and wastes in an environmentally sound manner
- Dispose of in such a way that the POP content is destroyed or irreversibly transformed
- Not allow recovery, recycling, reclamation, direct reuse or alternative uses of POPs
- Not transport waste across international boundaries without taking into account the Basel Convention
- Endeavour to develop appropriate strategies for identifying sites contaminated by POPs

Slide 3

POPs under the Chemical Conventions (1)

	Basel	Rotterdam	Stockholm
PCB	Y10, A 1180/A 3180	1336-36-3	Yes
PCT	Y10, A 1180/A 3180	61788-33-8	
PBB	Y10, A 1180/A 3180	36355-01-8 (hexa-) 27858-07-7 (octa-) 13654-09-6 (deca-)	
PCDD/Fs	Y 43/44, A 4110		Yes
POPs (pesticides, chemicals)	A 4010, A 4030, A 4130, A 4140	Yes	Yes
Other POPs pesticides	A 4010, A 4030, A 4130, A 4140		
Non-POPs pesticides	A 3130		

Slide 6

Mandate by the Stockholm Convention (Art.6,2)

The COP shall cooperate closely with the appropriate bodies of the **Basel Convention** on the Control of Transboundary Movements of Hazardous Wastes and their Disposal to, inter alia:

- 1. Destruction Efficiency of disposal technologies**
Establish levels of destruction and irreversible transformation necessary to ensure that the characteristics of POPs as specified in paragraph 1 of Annex D are not exhibited.
- 2. Methods for environmentally sound disposal**
Determine what they consider to be the methods that constitute environmentally sound disposal referred to above; and
- 3. Low POP Content**
Work to establish, as appropriate, the concentration levels of the chemicals listed in Annexes A, B, C in order to define the low POP content referred to in paragraph 1 d ii

Slide 7

Mandate by the Basel Convention (1)

1. **POPs covered by the Basel Convention**
(Annexes to the Convention)
2. **Decisions by the Open-Ended-Working Group (OEWG) at its first meeting in 2003**
 - Establishment of a small inter-sessional working group
 - Development of general technical guidelines
 - Development of specific technical guidelines for each of five persistent organic pollutants or groups of persistent organic pollutants:
 - ❖ PCBs, including PCTs, PBBs
 - ❖ dioxins and furans
 - ❖ DDT
 - ❖ Hexachlorobenzene (HCB)
 - ❖ Pesticides, including aldrin, chlordane, dieldrin, heptachlor, mirex and toxaphene

Slide 10

General Concept

1. The General Technical Guidelines on POPs as Wastes give all general information concerning the ESM of POPs as wastes
2. The five specific Technical Guidelines on POPs as wastes only give additional information related to the specific POPs chemical
 - Further/ongoing discussion is based on « General Technical Guidelines », which were adopted at COP 7

Slide 8

Status of the Technical Guidelines on POPs waste

POP	Lead Country	Status
POPs wastes in general	Canada	Adopted by COP 7 in October 2004
PCBs, PCTs, PBBs	Canada	Adopted by COP 7 in October 2004
DDT	Mexico	1 st draft soon available, to be discussed at OEWG IV
Pesticides and HCB	SBC	1 st draft soon available, to be discussed at OEWG IV
Dioxins and Furans	Australia	1 st draft available, to be discussed at OEWG IV

Slide 11

4. Content of the technical guidelines

Slide 9

Purpose of the Technical Guidelines on POPs waste

1. Define the term « Environmentally Sound Management » for specific waste types in the context of the Basel Convention
2. Define the terms given in Art. 6 of the Stockholm Convention
 - Low POP Content
 - Destruction Efficiency of disposal technologies
 - Methods for environmentally sound disposal

Slide 12

I. Introduction and II. Relevant Provisions

- I. **Introduction**
 - A. **Scope**
 - B. **About POPs**
- II. **Relevant Provisions of the Basel and Stockholm Convention**
 - **General historical information about the two conventions**
 - **General provisions for Parties concerning POPs wastes**
 - **Specific provisions for Parties, e.g. on ESM**
 - **Listing of all entries in the Annexes, which might be related to POPs wastes**

Slide 13

III. Issues to be addressed cooperatively (SC/BC)

III . A: Low POP Content

→ Defines the « border » between POPs and Non-POPs wastes

- a. PCB: 50 mg/kg
- b. PCDD/PCDF: 15 µ g TEQ/kg
- c. All other POPs: 50 mg/kg
(aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, HCB, mirex, and toxaphene)

Slide 16

IV. Guidance on ESM

IV.C: Waste Prevention and minimization

→ Refers to the elements of waste prevention and minimization programme

IV.D: Identification and inventories

→ Refers to how to identify POPs wastes, e.g. in obsolete stockpiles and how to prepare a (national) inventory of POPs waste as a basis for follow-up disposal activities

IV.E: Sampling, analysis and monitoring

→ Refers to how to take samples, conduct analysis and monitor the ESM of POPs waste

Slide 14

III. Issues to be addressed cooperatively (SC/BC) III . B: Levels of Destruction and irreversible transformation

→ Defines the « necessary performance » of disposal technologies

A concrete definition is not provided, since

- Destruction efficiency (DE) and destruction removal efficiency (DRE) are a function of the initial POP content.
- DE is difficult to be measured.
- BAT/BEP set “expected destruction efficiencies”, in particular circumstances on a technology by technology basis.
- All technologies should be operated in accordance with BAT/BEP.
- Pertinent national legislation provides information on this matter (Annex II).
- Limit value for PCDD/F emissions to air defined: **0.14 ng TEQ/Nm³**

Slide 17

IV. Guidance on ESM

IV.F: Handling, collection, packaging, labelling, transportation and storage

→ Refers to all points listed in the heading and gives short overall information

IV.G: Environmentally Sound Disposal

1. Pre-Treatment

Adsorption, Absorption, Dewatering, Oil-water separation, pH-adjustment, Mechanical separation, Mixing, Size reduction, Solvent washing, Thermal Desorption

Slide 15

IV. Guidance on ESM

IV.A: General Considerations

→ Refers to ESM « definitions » in the Basel Convention, the Stockholm Convention, OECD documents

IV.B: Legislative and regulatory framework

- Refers to
- Phase-out dates
 - Transboundary movement requirements
 - Specifications for transport equipment
 - Health and safety regulations
 - Analytical and sampling methods for POPs
 - Requirements for hazardous waste treatment and disposal facilities
 - General requirement for public participation
 - Contaminated sites
 - Other legislative controls

Slide 18

IV. Guidance on ESM

IV.G: Destruction and irreversible transformation methods (Annex IV)

- a) Alkali metal reduction (D9)
- b) Base catalysed decomposition (BCD)(D9)
- c) Catalytic hydro-dechlorination (CHD) (D9)
- d) Cement kiln co-incineration (R 1)
- e) Gas phase chemical reduction (GPCR) (D9)
- f) Hazardous waste incineration (D 10)
- g) Photo-chemical dechlorination and catalytic dechlorination reaction (PCD and CD) (D9)
- h) Plasma arc (D9)
- i) Potassium tert-Butoxide method (D9)
- j) Super-critical water oxidation (SCWO) and sub-critical water oxidation (D9)

Slide 19

IV. Guidance on ESM

IV.G: Other disposal methods

(when destruction and irreversible transformation do not represent the environmentally preferable option)

- a) Specially engineered landfill
- b) Permanent storage in underground mines and formation

IV.H: Remediation of Contaminated Sites

- Gives a short overview on this problems
- Makes reference to existing national guidance materials

IV.I: Health and safety

- Gives a short overview on health and safety measures to be taken
- Differentiates between high and low volume, concentration or risk situations

Slide 21

Annexes

- Annex I: International Instruments
- Annex II: Examples of pertinent national legislation
- Annex III: Selected analytical methods for POPs
- Annex IV: Economics of destruction and irreversible transformation methods
- Annex V: References

Slide 20

IV. Guidance on ESM

IV.J: Emergency response

- Gives a short overview on how to react in the case of an emergency

IV.K: Public participation

- Gives a short overview on how to enable public participation (processes)

4.3.3 BAT-BEP Experiences in New Zealand, by Howard Ellis (Wellington Consultation)

Slide 1

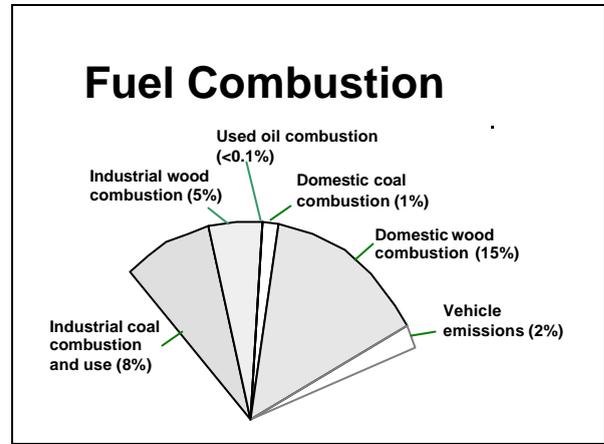
UNEP BAT/BEP Consultation, Asia & Pacific region
Wellington, 4-6 March 2005

Howard Ellis, NZ Ministry for the Environment

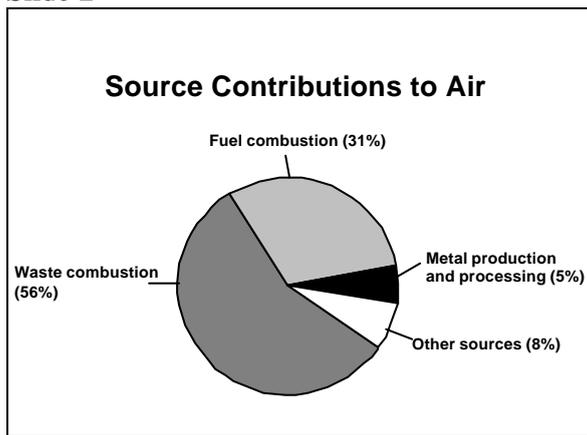
Simple 3-point approach to Article 5

1. Identify & understand dioxin releases
2. Identify response options - BAT/BEP + other measures
3. Develop Action Plan for minimizing and eliminating releases over the long term

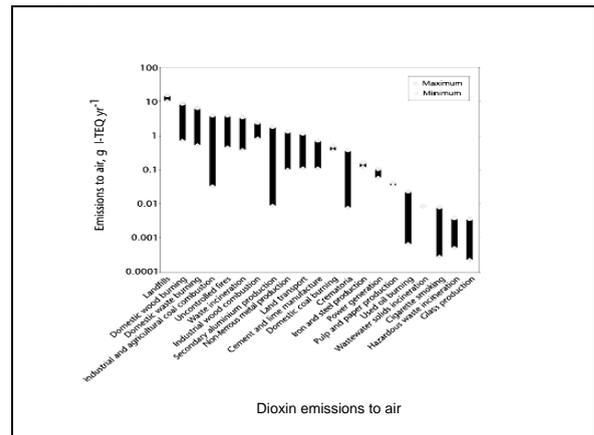
Slide 4



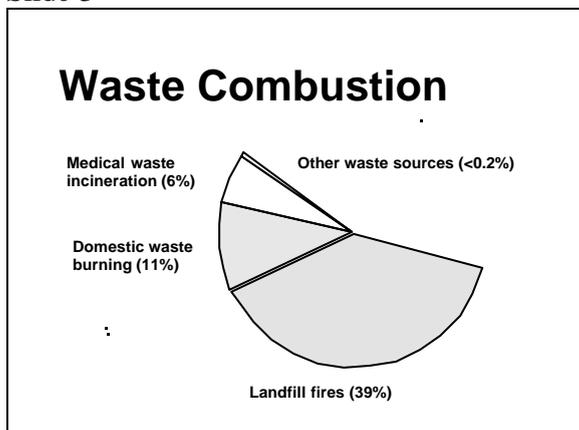
Slide 2



Slide 5



Slide 3



Slide 6

- ### Dioxin Releases to Land
- 30%
 - domestic and industrial wood combustion ash
 - medical and quarantine incineration ash and residues
 - Remainder
 - industrial and domestic solid wastes disposed to landfill
 - waste water treatment solids
 - Used oil use and disposal
 - coal combustion, contaminated wood burning ash
 - slag from iron and steel production
 - dusts and fines from secondary metallurgy (aluminium, other metals)

Slide 7

Dioxin Releases to Water

Relatively minor

- Waste water treatment
- Leachate from landfills (historical disposal)

Slide 10

NZ inventory of dioxin emissions to air, land, water, and reservoir sources. MfE (2000)

Dioxin Release estimate
g I-TEQ/yr

Emissions to air	14 - 51
Releases to land	26 - 54
Releases to water	0.56 - 2.6

Total historical reservoirs 1,450 - 1,700 g I-TEQ

Slide 8

Reservoir (historical) releases

Estimates for sources of local contamination

- Landfills – historical wastes
- Chlorophenol manufacturing waste in landfill
- Sawmill sites (PCP use in timber treatment)
- Gas works sites
- Pulp and paper (chlorine bleach) waste sites

Diffuse contamination

- 2,4,5-T use
- Air deposition from past industrial activity

Slide 11

BAT/BEP check: Part II Annex C

	Meets BAT/BEP	Priority	Minimising Potential
Medical & quarantine waste incinerators	No	HIGH	Medium
Metallurgical industry thermal processes	Most do Some don't	Moderate	Medium
Haz waste incinerators	YES	Low	Nil
Cement kilns	YES	Low	Nil
Pulp & Paper	YES	Low	Nil

Slide 9

NZ Summary of Dioxin releases

Category (UNEP)	Air		Land		Water		Total All media
	Best estimate	Total Air %	Best estimate	Total Land %	Best estimate	Total Water %	
Waste incineration	1.95	6.04	1.83	3.92	0.00	0.00	3.78
Ferrous and non ferrous metals production	1.75	5.42	7.01	15.02	0.02	0.67	8.78
Power generation and heating/cooking	8.95	27.73	6.44	13.80	0.00	0.00	15.39
Production of mineral products	0.46	1.43	1.75	3.74	0.00	0.00	2.21
Transport	0.64	1.98	0.00	0.00	0.00	0.00	0.64
Uncontrolled combustion processes	18.17	56.28	5.70	12.22	0.00	0.00	23.87
Production and use of chemicals and consumer goods	0.039	0.12	0.71	1.51	0.28	12.25	1.02
Miscellaneous	0.23	0.71	0.00	0.00	0.00	0.00	0.23
Disposal/landfilling	0.084	0.29	23.23	49.79	1.95	87.08	25.28
TOTAL g TEQ/annum	32.28	100	46.66	100	2.24	100	81.18

Slide 12

BAT/BEP check: Part III Annex C

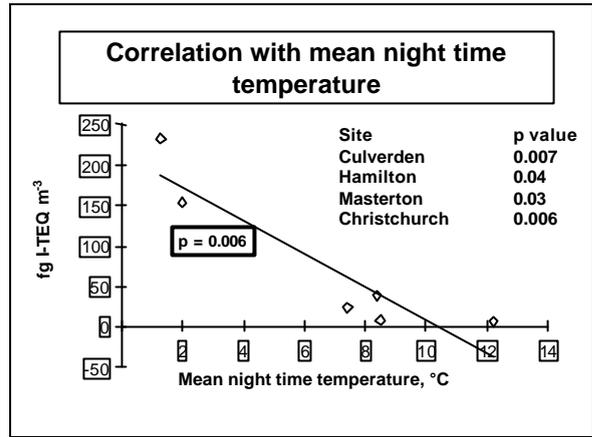
	Meets BAT/BEP	Priority	Minimising Potential
Residential waste open burning	No	HIGH	HIGH
Residential combustion for domestic heating	No	HIGH	HIGH
Metallurgical industry thermal processes	Most do Some don't	Low	Medium
Boilers (fossil fuel)	Not all	Low	Medium
Boilers (biomass)	Not all	Low	Medium
Crematoria	Not all	Low	Low

Slide 13

BAT/BEP check: Part III Annex C

	Meets BAT/BEP	Priority	Minimising Potential
Motor Vehicles	No	Low	Low
Animal Carcasses	No	Low	Low
Chemical Production	YES	Low	Low
Open burning (landfills)	YES	Low	Nil
Copper cable smouldering	YES	Low	Nil
Textile & Leather	No concern		
Vehicle shredding	No concern		
Waste oil refining	No concern		

Slide 16

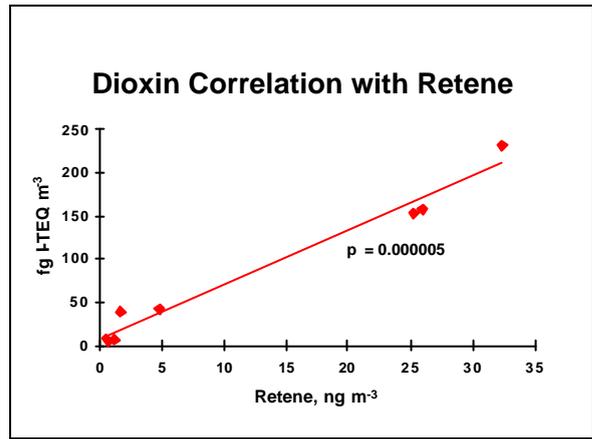


Slide 14

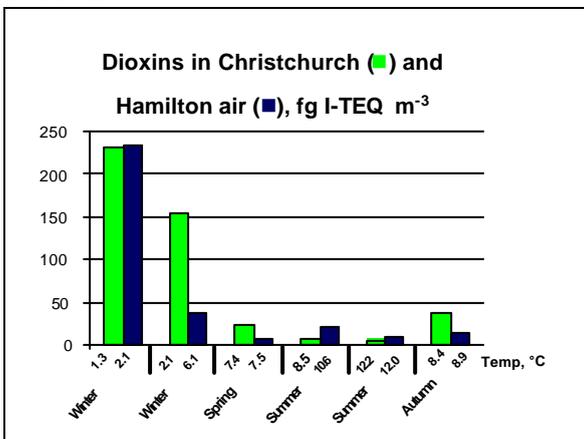
Dioxin Discharges to Air a Priority

- Sources and pathways well understood
- Most of the dioxin in people is via food contamination from air releases
- Most available dioxin is “newly” created
- Focus on reducing discharges to air
- Domestic wood burning, domestic waste burning, uncontrolled fires accounted for 10 – 40% of total dioxin releases

Slide 17



Slide 15



Slide 18

Reducing dioxin emissions to air via national standards that ban activities

Bans on:

- landfill fires
- open burning of insulated copper wire, oil or tyres
- burning bitumen road seal
- school and hospital incinerators by 2006 (unless consented)
- new high temperature hazardous waste incinerators.

Dioxin risk reduction strategy

- ✓ Air quality environmental standards for dioxins and other toxics, and PM10 particulate
- ✓ A design and thermal efficiency standard for domestic wood burners
- ✓ Update NZ Dioxin Inventory
- ✓ Apply BAT/BEP where appropriate
- ✓ Phasing in tighter vehicle emissions standards
- ✓ Developing industry-based schemes for particular waste products (tyres, used oil, farm plastics) to avoid their incineration
- ✓ Contaminated site remediation where possible

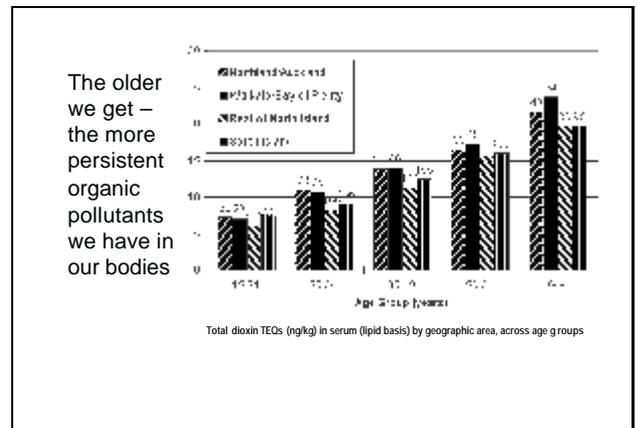
4.3.4 Taking Action under the Stockholm Convention, *by Barry Carbon (Wellington Consultation)*

Slide 1

Taking action under the Stockholm Convention

Barry Carbon
Chief Executive
Ministry for the Environment

Slide 4



Slide 2

Reduce harm to people and the environment from persistent organic pollutants

Slide 5

- Our objectives**
- Identify sources
 - Reduce/eliminate releases
 - Achieve decline in body burdens

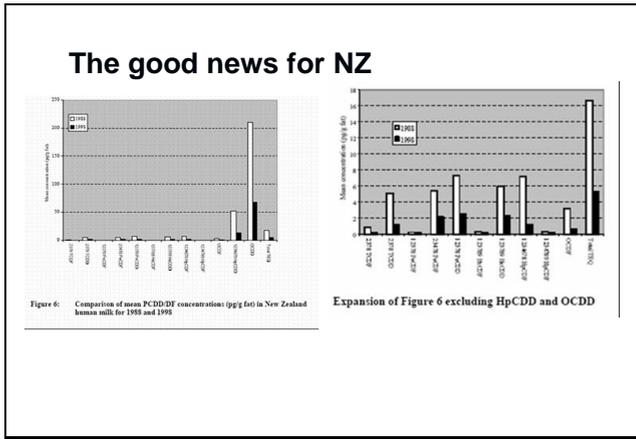
Slide 3

- Why minimise dioxin releases?**
- Very toxic
 - Accumulate in body
 - Slow to excrete
 - Passed on from mother to child
 - No cure

Slide 6

- Major historical sources gone**
- 2,4,5-T and 2,4-D
 - Pulp and paper
 - Leaded petrol
 - Timber treatment

Slide 7



Slide 10

Clean up performance

Table 2 Soil/sediment acceptance criteria.

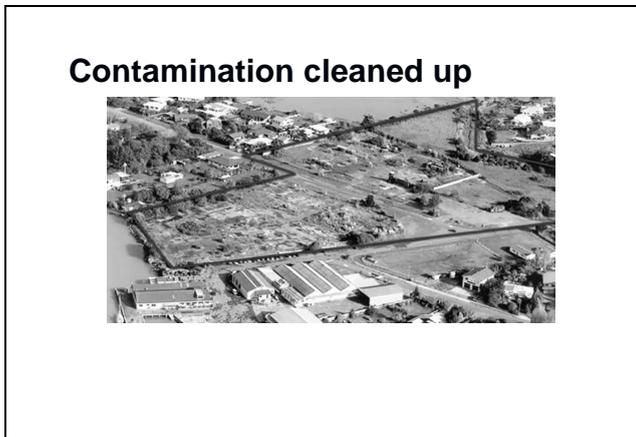
Land Use	Depth (m)	DDX (total DDT, DDD, DDE) (mg/kg)	Aldrin + Dieldrin + 10% Lindane (mg/kg)
Residential	All	5	3
Commercial	0-0.5	5	3
	Below 0.5	200	60
Recreational / Open Space	0-0.5	5 ¹	3
	Below 0.5	200	60
Marine sediment	All	0.01	0.01

Slide 8

Our dioxin action plan

- Plan
- Consult
- Evaluate
- Review
- Implement

Slide 9



4.3.5 Stockholm Convention: Australia's National Implementation Plan, by Chris Mobbs (Wellington Consultation)

Slide 1

**Stockholm Convention
Australia's National
Implementation Plan**

Slide 4

National Implementation Plan

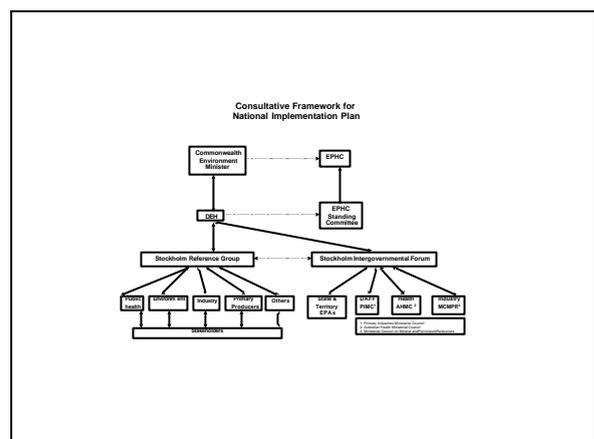
- Began development of NIP in late 2004
- Established two stakeholder consultation forums:
 - Intergovernmental Forum (government agencies)
 - Reference Group (non-government organisations)
- Reference Group includes industries listed on Annex C, environment and public health groups
- Aim to submit NIP to UNEP by early 2006

Slide 2

Talk will cover

- Australia's ratification of Stockholm
- Development of Australia's NIP
- Achievements in addressing POPs
- Future priorities
- Application of BAT BEP in Australia

Slide 5



Slide 3

Ratification of Stockholm

- May 2001 - Australia signed
- 20 May 2004 - Australia ratified
- 18 August 2004 – Convention Entered into force for Australia
- Australian Government Department of the Environment and Heritage is lead agency

Slide 6

Topics to be covered in NIP

- Australia's NIP will be structured to show
 - achievements to date
 - proposed actions to meet obligations of Convention
- Key component will be National Action Plan for by-product POPs

Slide 7

Achievements to date

- 1993 – released National Strategy for Management of Scheduled Wastes
- Strategy established three plans:
 - Organochlorines pesticides (OCP)
 - Polychlorinated biphenyls (PCB)
 - Hexachlorobenzene (HCB)
- 1987-1997 most POPs banned
- By 2001 - 5000 tonnes of PCBs removed and destroyed

Slide 10

Future Priorities...cont'd

- Destroy 8,000 tonnes of HCB waste and 20,000 tonnes contaminated soil at Orica site, Sydney
- Identify and ensure contaminated sites are cleaned-up in an environmentally friendly manner e.g cattle dip sites
- Develop mechanisms for monitoring POPs
- Continue assisting other countries in region

Slide 8

Achievements to date...cont'd

- Removal of OCP from farms
 - 1987-95 - 1400 tonnes
 - 1999-02 - 140 tonnes (ChemCollect)
- Remediation of contaminated sites
 - Homebush Bay (2000 Olympics site)
- 2001-04 - National Dioxins Program

Slide 11

Mirex

- Mirex is registered for use as termiticide (in Northern Territory)
- Used as a bait in mango plantations
- Australia has registered an exemption under Article 4
- Exemption to remain for up to 5 years (2009)
- NT Government undertaking research on alternative to mirex

Slide 9

Future Priorities

- Find alternative for mirex and remove exemption under Article 4
- Development of by-products action plan
- Continue phase out of PCBs by 2009
- Destroy remaining stocks of OCPs (90 tonnes)

Slide 12

National Dioxins Program

- 2001-04 studies to determine background levels of dioxins in:
 - population (blood serum, breast milk)
 - environment (air, soils, sediments, fauna)
 - food and agricultural commodities
 - emission sources (bushfires, motor vehicles)
- Risk assessments – human and ecological

Slide 13

Emissions sources (top 12)

Source Category	Annual Estimated Release (g TEQ/annum)			
	Air	Water	Land	Total ^a
Biomass burning	240	0	1,020	1,270
Pulp and paper production	0.4	0.4	110	110
Waste burning and accidental fires	88	0	8.7	97
Zinc production	50	0	0	50
Fossil fuel power plants	14.3	0	27.7	42.0
Aluminium production	4.45	0	31.80	36.25
Sewage and sewage treatment	0	0.9	33	34
Metal ore sintering	32	0	0	32
Medical waste incineration	6.39	0.36	21.9	28.7
Household heating and cooking with biomass	20.2	0	1.6	21.8
Iron and steel production plants	20.3	0	0.03	20.3
Copper production	1	0	13	14
Other sources	1	0	0	58
Total	500	3.42	1,300	1,800

Slide 16

Application of BAT BEP

- Commonwealth would not set up separate legislative regime for Stockholm
- This would duplicate the role of the States in licensing facilities

Slide 14

National Action Plan for by-products

- Work on dioxins being progressed through State and Commonwealth Environment Ministers' Council:
 - Environment Protection and Heritage Council
- Proposed way forward to be considered over coming months
- Work will contribute to National Action Plan

Slide 17

Application of BAT BEP

- Some States have sort advice from Commonwealth about application of BAT BEP draft guidelines
- Commonwealth will be seeking cooperation with the States to use BAT BEP guidance

Slide 15

Application of BAT BEP

- Management of land, water and environment is largely the responsibility of States and Territories
- They have day to day controls on facilities such as setting licence conditions on emissions

Slide 18

Application of BAT BEP

- The BAT BEP guidance have been used for:
 - Development of new pulp mills guidelines
 - Assessment of soil treatment plants

Slide 19

Promotion of Alternatives

- 1993 – Ministers rejected high temperature waste incinerator for destroying hazardous waste
- Led to treatment of different waste streams through the National Strategy for Management of Scheduled Wastes

Slide 22

Alternatives for treating medical waste

- Sorting at source
- Uses Electro Thermal Deactivation Technology
- Operating in the ACT for 2 years
- Replaced a waste incinerator
 - http://www.stericorp.com/irm/content/technical/default_frame.html

Slide 20

No Waste' Campaigns

- ACT – *No Waste by 2010*
- NSW – *Waste Avoidance and Resource Recovery Strategy 2003*
- SA – *Zero Waste*
- Victoria – *EcoRecycle Victoria Towards Zero Waste*
- WA – *Waste 2020 Towards Zero Waste*

Slide 23

Further Information

- Contact Chris Mobbs, Assistant Director, Chemical Policy
 - chris.mobbs@deh.gov.au
- DEH website
 - <http://www.deh.gov.au/industry/chemicals/index.html>

Slide 21

Waste Diverted Across Australia

Solid Waste Flows Per Capita and Per \$ Billion GSP by State, 1999-2000

State	Waste Generated	Waste Generated	Waste Disposed	Waste Recycled	Waste Diversion Rate
	kg/capita	GSP	kg/capita	kg/capita	%
ACT	1900	146.2	800	1100	58
Victoria	1600	9.9	900	700	44
Queensland	1400	13.7	800	600	43
NSW	1500	6.7	900	600	40
NT	1900	271.4	1400	500	26
SA	1300	31.7	1000	300	23
WA	2400	34.8	1900	500	21
Tasmania	1100	100	900	200	18
Australia (average)	1400	n/a	900	500	36

4.3.6 BAT-BEP Experiences in Japan, by Shin-ichi Sakai (Bangkok Consultation)

Slide 1

Stockholm Convention: Regional Consultation on the Draft
BAT/BEP Guidelines, March 7, 2005, Bangkok

**Reports from the regional EGB experts
- BAT/BEP Experiences in Japan**

Shin-ichi Sakai

Director, Research Center for Material Cycles
and Waste Management, NIES, Japan

Slide 4

Annex C

UNINTENTIONAL PRODUCTION

Part I: POPs subject to the requirements of Article 5

This annex applies to the following persistent organic
pollutants when formed and released unintentionally from
anthropogenic sources:

- Polychlorinated dibenzo-p-dioxins and dibenzofurans
(PCDD/PCDF)**
- Hexachlorobenzene (HCB)**
- Polychlorinated biphenyls (PCB)**

Slide 2

The "Dirty Dozen"

- . Aldrin
- . Dieldrin
- . Endrin
- . Toxaphene
- . Heptachlor
- . Mirex
- . Chlordane
- . PCBs
- . Hexachlorobenzene
- . Dioxins & Furans
- . DDT

ELIMINATION (ANNEX A)

UNINTENTIONAL PRODUCTION (ANNEX C)

RESTRICTION (ANNEX B)

Slide 5

Annex C

UNINTENTIONAL PRODUCTION

Part II: Source Categories

[BAT required for new sources]

- (a) Waste incinerators, including co-incinerators of municipal, hazardous, or sewage sludge;
- (b) Cement kilns firing hazardous waste;
- (c) Production of pulp using elemental chlorine or chemicals generating elemental chlorine for bleaching;
- (d) The following thermal processes in the metallurgical industry:
 - (i) Secondary copper production;
 - (ii) Sinter plants in the iron and steel industry;
 - (iii) Secondary aluminum production
 - (iv) Secondary zinc production

Slide 3

Article 5

**MEASURES TO REDUCE OR ELIMINATE
RELEASES FROM UNINTENTIONAL
PRODUCTION**

Each Party shall at a minimum take the
following measures to reduce the total
releases derived from anthropogenic
sources of each of the chemicals listed in
Annex C, with the goal of their continuing
minimization and, where feasible, ultimate
elimination:

Slide 6

Part III: Source Categories

[promotion of BAT/BEP for new and existing sources]

- (a) Open burning of waste, including burning of landfill sites;
- (b) Thermal metallurgical processes not mentioned in Part II
- (c) Residential combustion sources;
- (d) Fossil fuel-fired utility and industrial boilers;
- (e) Firing installations for wood and other biomass fuels;
- (f) Specific chemical production processes releasing POPs;
- (g) Crematoria;
- (h) Motor vehicles, particularly those burning leaded gasoline;
- (i) Destruction of animal carcasses;
- (j) Textile and leather dyeing and finishing;
- (k) Shredder plants for the treatment of end of life vehicles;
- (l) Smouldering of copper cables;
- (m) Waste oil refineries.

Slide 7

Definitions of BAT/BEP

- **Best Available Techniques**
 - “means the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for providing in principle the basis for release limitations designed to prevent and, where that is not practicable, generally to reduce releases of chemicals listed in Part I of Annex C and their impact on the environment as a whole.”
- **Best Environmental Practices:**
 - “means the application of the most appropriate combination of environmental control measures and strategies”

Slide 10

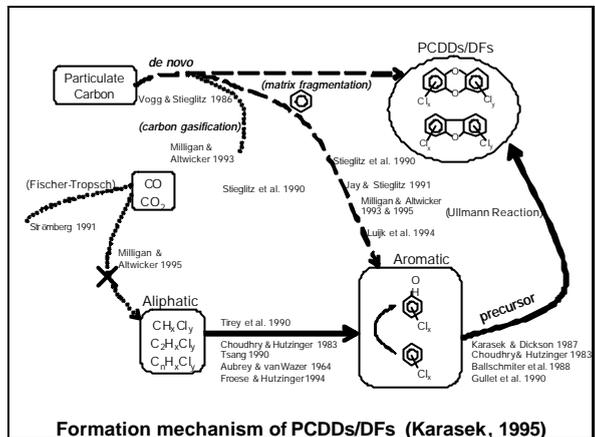
Byproducts of Combustive Reactions

Slide 8

Expert Group on BAT/BEP

1997-1998	Awareness-Raising Workshops
1998-2000	Negotiating Conferences
6/2002	INC-6 (BAT Expert Group formed)
3/2003	EGB-1 (RTP, NC, USA)
12/2003	EGB-2 (Villarrica, Chile)
10/2004	EGB-3 (Tokyo, Japan)
5/2005	First Conference of the Parties

Slide 11

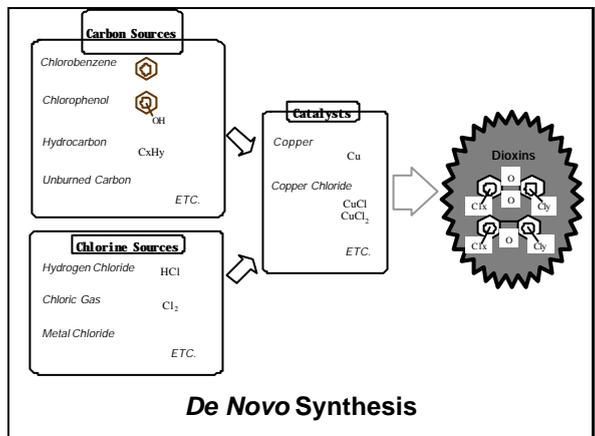


Slide 9

Sources of Dioxins, PCDDs/DFs

- 1 . Byproducts of Combustive Reactions
 - Waste incineration: Municipal solid waste, Industrial waste
 - Metal smelting: Steel electric furnace; Sintering, Zn- Al production from secondary materials
 - Fire accident, Forest fire etc.
- 2 . Byproducts of Chemical Reactions
 - Defoliant, Agrichemicals: 2,4,5-T, PCP, CNP etc.
 - Industrial products: PCB in insulating oil
 - Bleaching process of paper pulp etc.
- 3 . Secondary Sources
 - Polluted soil, Sewage sludge, Compost etc.

Slide 12



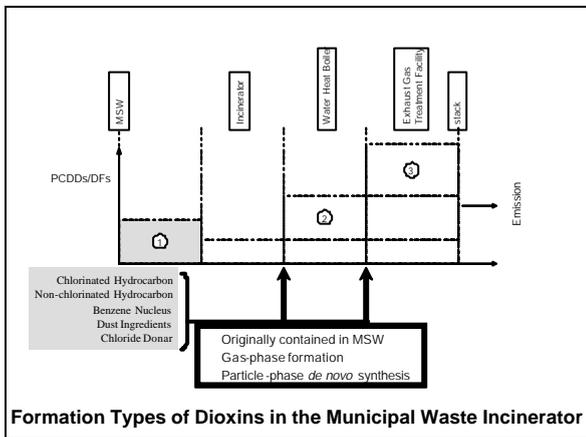
Slide 13



Slide 16

- BAT of Waste Incineration**
- ◆ Potential Purposes of Waste Incineration
 - Volume reduction
 - Energy recovery
 - Destruction and minimization of hazardous constituents
 - Disinfection
 - Reuse of some residues
 - ◆ BAT/BEP Outline
 - Practising proper waste handling, ensuring good combustion, avoiding formation conditions, capturing the chemicals and handling residues appropriately

Slide 14



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- BAT of Waste Incineration**
- ◆ BAT of Combustion Techniques
 - Maintain temperatures in the gas phase combustion zones for completing oxidation of the waste (for example, 850°–950° C in grated municipal solid waste incinerators, 1,000°–1,200° C when chlorine content of waste is high)
 - Provide for sufficient residence time (for example, 2 seconds) and turbulent mixing in the combustion chamber to complete incineration
 - Preheat primary and secondary air to assist combustion
 - Use continuous rather than batch processing wherever possible to minimize start-up and shutdown releases
 - (See Advance Draft, pp.73-74)
 - ◆ BAT for Flue Gas Treatment
 - Improvement of dust abatement and recirculation
 - Acid gas removal techniques
 - Activated carbon filter
 - Selective catalytic reduction
 - (See Advance Draft, pp.74-76)
- Achievable performance levels**
- 0.01 - 0.1 ngTEQ/Nm³

Slide 15

- BEP of Waste Incineration**
- Waste management practices**
- 3 R initiative – Reduce, Reuse & Recycle
- Waste inspection and characterization
- Incinerator operating and management practices**
- Ensuring good combustion
- Avoiding Cold starts, upsets and shutdowns
- Monitoring combustion gases

Slide 18

- Emission Control (BAT in Japan)**
- ◆ Perfect combustion control
 - Constant feeding of waste
 - Continuous operation, more than 800? , more than 2 seconds, less than CO 100 ppm
 - Ignition loss of bottom ash: Under 10%
 - ◆ Emission gas control
 - Rapid cooling; less than 200? , Higher efficient collection of dust, Rapid cooling reactions tower, Bag filter, Activated carbon adsorption, Catalytic decomposition
- Targets of emission concentration**
- New: 0.1–5ngTEQ/Nm³ Existing: 1–10ngTEQ/ Nm³

Slide 19

(2) Cement kilns firing hazardous waste

The main purpose of cement kilns is clinker production. Firing waste in cement kilns aims at energy recovery and substitution of fossil fuels. In some cases hazardous wastes are disposed of in these installations. (e.g.PCDD/PCDF < 25.8 ng I-TEQ/m³)

Types of waste that may be used as fuels

Used tyres, Waste oils, Sewage sludge, Rubber, Waste wood, Plastics, Paper waste,etc.

Slide 22

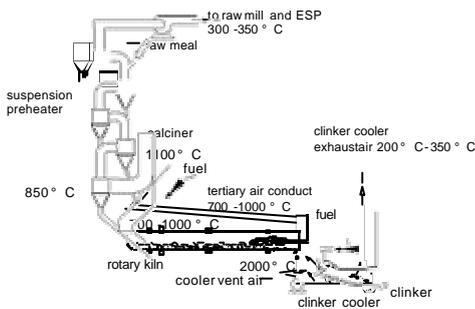
BAT of Cement Kiln

- ◆ Primary measures
 - Process optimization(Rapid cooling, less than 200?)
 - Feed material preparation (Pre-treatment of waste)
 - Input controls (minimize introduction of sulphur, nitrogen, chlorine, metals and VOCs, ensure temperature > 900?)
 - Stabilization of process parameters
 - Process modification
- ◆ Secondary measures
 - Improvement of dust abatement and recirculation
 - Activated carbon filter
 - Selective catalytic reduction

Achievable performance levels

< 0.1 ngTEQ/Nm³

Slide 20



Rotary kiln with suspension preheater and calciner

Slide 23

(3) Thermal processes in the metallurgical industry

[PART II]

- Secondary copper production
- Sinter plants in the iron and steel industry
- Secondary aluminum production
- Secondary zinc production

[PART III]

- Secondary lead production
- Primary aluminum production
- Magnesium production
- Secondary steel production
- Primary base metals smelting

Slide 21

BEP of Cement kilns firing hazardous waste

- Infrastructure, paving, ventilation
- Control and monitoring of performance
- Control and abatement of gross air emissions
- Environmental monitoring
- Audit and reporting systems
- Specific permit and audit systems for waste burning
- Demonstration by emission monitoring that a new facility can achieve a given emission limit value
- Occupational health and safety provisions
- Sufficient qualification and training of staff

Slide 24

Emission Control Technologies of Metal Production

- ◆ Rapid cooling of furnace exhaust gas
 - Water spray
 - Mixed with indoor cooling gas
- ◆ Improvement of dust collecting efficiency
 - Bag filter
 - Lower temperature of dust collecting
- ◆ Sorting of secondary raw materials
 - Removing of PVC adhering to scrap, PCB mixed in scrap, cutting oil and painting

Achievable performance levels

< 0.1 – < 0.2 ng TEQ/Nm³

Slide 25

(4) Other sources (Part ?)

◆ **Open burning of waste, including burning of landfill sites**

- Open burning is an environmentally unacceptable process that generates UPOPs and numerous other pollutant products of incomplete combustion
- Avoid non-combustible materials, waste loads containing high chlorine content, catalytic metals
- Materials to be burned should be dry, homogeneous or well blended, and of low density
- Supply sufficient air
- Minimize smoldering, possibly with direct extinguishment
- Limit burning to small, actively turned, well-ventilated fires, rather than large poorly ventilated dumps or containers.

Slide 28

Byproducts of Chemical Reactions

Slide 26

◆ **Crematoria**

- Avoidance of chlorinated material
- Design of crematoria to deliver a furnace temperature of 850° C
- 2-second residence time for the combustion gases
- Sufficient air to ensure combustion

◆ **Smouldering of copper cables**

- Mechanical cable chopping, stripping
- High-temperature incineration > 850° C
- Set premium pricing for unstripped cables and wiring
- Encourage sending the feed material to copper smelters

Slide 29

(1) Production of pulp using elemental chlorine or chemicals generating elemental chlorine

◆ **Process description**

- Kraft (sulphate) pulping process
- Lime and soda processes
- Sulphite pulping processes
- Bleaching

◆ **Formation of 2,3,7,8-TCDD/TCDF**

- Most of the formation of 2,3,7,8-TCDD and 2,3,7,8-TCDF is generated in the chlorination stage via the reaction of chlorine with the precursor of TCDD/TCDF

Slide 27

◆ **Motor vehicles, particularly those burning leaded gasoline**

- Best available techniques:
 - Prohibition of halogenated scavengers;
 - Prohibition of the use of leaded gasoline;
 - Installation of Diesel particulate filters and/or catalytic converters;
 - Alternatives to gasoline engine (electricity, solar light and fuel battery).
- Best environmental practices:
 - Separation of transport containers according to the fuel (for example, do not transport leaded gasoline containing halogenated scavengers in containers that are also being used for the transport of Diesel or unleaded gasoline);
 - Promotion of vehicles with low fuel consumption;
 - Education to identify driving conditions that have low pollutant formation and release;
 - Good maintenance of the vehicle.

Slide 30

Emission Control Technologies

◆ **Primary measure**

- Reduction or elimination of elemental chlorine
- Utilization of DBD- and DBF-free defoamers
- Elimination of the pulping of furnish contaminated with Polychlorinated phenols

◆ **Secondary measure**

- Substitution, Investment planning/cycles,
- Training, education and motivation of personnel
- Process control monitoring and optimization

Achievable levels

N.D. in water: e.g. ClO₂ substitution level > 85%

Slide 31

(2) Specific chemical production processes releasing chemicals

- ◆ Most of the processes described share common steps, including chlorination of organic or inorganic raw materials, purification of the products, separation of product streams (usually by distillation), destruction of high-molecular-weight side products and recycle or sale of hydrogen chloride
- ◆ Efficient separation and destruction of chlorinated organic side products, which may include persistent organic pollutants, is key to best available techniques applicable to these processes
- ◆ Examples
 - ◆ Distillation and internal recycling of byproducts
 - ◆ Elimination of carbon electrodes for chloralkali production
 - ◆ Elimination of alkali treatment of 1,2,4,5-tetrachlorophenol and 2,4,5-trichlorophenol
 - ◆ Elimination of phenol route to chloranil

Slide 34

BAT of Shredder plants of ELV

- Only Summary in Advance Draft of BAT/BEP Guideline
- To prevent accidental fires should be in place at shredder plants. Accidental fires can occur when highly flammable shredder light fluff, which is separated from the goods to be shredded, is spontaneously ignited.
- To prevent PCB-containing condensers, PCB- or chlorobenzene-contaminated waste oils or textiles, and polymers containing brominated flame retardants.

Slide 32

(3) Shredder plants for the treatment of end-of-life vehicles (ELVs)

- Shredder plants for treatment of end-of-life vehicles are listed in Annex C as a source that has the potential to form and release chemicals listed in Annex C.
- At present there is not sufficient evidence that in the (mechanical) shredding of vehicles, household electrical equipment or other electrical appliances new formation occurs of UPOPs
- The data available indicate that the PCDD/PCDF and PCB are released from shredder plants.

Slide 35

Economic and social implications (1)

- Economic and social conditions in a country are a factor in determining what are BAT/BEP
- Where processes are relatively large scale, capital intensive and involve large and continuous throughputs (for example, cement kilns firing hazardous wastes, sinter plants in the iron and steel industry, fossil fuel-fired utilities) the technologies and practices are rather similar worldwide

Slide 33

Emissions of PCDD/PCDF in German shredder plants (UBA 1996)

Facility	Capacity (t/year)	PCDD (pg TEQ)	PCDF (pg TEQ)	PCB (pg TEQ)	PCDD/PCDF/PCB (pg TEQ)	PCDD/PCDF/PCB (pg TEQ)
Waldhof	100,000	100	100	100	100	100
Waldhof	100,000	100	100	100	100	100
Waldhof	100,000	100	100	100	100	100
Waldhof	100,000	100	100	100	100	100
Waldhof	100,000	100	100	100	100	100

Slide 36

Economic and social implications (2)

- Where processes are relatively smaller in scale (crematoria, home heating and cooking, industrial boilers, motor vehicles) or involve management of wastes (waste incineration, open burning), the technologies and practices available may vary greatly from country to country
- In these cases, determining what are BAT/BEP will need to include an analysis of economic feasibility of the various options available

Slide 37

Japan's Experiences on BAT/BEP to control UPOPs

Slide 40

- ### The Dioxins Law
- (promulgated on July 16, 1999)
1. National Plan for the Reduction of Dioxin Emissions
 2. Targets of Policy
 3. Emission Control
 4. Control of Ash and Dust from Waste Incinerators
 5. Recovery of Contaminated Soil
 6. Monitoring of Environment and Sources

Slide 38

- ### Toyono Clean Center in Nose-cho, Osaka Prefecture
- In 1998, a high PCDDs/DFs of 8500 pg-TEQ/g was detected in the soil surrounding the MSWI plant.
 - The investigation detected an extremely high concentration of PCDDs/DFs in the water circulation system of the wet spray tower.
 - This presumably happened because combustion was not complete in the furnace, and emission gas containing high concentrations of PCDDs/DFs was generated in the process of electrostatic precipitation.
 - In addition, the recycling of the waste water from emission gas scrubbing resulted in secondary formation and concentration of PCDDs/DFs, of which a portion became mist from the open cooling tower and was released into the environment.

Slide 41

- ### The Targets of Policy
- TDI : 4 pg-TEQ/kg/day
 - Reduction Target :
 - 90% Reduction
from 1997 Level by the End of FY2002
 - Environmental Quality Standards :
 - Air 0.6 pg-TEQ/m³
 - Water 1 pg-TEQ/L
 - Soil 1,000 pg-TEQ/g
 - Sediment 150 pg-TEQ/g

Slide 39

- ### Tokorozawa Story
- In a separate incident in 1999, a TV news program reported that PCDDs/DFs had been detected in the leaves of spinach and tea cultivated in Tokorozawa City, Saitama Prefecture, which led to serious public concern.
 - Following these two incidents, the Japanese government established the Special Measures Law on Dioxin Control in 1999 from the viewpoint that dioxin control measures had to be undertaken urgently.

Slide 42

Emission Standards & the Number of Facilities

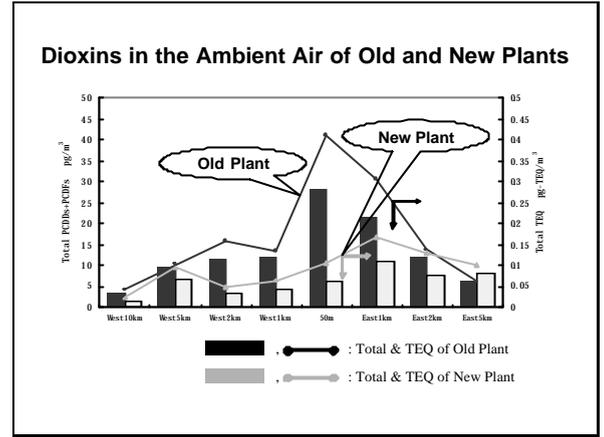
Unit of Standards:ng-TEQ/m³N

Type of Facilities	Emission Standards		
	New Facility	Existing Facility	
Waste incinerators (hearth area is more than 0.5m ² or capacity of incinerator is more than 50kg/h)	4 ton/h -	0.1	1
	2 - 4 ton/h	1	5
	- 2 ton/h	5	10
Electric steel-making furnaces	0.5	5	
Sintering facilities for steel industry	0.1	1	
Facilities for collecting zinc	1	10	
Facilities for manufacturing aluminum base alloy	1	5	

Slide 43



Slide 46



Slide 44

Comparison of Old & New Facilities		
	Old Facility	New Facility
Capacity	30ton/8hrs, 4 lines, Total: 120ton/day	85ton/24hrs, 3 lines, Total: 255ton/day
Incineration Processes	Stoker Furnaces with Semi-Batch Operation, Water Spray Cooling	Stoker Furnaces with Continuous Operation, Boiler & Power Generation
Gas Treatment Processes	Multi-cyclone, Electrostatic Precipitator, Stack of 55m	Quenching Reactor, Bag Filter with Carbon Injection, Stack of 59m
Year	Sep., 1976	Mar., 1999

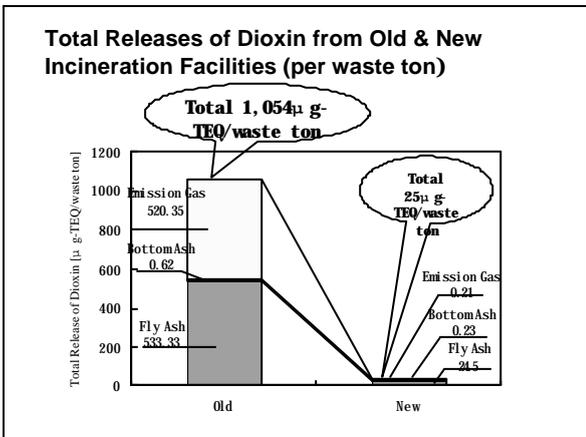
Slide 47

Monitoring of Environment and Sources

Environmental Monitoring :
 Prefectural governors must monitor levels of dioxins in air, water (surface and ground), sediment and soil.

Sources Monitoring :
 Owners of the facilities under the control must monitor levels of dioxins in emission gas or effluent at least once a year.

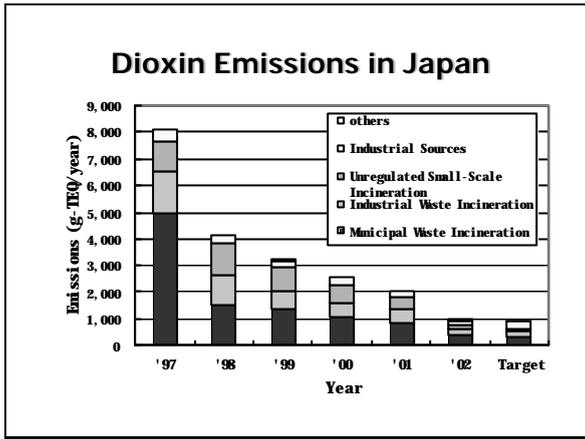
Slide 45



Slide 48

The Control on Ash and Dust from Waste Incinerators

- The treatment standard for ash and dust from waste incinerators : **3 ng-TEQ/g**
- The standard for maintenance and management of final landfill sites of waste.



4.3.7 Developing country concerns with respect to meeting BAT-BEP requirements, by *Annex II of EGB-3 Report (Nairobi Consultation)*

Annex II of EGB-3 Report

Annex II

DEVELOPING COUNTRY CONCERNS RELATING TO MEETING BAT-BEP REQUIREMENTS, IN PARTICULAR, IN THE AREA OF MEDICAL WASTE, WHILE CONTENDING WITH OTHER HIGH PRIORITY SOCIO-ECONOMIC ISSUES.

The developing country parties expressed with concern, the difficulties that may be confronting some of their member to meet the BAT-BEP standards for POPs in medical waste management due to lack of or inadequacy of capacity and technology while contending with other high priority socio-economic issues. However, we recognize that medical waste may have to be disposed off in a manner that will prevent the spread of infectious diseases arising from the present practice of co-disposal of hazardous medical wastes with other domestic type wastes in the open dump. Therefore, in the absence of sufficient, timely and appropriate international technical and financial assistance, developing country parties may have to be allowed in the short-term the use of the other options which are better than open dumping, including small scale hospital incinerators, even if they are not BAT, even though many aspects of BAT and BEP guidance would still apply and still be useful, especially waste management measures including segregation, and minimization. In this regard, there is need for early provision of financial resources for capacity building and institutional strengthening to enable compliance with BAT-BEP guidelines for POPs management by developing country parties. We note with interest the GEF/UNDP/WHO Medical Waste Management demonstration project under development, and we encourage the GEF, its implementing agencies and others to support and rapidly initiate much more work in this area. This would be greatly facilitated by developing countries making the related BAT/BEP issues and important part of their National Sustainable Development Strategies.

The need for special assistance in meeting BAT and BEP requirements for medical waste management is indicative of broader concerns relative to implementation of BAT and BEP for many developing countries. Implementation of BAT and BEP must be made broadly compatible with sustainable development goals in order to encourage development and poverty reduction while, at the same time, taking needed measures to protect public health and the environment from POPs.

5 CASE STUDIES

5.1 FORMATION AND RELEASE OF POPs IN THE CEMENT INDUSTRY AND THE USE OF ALTERNATIVE FUELS, BY WILLEM VAN LOO (VIENNA CONSULTATION)

Slide 1

Stockholm Convention: Regional Consultation for Central and Eastern European countries on the POP's BAT and BEP Guidelines

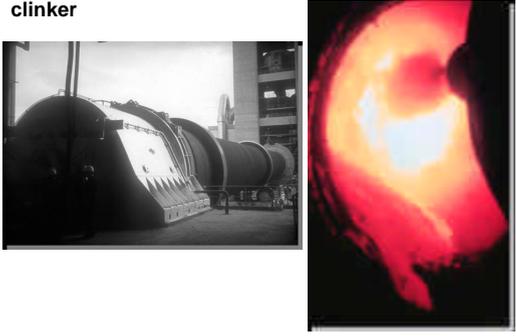
Formation and Release of POP's in the Cement Industry and the Use of Alternative Fuels

Vienna, 9-11 February 2005

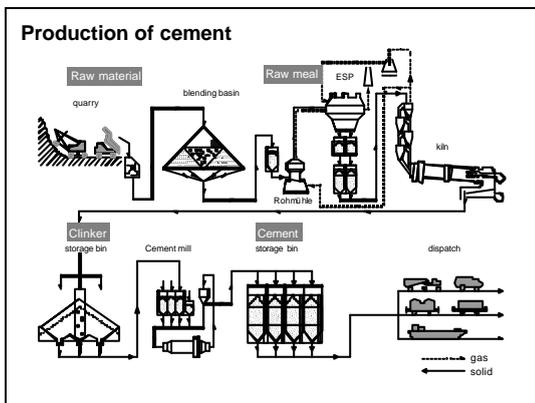
By Willem van Loo- CEMBUREAU/CSI

Slide 4

The rawmaterials are burnt at 1450° C to form clinker



Slide 2

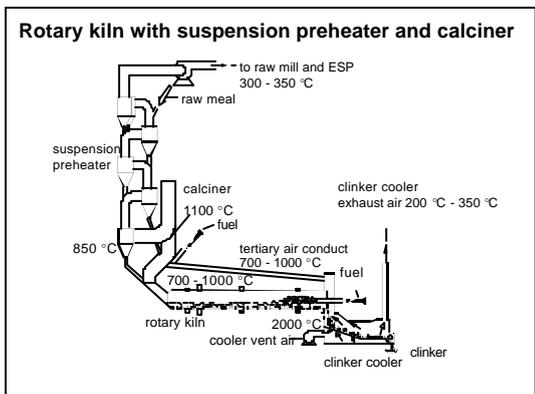


Slide 5

SUBSTITUTION OF FOSSIL FUELS IN CLINKER MANUFACTURING



Slide 3



Slide 6

FUEL SUBSTITUTION IN THE KILN FIRING PROCESS

Types of alternative fuels	Substitution Rate in Europe
<ul style="list-style-type: none"> • animal meal • rubber tyres • waste oil • impregnated saw dust • solvents • sewage sludge • paper sludge • 	<p>12% or 4.4 Mtonnes</p>

Slide 13

In the development of the Hazardous Waste combustor (HWC) Maximum Achievable Control Technology (MACT) rule, EPA noted that:

“Hazardous waste burning in cement kilns does not have an impact on dioxin/furan formation, dioxin/furan is formed post combustion”

(Federal Register, 64 FR 52876, September 30, 1999)

Slide 15

Measures for minimisation and control of PCDD/F's emissions

1. *Limit alternative raw material feed as part of raw-mix if it includes precursor type organics*
2. *Quick cooling of kiln exhaust gases to lower than 200°C in wet kilns (already inherent in dry preheater & precalciner kilns)*
3. *No alternative fuel feed during start-up and shut down*
4. *Monitoring and stabilisation of process parameters*

Slide 14

The data presented in the WBCSD report show that:

- **Most cement kilns can meet an emission limit of 0.1 ng TEQ/Nm³;**
- **Co-processing of alternative fuels and raw materials does not influence or change the emissions of POP's;**
- **Cement kilns in developing countries presented in the report meet an emission level of 0.1 ng TEQ/Nm³ with good margins.**

Slide 16



The slide features two logos. On the left is the 'Cement Sustainability Initiative' logo, which consists of a gear with a plant growing inside it, surrounded by the text 'Cement Sustainability Initiative'. On the right is the 'CEMBUREAU' logo, which features a stylized 'C' and 'B' intertwined, with the word 'CEMBUREAU' written below it.

Info@wbcسد.org
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5.2 SEWAGE SLUDGE AS ALTERNATIVE FUEL: A CASE HISTORY FOR ENCI MAASTRICHT, BY MR ROB VAN DER MEER AND WILLEM VAN LOO (VIENNA CONSULTATION)

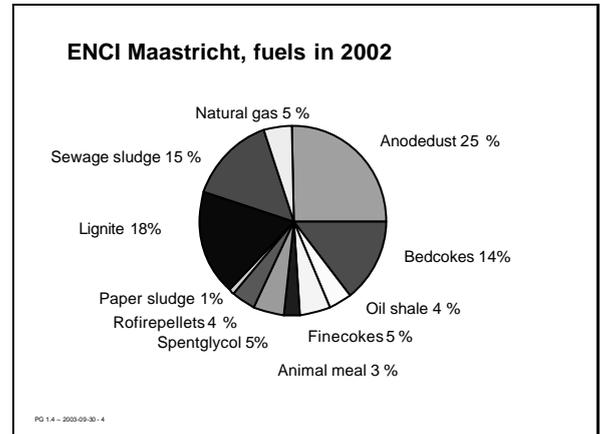
Slide 1

Sewage Sludge as Alternative Fuel

A case history for ENCI Maastricht

By Rob van der Meer and Willem van Loo

Slide 4



Slide 2

Sewage Sludge as Alternative Fuel

- **General, ENCI Maastricht**
- **Utilisation in Maastricht**
- **Supply and transport**
- **Physical state**
- **Chemical composition**
- **Health and safety data**
- **Process issues**
- **Technical issues**

Slide 5

Sewage sludge

Sewage sludge is residual product of waste water treatment, with about 50% organic material (on dry basis).

Change in disposal strategy:
agriculture -> landfill -> industrial disposal

CO₂-cycle of sewage sludge

Slide 3

ENCI Maastricht - kiln 8

long dry kiln, 950.000 tpy
2 stage single string preheater
planetary cooler

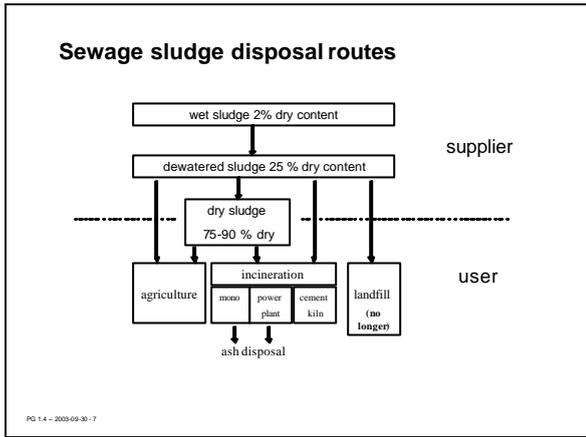
Slide 6

Sewage sludge treatment in the Netherlands

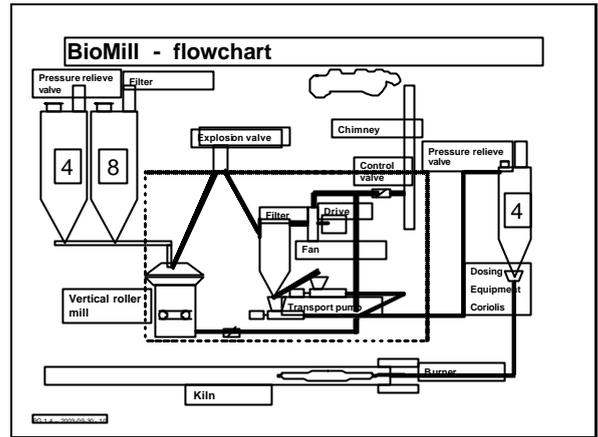
Treatment	tpy (dry)
incineration	175.000
wet oxidation	30.000
thermal drying	139.000
Composting	40.000
Gasification	2.000
Export	14.000
Total	400.000

N.B. Landfill is forbidden in the Netherlands.

Slide 7



Slide 10



Slide 8

Sewage sludge, emission standards

parameters		limits				typical results ²	
		Waste incinerator - plant	EU-Waste incineration directive		Cement plants		
		17.BlnSchV	Coal - power plants > 300 MW _{th}	Coal - power plants < 300 MW _{th}	Power plants; different types	Cement plants	
		O ₂ = 11%	O ₂ = 10%	O ₂ = 8%	min - max	min - max	
Dust suspended							
dust	mgNm ⁻³	1.0	30	30	1 - 15	4 - 34	
HCl	mgNm ⁻³	1.0	10	10	2 - 130	0.3 - 5.7	
HF	mgNm ⁻³	1	1	1	0.2 - 3.9	0.05 - 1.1	
Heavy metals							
Hg	mgNm ⁻³	0.03	0.05	0.05	< 0.002 - 0.01	< 0.002 - 0.05	
Cd + Tl	mgNm ⁻³	0.05	0.05	0.05	< 0.002 - 0.01	< 0.002 - 0.028	
Sum Pb, Cr, Co, Cu, Mn, Ni, V	mgNm ⁻³	0.50	0.50	0.50	0.002 - 0.18	0.001 - 0.03	
Organic							
C _{org}	mgNm ⁻³	1.0	10 ¹	100	?	?	
PCDD/PCDF	mgNm ⁻³	0.1	0.1	0.1	< 0.002 - 0.033	< 0.002 - 0.042	
Parameters with process-related exceptions							
SO ₂	mgNm ⁻³	5.0	50 ¹	200 ¹	0.1 - 390	10 - 370	
NO _x	mgNm ⁻³	200	500 ¹	200 ¹	160 - 830	230 - 750	

¹ exceptions are possible, if TOC and SO₂ is not produced by burning waste.
² Data-sources EU-Directive and Report for usage of waste in industry of Nordrhein-Westfalen.

PG 1.4 - 2003-09-30 - 8

Slide 11



Slide 9

Utilisation in Maastricht

1997 - 1998 **Environmental Impact Study (MER)**

1997 **Starting experiments**
grinding in ball mill with inerting with N₂

1998 - 2000 Extended trials with ball mill

1998 Permit for 100.000 tpy sludges

1999 **Construction BioMill 1**

2000 Starting up BioMill 1 - 40.000 tpy

2003 **Construction BioMill 2**

2004 Starting up BioMill 2 - 40.000 tpy

PG 1.4 - 2003-09-30 - 9

Slide 12

Supply and transport

suppliers Waste water treatment companies

material dried sewage sludge

transport silo trucks
pneumatic transport from truck to silos

PG 1.4 - 2003-09-30 - 12

Slide 13

Physical state

particle size ungrinded sewage sludge < 10 mm
 moisture content < 10%



PG 1.4 - 2003-09-30-13

Slide 16

Safety data

Safety aspects with sewage sludge silos

- CO and CH₄ detection
- material temperature measurements
- gas temperature measurement
- explosion valves
- CO₂-inertising

grinding installation

- CO and CH₄ detection
- gas temperature measurement
- explosion valves
- firewater

PG 1.4 - 2003-09-30-16

Slide 14

Chemical composition

		average	objective
heat value	GJ/t	12	> 10
ash	%	40	< 50
volatiles	%	50	
moisture	%	6	
S	%	0,80	
Cl	%	0,13	< 0,20
Hg		0,9 ppm	< 1,5 mg/kg
P ₂ O ₅	%	5,5	< 8

PG 1.4 - 2003-09-30-14

Slide 17

Safety data

	limit value	high alarm level
CO	4500 ppm	5000 ppm
CH ₄	150 ppm	200 ppm
temperature	45 °C	65 °C

PG 1.4 - 2003-09-30-17

Slide 15

Chemical composition

component	average (%)	metal	average (mg/kg)
CaO	8,7	Sb	-
SiO ₂	40,4	Pb	200
Al ₂ O ₃	13,7	Cr	200
Fe ₂ O ₃	12,2	Cu	400
K ₂ O	2,3	Mn	600
Na ₂ O	0,5	V	-
MgO	2,0	Sn	100
TiO ₂	0,75	As	-
Mn ₃ O ₄	0,18	Co	-
		Ni	300
		Se	-
		Te	-
		Tl	-
		Zn	1100
		Cd	-
		Br	60

PG 1.4 - 2003-09-30-15

Slide 18

Health

All workers in the plant working with sewage sludge are voluntarily vaccinated for:

- hepatitis A and
- tetanus injections

Important is the possible presence of endotoxines in the sewage sludge and exhaust gasses of the grinding installation.

PG 1.4 - 2003-09-30-18

Slide 19

Process issues

- Flame and clinker criteria
- Hg and P₂O₅ content
- Odour and VOC
- Kiln Stack Emissions
- Brew

PG 1.4 - 2003-09-30 - 19

Slide 22

c. Odour and VOC
Emission measurement at stack of BioMill (2001)

volume 6.600 Bm³/hour (50 °C)
 circa 5.400 Nm³/hour

components

moisture	20	gr/Nm ³
NO _x (as NO ₂)	< 1	mg/Nm ³
CO	6	mg/Nm ³
SO ₂	< 1	mg/Nm ³
O ₂	20,9	vol%, droog
C _x H _y (ass CH ₄)	700 - 860	mg/Nm ³
dust	< 1	mg/Nm ³
heavy metals	max. 0,02	mg/Nm ³
Cd	< 0,001	mg/Nm ³
Hg	< 0,0002	mg/Nm ³

PG 1.4 - 2003-09-30 - 22

Slide 20

a. Flame and clinker criteria

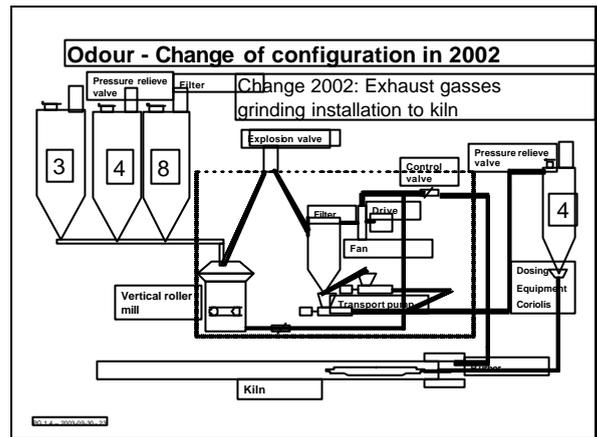
Flamecriteria fuel	Without	/	With sludge
H-min.	> 19 GJ/ton	19,3	19,3
Volatiles	> 20 %	29,2	35,3
Sulphur	< 1,5 %	0,92	0,89

Clinker

Sulfatisation	< 1,2	1,15
Chlorine	< 0,05	0,03

PG 1.4 - 2003-09-30 - 20

Slide 23



Slide 21

b. Hg en P₂O₅ content

Hg-limits: EU co-incin. 0,05 mg/Nm³
 17 BimSchV waste incin. 0,03 mg/Nm³

Hg – situation at ENCI:
 Input-average 0,9 ppm Hg in sewage sludge
 Objective: emission level stable on 0,02 mg/Nm³

P₂O₅
 Quality of concrete (setting time, interaction with plastifiers)

- P₂O₅-content of clinker
- Composition of clinker
- No general judgement possible
 -> practical tests needed

PG 1.4 - 2003-09-30 - 21

Slide 24

d. Kiln Stack Emissions (test runs 97-98)

SO ₂	level: 71 kg sewage sludge /hour less then in periods without sewage sludge
NOx	same level as in periods without sewage sludge and below permit value
dust	no change
HCl/HF	below permit value
C _x H _y /PAK	in normal range
PCDD/F	below 0,1 ng TEQ/Nm ³
Hg	below 0,5 mg/Nm ³
Other metals	below 1 mg/Nm ³

PG 1.4 - 2003-09-30 - 24

Slide 25

e. Brew

since 1996 two incidents

- brew of unground sludge in an external storage hall
height of storage is important
- brew of ground sludge in a silo

PG 14 - 2003-09-30 - 25

5.3 “PARADISO”, A CASE STUDY FOR THE PACIFIC ISLANDS, BY BRUCE GRAHAM (WELLINGTON CONSULTATION)

Wellington Consultation Meeting on BAT/BEP Case Study

Background Information

The details for this case study have been developed from recent inventory reports for 5 Pacific Island countries, which were all prepared using the UNEP Toolkit. The results for releases to air are summarized in attachment 1. As shown, there are significant variations between different countries. However, for most, the major sources are in the categories of waste incineration (medical and quarantine), power generation (mainly domestic wood burning) and uncontrolled combustion (rubbish burning). Other sources of significance in one or more countries include asphalt plants, a secondary steel mill, and biomass-fired power boilers.

Case Study for the Pacific Island Country of Paradiso

Country situation: Paradiso is a Pacific Island nation with a population of 420,000 people spread across 5 major (high) islands and 25 smaller islands, half of which are atolls. The Capital is Port Alofi, with a population of 110,000 people.

Institutional framework: Most environmental matters fall under the responsibility of the Department of Environment, although there is no wide ranging Environment Act, which would allow, for example, for the issue of permits and control of industrial activities. There is however, a requirement for the preparation of Environmental Impact Assessment reports, prior to the development of new industrial and commercial facilities.

Economy: The four mainstays of the economy are fishing, agriculture, forestry and tourism. The major agricultural exports include sugar and copra. In the past most timber has been exported as “green” logs, but this situation is gradually changing with the increasing development of local processing facilities, including timber mills and treatment plants.

Inventory Results: The results obtained using the UNEP Toolkit were as follows:

Cat.	Source Categories	Annual Releases (g TEQ/a)				
		Air	Water	Land	Products	Residue
1	Waste Incineration	1.321	0.000	0.000	0.000	0.007
2	Ferrous and Non-Ferrous Metal Production	0.110	0.000	0.000	0.000	0.300
3	Power Generation and Heating	0.357	0.000	0.000	0.000	0.000
4	Production of Mineral Products	0.121	0.000	0.000	0.000	0.000
5	Transportation (and generators)	0.059	0.000	0.000	0.000	0.000
6	Uncontrolled Combustion Processes	0.891	0.000	0.060	0.000	1.756
7	Production of Chemicals and Consumer Goods	0.000	0.000	0.000	0.000	0.000
8	Miscellaneous	0.039	0.000	0.000	0.000	0.000
9	Disposal/Landfilling	0.000	0.000	0.000	0.000	0.000
10	Identification of Potential Hot-Spots	0.000	0.000	0.000	0.000	0.000
1-9	Total	2.9	0.0	0.1	0.0	2.1

Action Plan for Unintentional POPs

The Paradiso Action Plan for unintentional POPs includes a proposal for BAT to be **required** for any new sources in the categories of waste incineration, ferrous and non-ferrous metal production, and production

of mineral products. The application of BAT/BEP will also be **promoted** for all other significant sources identified in the inventory.

Work Group Exercises/Discussion Points

1. Medical Waste Incineration

The majority of the dioxin releases shown in category 1 are due to incineration of medical wastes. In Paradisio, the wastes are generated at 2 major hospitals, 5 smaller clinics and 2 private medical centres. One of the hospitals has a new single-chamber, 2-burner high temperature incinerator while the facilities at all the other centres are very old and in urgent need of replacement. At some of the smaller clinics the waste is simply disposed by burning in a hole in the ground. The available information on waste quantities is very limited – the activity data used in the Toolkit was simply based on data collected over 2 weeks at one of the hospitals, with a numerical adjustment to estimate the total wastes generated throughout the country.

The Department of Health has recently embarked on a 5-year programme for upgrading hospital waste management at all of its facilities. To date this has provided for the new incinerator mentioned above, plus some initial programmes for improving waste management systems, including the segregation of infectious wastes from the bulk waste stream. The long-term plans allow for the purchase and installation of two additional incinerators (in 2006 and 2009), and operation of a national collection service for transporting wastes from other sites to the incinerators.

Exercise: Review the relevant sections of the BAT/BEP guidance (eg. sII, sIII and sV.A.(ii)) and provide comments/discussion on the following points:

1. What additional information (to that given above) is required before any sensible decisions can be made about the development of effective medical waste management systems in Paradisio?
2. What alternative methods (ie. non-incineration) are available for medical waste disposal, and how should consideration of these be incorporated into the planning and approval processes for the proposed new incinerators?
3. Assuming incineration remains as the preferred option, what actions should the Department of Environment take to ensure that the units are designed, built and operated to comply with the guidance on BAT/BEP? How can these be made legally enforceable?
4. Are there any practical measures that might be considered for applying BAT/BEP to the existing (new) incinerator?
5. What other waste management aspects should the Department of Health be encouraged and/or required to address in its future operations?
6. Many Pacific Island countries have included quarantine wastes under the medical waste category when using the UNEP Toolkit. Is the BAT/BEP guidance on medical waste applicable to quarantine wastes, and if not what additional information should be included?

2. Domestic Rubbish Burning and Landfill Fires

Domestic rubbish burning and fires at rubbish dumps were identified as two of the major contributors to dioxin releases throughout Paradisio. Domestic rubbish and garden wastes are burnt by at least 40% of all households. This is despite the fact that regular rubbish collection services are provided in most of the urban areas. Burning is also a problem at most of the rubbish dumps, which are scattered throughout the country. These fires are often started by scavengers.

The municipal and district authorities are responsible for rubbish collection and disposal throughout Paradisio. One of these, the Port Alofi City Council is about to prepare a new Action Plan for upgrading

waste management services in the city. This will include efforts to reduce waste generation and the development of a new “state-of-the-art” landfill facility.

Exercise: Review the guidance relevant to waste burning and then comment on the following:

1. What advice should the Department of Environment give to the City Council, to promote the application of BAT/BEP in the new waste programme?
2. What incentives could be considered to promote alternatives to rubbish disposal by burning?
3. What data gathering and/or monitoring programmes could be put in place to assess the effectiveness of the above actions (noting also the review and reporting requirements under Article 5(a)(v) of the Stockholm Convention).

3. Biomass-Fired Power Boilers

The dioxin/furan inventory identified at least 15 power boilers in Paradisio that are either powered using biomass, or co-fired with a mix of biomass and fossil fuels. Most of these plants are associated with the processing of sugar cane and copra production. Many of the units are old and inefficient and it can be expected that most of these will be replaced at some time over the next 10 years. In addition, this programme is likely to be accelerated by a move in both of these industries towards larger centralised processing plants.

Exercise: Review the guidance relevant to these power boilers and then comment on:

1. What guidance can be given on alternative processes or methods for reducing dioxin releases from these sources?
2. What mechanisms (regulatory or otherwise) should be considered for ensuring the application of BAT/BEP in any new or substantially modified installations?
3. What criteria should be established for deciding when plant modifications amount to “substantial”?

4. Domestic Wood-Burning

As with most Pacific Island countries, significant quantities of wood are used in Paradisio for cooking and to a lesser extent, home heating.

Exercise: Review the relevant guidance on domestic wood burning and comment on:

1. Its relevance to and potential for practical application in the Pacific Island situation?
2. What additional guidance, research or other developments could be considered for assisting countries in reducing releases from this source?

Attachment 1: Provisional Inventories of Dioxin Releases to Air – 5 Pacific Island Countries

The information given below has been taken from draft inventory reports for five Pacific Island countries, ranging in size from Niue (popn 1800) through to Papua New Guinea, which is the largest in the sub-region (popn 5.2million). The populations of the other three countries are Federated States of Micronesia, 110,000, Samoa, 167,000 and Fiji, 810,000.

Cat.	Source Categories	Annual Releases to Air (g TEQ/a)				
		Fiji	FSM	Niue	PNG	Samoa
1	Waste Incineration	9.50	0.41	0.23	0.91	0.80
2	Ferrous and Non-Ferrous Metal Production	0.11	0.00	0.00	0.00	0.00
3	Power Generation, Domestic Cooking & Heating	1.10	0.04	0.00	5.76	0.01
4	Production of Mineral Products	0.27	0.03	0.00	0.00	0.00
5	Transportation, including stationery generators	0.08	0.01	0.00	0.02	0.00
6	Uncontrolled Combustion Processes	0.09	0.22	0.16	40.92	0.24
8	Miscellaneous	0.01	0.03	0.00	0.00	0.00
1-9	Total	11.2	0.7	0.4	47.6	1.1

Cat.	Source Categories	Percentage Releases to Air				
		Fiji	FSM	Niue	PNG	Samoa
1	Waste Incineration	85.1%	55.1%	58.7%	1.9%	75.7%
2	Ferrous and Non-Ferrous Metal Production	1.0%	0.0%	0.0%	0.0%	0.0%
3	Power Generation, Domestic Cooking & Heating	9.8%	5.5%	0.2%	12.1%	0.8%
4	Production of Mineral Products	2.5%	4.1%	0.0%	0.0%	0.0%
5	Transportation, including stationery generators	0.7%	2.0%	0.1%	0.0%	0.3%
6	Uncontrolled Combustion Processes	0.8%	29.9%	41.0%	86.0%	23.2%
8	Miscellaneous	0.1%	3.4%	0.0%	0.0%	0.0%
1-9	Total	100.0%	100.0%	100.0%	100.0%	100.0%

It will be apparent from the tables that there are large variations between countries in the relative contributions from different types of sources. Some of these variations may be explained by real differences between the countries. However, others may simply be due to limitations in the methodology used in each country in generating source activity data. These limitations include the following:

- A variable amount of effort put into estimating the quantities of wood and other fuels used for cooking and/or home heating, and the amount of domestic rubbish burning;
- A very limited coverage of biomass burning, mainly due to lack of activity data. This may be important in countries with significant cropping activities (eg. sugar cane);
- Limited activity data for biomass burning in boilers;
- Limited activity data for fires at rubbish dumps
- No data for asphalt plants in some countries

It should also be noted that no significant attempts have been made in any of the countries to estimate dioxin releases to land or water from waste disposal activities (category 9). This is largely due to the absence of proper waste disposal infrastructure in these countries. Any releases are therefore likely to be widely dispersed and cannot be estimated using the UNEP Toolkit.

There are no chemical manufacturing facilities in any of the countries (Toolkit category 7).

5.4 WASTE MANAGEMENT IN BUCCHINILAND, BY ROBERT KELLAM (WELLINGTON, BANGKOK, MANAMA, BUENOS AIRES AND NAIROBI CONSULTATIONS)

CASE STUDY: Waste Management in Bucciniland

Overview: You are members of the Senior Technical Advisory Board to the Ministry of the Environment for the populous and rapidly industrializing coastal nation of Bucciniland. Bucciniland has recently ratified the Stockholm POPs Convention and is hard at work on its national action plan for addressing the unintentional POPs listed in Annex C. You have been asked to advise the Ministry on the appropriate implementation strategy for the open waste burning and incineration categories. In particular, your task is to recommend to the government what should be considered the best available techniques (BAT) and best environmental practices (BEP) for these categories of sources.

Background:

Bucciniland is in transition from a primarily agrarian economy to a mix of agricultural and industrial specialties. The interior of the island is well-suited for growing sugar cane, many types of grain, and timber for export. Industries, particularly light manufacturing and a burgeoning semi-conductor business, have tended to locate in the low-lying coastal areas adjacent to a small number of deep water ports. The capital city of Johnsville boasts the best harbor, has the largest concentration of industrial facilities, and houses almost 60% of the nation's 5 million inhabitants.

While the economy has been growing at a steady rate, the infrastructure of the country has not kept pace. Outside the metropolitan area of Johnsville, good roads are a rarity and electrification is just now reaching many parts of the interior. A single rail line was built from the heavily forested center of the country to Johnsville in 1980 to transport timber to the port.

The rapid growth of the economy has led to a dramatic increase in demand for consumer products. Imports of appliances, clothing, household goods, construction materials and luxury items are at an all time high and a "disposable" society mentality is beginning to take hold. New construction, as well as the demolition of older buildings and homes, is a common sight in the cities.

Waste Management Practices:

Traditional waste management in Bucciniland has been by "town dump" or backyard burning. Dumps receive all manner of wastes and are periodically burned to reduce volume (or may spontaneously combust and perpetually smolder). Crop residues and stubble are regularly burned off to reduce insect pests and prepare for the next planting, and prescribed burning is a regular practice in forested areas to re-claim land for farming, stimulate forest recovery, or reduce the likelihood of uncontrolled bush fires.

With the rapid industrialization of Bucciniland, the influx of population to the major cities, particularly Johnsville, has created a municipal solid waste (MSW) crisis. MSW volumes have increased dramatically over the past two decades and the composition of these wastes has changed considerably. The Johnsville "Mount Trashmore" landfill now rivals the tallest buildings in the city.

The Johnsville Metropolitan Waste Authority, in 1993, initiated voluntary recycling programs for aluminum, glass, and newsprint which have had some beneficial effect on waste volume (reducing the annual growth rate from 10% to 8%); but in the absence of adequate markets for the recycled materials, most have ended up in large stockpiles that are only slightly less unsightly than the landfill.

Another unsettling event was the discovery in 1995 that waste solvents and other toxic chemicals were leaching from the unlined landfill into Johnsville's groundwater supply. The problem was made worse by the

presence of a shallow water table in most of the coastal areas. This finding led the government to announce the near-term closure of the landfill and to hurriedly negotiate the purchase, at the cost of \$200 million USD, of a large MSW incinerator. The landfill, which was closed and capped when the incinerator began operation in 1998, has now had to be re-opened to accommodate an increase in waste volume that has outstripped the incinerator's rated capacity.

Although the Environmental Ministry has established guidelines defining hazardous wastes, and requires that such wastes be kept separate from other municipal and household wastes, there are currently no dedicated facilities available on the island for hazardous waste treatment and disposal. Some industries dispose of such wastes in captive incinerators. Others provide fuel grade wastes (e.g., spent solvents) to local cement kilns or store the materials on-site. A small proportion of these wastes, however, appear to be entering the country's municipal waste stream.

Medical wastes (including pathogenic wastes) are generally disposed of in incinerators adjacent to the island's hospitals and medical centers. These incinerators are typically small, single chamber, batch units that handle all of the trash collected at the center and are operated by the custodial staff. Ashes are disposed of local landfills. Some unincinerated medical wastes (including sharps) have been found in MSW landfills but the amount is small.

The government of Bucciniland mandated in 1996 that future MSW disposal throughout the country must either be accomplished through the construction of lined sanitary landfills or controlled incineration, and set a deadline of 2006 for implementation. Some of the larger villages have invested in small, batch operated, modular incinerators. Either alternative, however, is beyond the financial reach of most of the small villages in the interior and the government's deadline seems unlikely to be met.

The government has also initiated a public awareness campaign to try and reduce the amount of backyard trash burning. This program has met with some success, but has placed even more stress on the existing municipal collection and disposal systems. The Ministry has also attempted to persuade farmers and foresters to limit the amount of open burning of agricultural residues forested areas but with little success.

Relevant Data:

National POPs Inventory. As a part of its national action plan to meet the obligations of Article 5 of the POPs convention, the Environmental Ministry has recently completed an inventory of estimated releases of the unintentional POPs from the categories of sources identified in Annex C. The inventory has identified open burning, including the burning of landfills, and MSW and medical waste incineration as potentially significant sources of unintentionally produced dioxins and furans. The inventory also forecasts that these releases will increase with further industrial and population growth, unless current waste management practices change.

Johnsville Incinerator. In 2004, the Environment Ministry completed a technical study of the MSW incinerator in Johnsville. The incinerator is a continuous feed moving grate incinerator composed of 2 units each with a capacity of 1,000 metric tons of waste throughput per day. The energy recovered from the incineration process is sufficient to meet 25% of the electricity demand in the capital. The facility was designed to accommodate 2 additional units of the similar size but these have not been constructed due to budget limitations.

The waste feed is primarily MSW but includes a small amount (<2%) of hazardous and medical waste. Based on the Ministry's testing, the incinerator routinely operates at a combustion temperature of 900°C with a residence time of 2 seconds. Flue gases are treated to remove acid gases and particulate matter through a combination of wet scrubbers, cyclones, and electrostatic precipitators. The latter are operated at a temperature of 220°C. The residues (bottom and fly ash) are combined and transported in open trucks to the Mount Trashmore landfill. Measurement of dioxins in the stack gases ranged from 0.05-0.5 ng TEQ/Nm³.

Rural Incinerators. Although sufficient funds were not available to test any of the 150 small modular incinerators scattered through the smaller urban and rural areas of the country, the Environment Ministry was able to conduct a qualitative survey during 2004. The survey found that, while a few of these units included a secondary

combustion chamber, most were single chamber batch incinerators operated by the same individuals who had previously served as custodians for the town dumps.

Medical Waste Incinerators. As with the rural incinerators, funds were not available for testing the hospital incinerators but application of the emission factors in the POPs Toolkit identified these sources as being of concern. A qualitative study revealed that many of the incinerators continued to smolder for several hours after being fired and that the exhaust stacks were often adjacent to the air exchange systems for the hospitals.

Alternative Approaches to Incineration. In early 2005, an expert group commissioned by the National Academy of Technology met to examine alternatives to waste incineration, particularly those that were not considered to lead to the formation and release of the unintentional POPs. The group concluded that, while there were many promising technologies under development, the full environmental and economic dimensions of most were not well understood and few could be considered sufficiently demonstrated on a scale that would permit a rapid transition in the larger municipalities. The group noted, however, that several pilot demonstrations of autoclaving and other non-incineration technologies had been successfully applied to treat hazardous, medical and MSW and encouraged their consideration in future decisionmaking. The group also stressed that waste minimization, source separation, and re-cycling and re-use initiatives merited further investment, regardless of the final disposal option selected.

Waste, Agricultural, and Forestry Open Burning Practices. The Ministries of Agriculture and Environment collaborated on a study of open burning practices in early 2005. The study concluded that much of the open backyard burning conducted in the country resulted in incomplete combustion which, under the right conditions or in the presence of high waste loads of chlorine or catalytic metals, could result in significant formation and release of unintentionally formed POPs. The study recommended that, at a minimum, the government establish guidance on ways to minimize releases from open burning and undertake a public awareness campaign.

Questions for the Senior Technical Advisory Board:

- 1. Recognizing the particular circumstances in which Bucciniland finds itself and the available information, how would you recommend the Environmental Ministry address the following questions:**
 - a. Does the existing large MSW incinerator meet the requirements for BAT? If not, what changes/improvements would be necessary?**
 - b. Do the existing rural incinerators represent BAT for these areas? If not, what changes/improvements would be necessary?**
 - c. Do the existing medical waste incinerators meet BAT? If not, what changes/improvements would be necessary?**
 - d. In considering non-incineration alternatives to the construction of new incineration facilities (including any facilities to treat and dispose of hazardous waste), what kinds of issues would need to be addressed?**
- 2. What improvements in best environmental practices (BEP) would you recommend for:**
 - a. Generation, collection, handling and disposal of MSW**
 - b. Open waste burning (including backyard burning and smoldering landfills)**
 - c. Open agricultural and forestry burning**
 - d. General waste management practices**
- 3. What challenges do you think Bucciniland will face in meeting its waste management obligations under Article 5 for these categories of sources?**

5.5 CREMATORIA IN THAILAND, BY UTE KARL (BANGKOK CONSULTATION)

Slide 1

Crematoria in Thailand

- **Basic Cremation Data for Bangkok**
- **Technical Review of the Crematories**
- **Analysis of Status Quo in Bangkok**
- **Options for Rehabilitation Measures**

GTZ Study May 2003 – March 2004

Slide 4

Technical Review of the Crematories

All cremators visited during site inspection are designed as flat bed systems, mostly equipped with a fixed hearth.

Slide 2

Basic Cremation Data for Bangkok

309 temples in Bangkok; most of these used for less than five cremations per month

In-effective use of existing crematoria in Bangkok

Source: GTZ 2004

Slide 5

Analysis of Status Quo in Bangkok

The technical standard of the temples can be summarised as follows:

- mostly non-automatic coffin feeding into the cremation chamber,
- cremator type, mostly based on flatbed-fixed hearth systems,
- cremator design is mostly very simple, limited for 1 to 2 cremations/day,
- mostly primary and secondary combustion chambers,
- burner systems using oil or gas,
- no integrated process control system,
- no flue gas conditioning and cleaning devices, except of one crematorium equipped with a cyclone.

Technical measures reducing PCDD, PCDF and other harmful substances are not implemented.

Slide 3

Basic Cremation Data for Bangkok

During site inspection in totally 20 cremation temples were visited and their characteristic data were collected.

Collected plant information:

- Technical information, such as cremator design (primary and secondary chamber), burner equipment, combustion air device, flue gas treatment
- Available operation and emission data, such as temperatures, opacity and emission data available by BMA/PCD,
- Status of operation, such as coffin feeding, cremation processing, preheating, duration of cremation, religious aspects, etc,
- Technical Maintenance, such as procedure and responsibility,
- Basis for rehabilitation measures.

Slide 6

Options for Rehabilitation Measures

No rehabilitation / Close down:

- coal fired cremators,
- cremators, not equipped with a post combustion chamber,
- cremators, characterised by extremely unsatisfying combustion conditions as given by cremation cycle of more than 180 min and energy consumption rates of more than 1,100 kWh/cremation.

Rehabilitation measures shall achieve:

- reduction of environmental impact by minimising combustion-dependent pollutants, such as CO and total hydrocarbons as well as party NO_x,
- reduction of fuel consumption,
- improvement of operational conditions,
- increase of cremation capacity, in order to compensate the lack of cremations, resulting from the proposed close-down of the above described crematoria with extremely unsatisfying technical standard.

Slide 7

Proposed Rehabilitation Measures

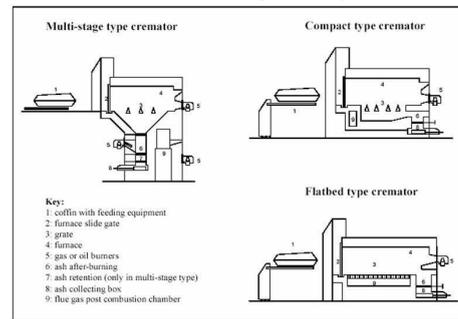
Continuous operation conditions:

(at least 4 cremations per day / 80-100 per month)

- Semi-automatic coffin feeding system: To enable feeding, when the furnace of the cremator is still on temperatures of more than about 500 °C, at least a semi-automatic feeding device is necessary;
- Combustion air device: Installation of a separate air fan in combination with an air nozzle system in the post combustion chamber; In order to generate a turbulent mixing zone, the shape of the post combustion chamber has to be adapted;
- Cremator control system: Temperature control loops for primary and secondary burners and oxygen controlled secondary air supply (2 thermocouples, 1 oxygen measuring unit)
- Ash racking equipment for work safety

Slide 10

Cremator Design Concepts



Slide 8

Proposed Rehabilitation Measures

Dust separation from flue gases:

- Dust separation in a cyclone or multi-cyclone system: cyclone systems work up to temperatures of 350 to 450 °C. The flue gas has to be cooled down e.g. by temperature controlled air injection into the duct;
- Dust separation in a bag-house filter: Here, flue gas has to be cooled down to 200 °C (safety for the filter bags). The pressure drop requires an ID fan to ensure flue gas flow. To avoid damages of the filter bags (sparks) a cyclone system has to be installed upstream the bag-house.
- PCDD/PCDF removal with the dry sorbent injection process based on the bag-house filter system (addition of agents upstream the bag-house).

Slide 9

Centralisation of Cremation in Bangkok

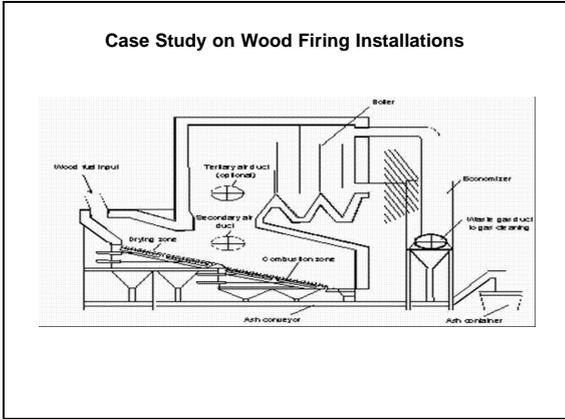
Long-term perspective: 3 cremation centres for Bangkok

Design of each centre:

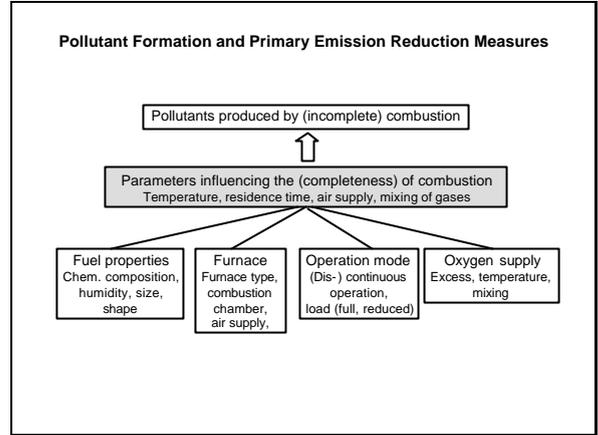
- 2,500 cremations per year and per line (10 cremations per day and per line, five operation days per week, four cremation lines; Centre capacity 10,000 cremations per year (40 cremations per day);
- Technical infrastructure: coffin handling, fuel storage, electricity connection, reagents handling and filter ash collection/storage;
- Low emission gas burners and liquid gas storage;
- Bag-house filters with automatic ash collection;
- Integral cremation technology.

5.6 WOOD FIRING INSTALLATIONS IN THAILAND, BY UTE KARL (BANGKOK CONSULTATION)

Slide 1



Slide 4



Slide 2

Biomass Combustion Technologies

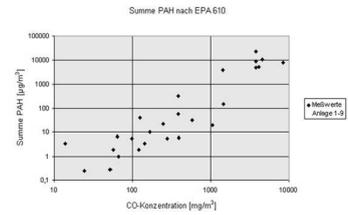
Annual wood consumption	Thermal capacity	Combustion Technology			
		Underfeed stoker furnace	Cyclone suspension furnace	Grate furnace	Fluidized bed combustion
≥ 100 000 t/a	≥ 50 MW			x	x
≤ 100 000 t/a	≤ 50 MW	x		x	x
≤ 50 000 t/a	≤ 25 MW		(x)	x	
≤ 20 000 t/a	≤ 10 MW	(x)	x	x	
≤ 10 000 t/a	≤ 5 MW	x	x		
≤ 5 000 t/a	≤ 2,5 MW	x	x		
≤ 2 000 t/a	≤ 1 MW	x	x		

Operating hours: 7.500 h/a; LHV Wood: 14 MJ/kg (x): Modular construction
 Reference: Tippkötter, R.: Technologie der energetischen Verwertung von Holzabfällen durch Verbrennung und Vergärung, in: VDI-Seminar 4392/7 „Holzabfälle – Rechtliche und wirtschaftliche Situation“, Berlin, 18./19.2.1999

Slide 5

Primary Emission Reduction Measures

Carbon monoxide as an indicator for completeness of combustion

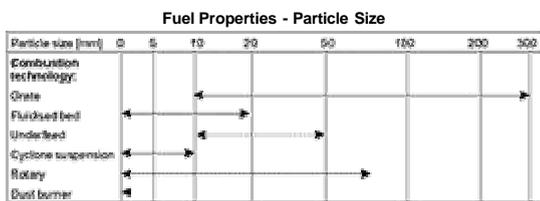


Polycyclic Aromatic Hydrocarbon Emissions (PAH)

Reference: Schmoeckel, G.; Streit, A.: Emissionen organischer Stoffe bei der Holzfeuerung, Bayerisches Landesamt für Umweltschutz, München

Slide 3

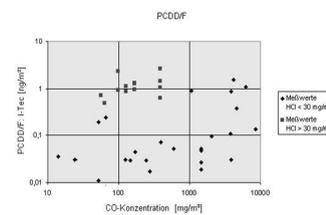
Characteristics of Wood Combustion Technologies



Slide 6

Primary Emission Reduction Measures

Influence of fuel composition



Polychlorinated Dibenzo-dioxin/-furan Emissions (PCDD/F)

Reference: Schmoeckel, G.; Streit, A.: Emissionen organischer Stoffe bei der Holzfeuerung, Bayerisches Landesamt für Umweltschutz, München

Slide 7

Best Available Techniques (BAT) and Best Environmental Practices (BEP) for firing installations for wood and other biomass

Draft BAT/BEP Guidelines of the Stockholm convention:

Primary measures and process optimisation

- Prevention of illegal incineration
- Optimised combustion technology: Improved burn out of gases and fly ash and reduction of dust content
- Measures in the boiler
- Optimised plant operation

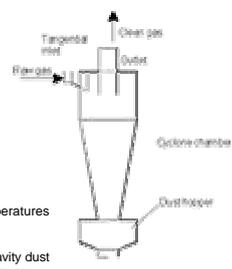
Secondary measures

- Optimised gas cleaning
- Optional destruction of PCDD/PCDF by catalytic oxidation, i.e. in combination with SCR for NO_x reduction

Slide 10

Secondary Emission Reduction Measures

Particulate Emission Control - Cyclones



Field of application: Pre-cleaning of flue gas, Small thermal capacities, with multi-cyclones dust concentrations of 100-150 mg/Nm³ are achievable

Pressure drop: 700 - 1,500 Pa.

Operating temperature: For special applications temperatures up to 1,200°C are possible

Energy consumption: 0.05- 0.1 kWh/1,000 m³ for gravity dust arresters; 0.3 - 0.5 kWh/1,000 m³ for cyclones

Slide 8

Emission Control Measures and Fuel Characteristics

Draft BAT/BEP Guidelines of the Stockholm convention:

Primary measures:

- Control of fuel quality
- Optimised burn-out (e.g. reduction of excess air)
- Sufficient residence time of flue gases in the hot zone of the furnace

Secondary measures:

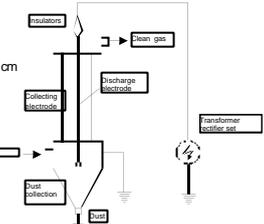
- Efficient dust abatement (electrostatic precipitators, fabric filters)
- Dry sorbent injection
- Selective catalytic reduction (SCR)

→ Major role of fuel quality

Slide 11

Secondary Emission Reduction Measures

Particulate Emission Control - Electrostatic Precipitators (ESP)



Field of application: Improved dust control; Clean gas dust concentration 10-50 mg/Nm³; Optimum efficiency with dust resistances of 10⁹-10¹¹ Ω cm

Pressure drop: 150 - 300 Pa

Operating temperature: Dry ESP, normal steel: 300°C possible; < 200°C preferred to avoid PCDD/F formation

Energy consumption: : 0.1 - 0.6 kWh/1,000 m³ with pulsed energisation

Slide 9

Performance Monitoring and Reporting

Draft BAT/BEP Guidelines of the Stockholm convention:

Ensure complete combustion:

Measuring instruments which continuously determine carbon monoxide emission mass concentrations

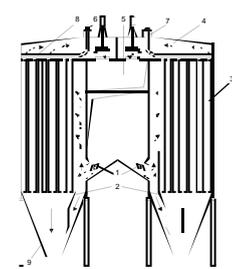
Ensure the performance of emission control equipment:

Measuring instruments which continuously determine dust emission mass concentrations qualitatively or quantitatively (depending on plant size)

Slide 12

Secondary Emission Reduction Measures

Particulate Emission Control - Fabric Filters



Filter types:

- Bag filters
- Pocket filters

Cleaning principles:

- Shaking cleaning
- Reverse flow cleaning
- Ultrasonic cleaning
- Pulse jet cleaning

Slide 13

Secondary Emission Reduction Measures

Particulate Emission Control - Fabric Filters

Field of application:
Improved dust control
Gas cleaning with additives
Clean gas dust concentration
< 10 mg/Nm³ achievable

Pressure drop:
500 - 2,000 Pa

Temperature:
up to 250°C depending
on filter

Energy consumption:
0.4 - 0.7 kWh/1.000 m³

Filter media	Abbreviation (trade mark)	Temperature resistance		Resistance to chemicals		
		Service temperature	Peak temperature	hydrolytic	acid	alkali organic solvents
Polypropylene	PP	90	100	xx	xx	o
Polyester	PE	150	160	-	x	o o
Polyacrylonitrile	PAN (Dalon T)	125	140	x	x	x o
Aramid	AR (Nomex)	180	220	o	x	x xx
Polyphenylenesulphide	PPS (Ryton)	190	200	xx	xx	x x
Polyphenylenesulphide on PTFE fabric	PPS/PTFE	260	280	xx	xx	x x
Polyimide	PI	250	270	o	x	- xx
Polytetrafluorethylene	PTFE (Teflon)	250	280	xx	xx	xx
Fibre glass		260	280	xx	x	x xx

x = very good
o = moderately
- = unsuitable

Slide 16

CFBC: Operational Data

Overall energy efficiency (heat and power): 85 %.

Wastewater: in small amounts 0.3 m³/h; 2,592 m³/a in 1999) is fed into the municipal sewage system.

In 1999 102,589 MWh_e of net electricity and 634,223 MWh of process heat (= 741,456 tons of steam) were produced.

Net electric efficiency: 15.8 %; net thermal efficiency: 68 % (in 1999).
The overall energy efficiency was 85 %.

The two units were in operation for 8,021 and 6,031 hours respectively, mainly in part load.

Fixed costs in 1999: 6.9 Mio. EUR,
Variable costs in 1999: 3.06 Mio. EUR.

Slide 14

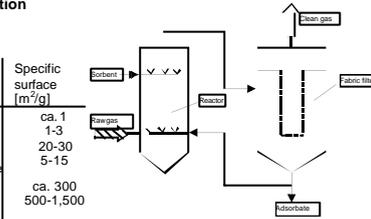
Secondary Emission Reduction Measures

Additional Flue Gas Cleaning

- Dry sorbent injection
- Conditioned dry sorption

Adsorbent agents:

		Specific surface [m ² /g]
Acid gases SO ₂ , HCl, HF	CaCO ₃	ca. 1
	CaO	1-3
	Ca(OH) ₂	20-30
	Calcium silicate	5-15
Heavy metals POP	Activated coke	ca. 300
	Activated carbon	500-1,500



Slide 17

CFBC: Operational Data

The two units consumed 360,916 t/a (25.8 t/h) wood, 170,000 Nm³/a natural gas and 3.943 t/a of light fuel oil. The wood is fed into the combustion chamber from two bunkers with wood chips and from two bunkers with wood dust.

Characteristics of the burned wood:

Lower heating value [MJ/kg]	14.7
Sulphur content [wt.-%]	< 0.1
Water content [wt.-%]	18
Ash content [wt.-%]	4

Slide 15

Example: Circulating atmospheric fluidised bed combustion

The plant consists of two units with a total rated thermal input of 90.5 MW, a gross electrical power of 19.8 MW_{el} and a net electrical power of 13 MW_{el}.

It was commissioned in 1992 and 1996 respectively and is used in a chipboard factory to produce electricity and process heat from wood residuals.

Fuel: residues from the production process, bark and other wood residues.

Flue gas cleaning system: Pulse-jet fabric filter

NO_x control: low combustion temperature; air staging (3 stages for the combustion air inlet) and flue gas recirculation.

Only wood without contamination by wood preservatives is burned.

Slide 18

Operational Data: Emissions in 1999

	Monitoring	ELV at 7 % O ₂	Emission values at 7 % O ₂	
			Unit 1	Unit 2
O ₂ -Content [%]			5-5.5	6.5-7.5
Flue gas volume [m ³ /h]			33,153	86,453
Dust [mg/Nm ³]	continuous	17	4 ¹⁾	2.2 ¹⁾
SO ₂ [mg/Nm ³]	continuous	165	2.9 ¹⁾	2.3 ¹⁾
NO _x [mg/Nm ³]	continuous	350	164 ¹⁾	339 ¹⁾
CO [mg/Nm ³]	continuous	200	147 ¹⁾	178 ¹⁾
HCl [mg/Nm ³]	continuous	25	7.3 ¹⁾	8.8 ¹⁾
HF [mg/Nm ³]	individual	1.7	0.04	0.1
Dioxins/Furans [ng TE/m ³]	virtually continuous	0.1	0.013	0.006
Σ Cd,Tl [mg/Nm ³]	individual	0.1	0.004	0.003
Hg [mg/Nm ³]	individual	0.1	0.001	0.001
Σ Heavy Metals [mg/Nm ³]	individual	0.8	0.015	0.006
Total organic C [mg/Nm ³]	individual	40	2.0	2.0

¹⁾ Annual mean value

^{*)} The value is almost equivalent to daily mean values as the unit operates quasi continuously.

5.7 METALS PRODUCTION, BY HEIDELORE FIEDLER (BUENOS AIRES, MANAMA AND NAIROBI CONSULTATIONS)

Slide 1

**Case Study:
Production of Metals**

Heidelore Fiedler
UNEP Chemicals
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Switzerland
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Slide 4

Utopia: Future Projects

Utopia has plans for the following projects:

- Since the country has rich iron ores, in June 2005 to start construction of a plant to produce 120,000 tons of iron/steel in blast furnaces;
- In August 2005, one of the electric arc furnaces of the secondary steel plant A-A has to be replaced;
- In November 2005, the secondary copper plant will export its dusts/fly ashes to the secondary zinc plant;
- Export of lead acid batteries from automobiles to Fantasia for recycling.

Slide 2

Utopia and Fantasia are two countries in Africa

1. Utopia: population of 40 million;
 - The country is Party to the Basel Convention since 1994;
 - The country is Party to the Stockholm Convention since 3 March 2003;
 - The country does not have a laboratory to analyze PCDD/PCDF;
 - The country does not have legislation for PCDD/PCDF.
2. Fantasia: population of 15 million
 - The country is Party to the Basel Convention since 1998;
 - The country ratified the Stockholm Convention on 8 April 2005;
 - The country has a governmental laboratory capable to sample and analyze PCDD/PCDF;
 - The country has legislation where in Directive 2378/2003 of Fantasia a maximum permissible concentration for PCDD/PCDF in emissions to air of 0.1 ng TEQ/Nm³ from stationary sources of incineration of municipal solid waste and medical waste is established.

Slide 5

Fantasia: Production of Metals

Fantasia has the following industrial activities:

- Lead production based on batteries from automobiles. There are 5 companies. The annual capacities vary from 500 to 10,000 tons per year and company; Of the 5 companies, 4 have reverberatories (P-1 to P-4). These plants have cyclones for flue gas cleaning. Plant P-5 has pre-treatment of the batteries; P-5 has 2 rotary kilns, rapid cooling of the gases, and bagfilters.
- From 2006, import of lead acid batteries from Utopia for the rotary kilns in plant P-5.

Slide 3

Utopia: Production of Metals

Utopia has the following industrial activities:

- Two steel companies, which have electric arc furnaces (EAFs); The scrap originates from domestic sources and imports from Fantasia; Plant A-A, built in 1995, is equipped with postcombustion and bagfilters; Plant A-B, built in 1975, has electrostatic filters for flue gas cleaning. The flue gases leave the stack at a temperature of 280 °C .
- One plant for secondary zinc production, which is operating on zinc scrap. The plant was built in 2002.
- Lead production utilizing batteries from automobiles. There are 7 companies that have 7 reverberatory furnaces. The furnaces are small; some have cyclones for dust control.
- Production of secondary copper is done in rotary kilns and blast furnaces. Pierce-Smith converters are used in the conversion step. Wet scrubbers are present for gas cleaning.

Slide 6

Utopia and Fantasia: Questions to the Ministry of Environment

The Ministry of Environment is faced with the following questions:

- (1) In relation to present situation:
 - (a) Which plants can be considered BAT? Why?
 - (b) Which plants do not fulfill BAT? Why?
- (2) In relation to future activities:
 - (a) Which plants have to apply BAT? Why?
 - (b) What are their options?
 - (c) Which plants are not required to apply BAT?
 - (d) Which possibilities exist to promote BAT or BEP?

Questions to Ministry of Environment (2)

- (3) In relation to legislation and monitoring for future projects:
- (a) Existing legislation. Future needs?
 - (b) Export/import of secondary raw materials;
 - (c) Monitoring: Which plants? Timing?
- Which limit values should be applied? Which POPs should be monitored?

5.8 ACTION PLAN FOR CONTINUING MINIMIZATION OF THE TOTAL RELEASES FROM UNINTENTIONAL PRODUCTION IN SOUTH ARABIA, BY ZOLTAN CSIZER (MANAMA CONSULTATION)

Action Plan for Continuing Minimization of the Total Releases from Unintentional Production in South Arabia

A CASE STUDY

Overview. You are members of the Senior Technical Advisory Group to the Ministry of Environment and other relevant Ministries that closely cooperate in implementation of the obligations for the Stockholm Convention. South Arabia is a rapidly industrializing coastal nation with fast growing population has recently ratified the Stockholm Convention on POPs (It is notable that the country is a party of the Basel and Rotterdam Conventions).

. The Ministry of Environment has just started to develop a national action plan for addressing the unintentional POPs in line with Article 5 and Annex C of the Convention. You have been appointed to advise the Ministry of Environment and the cooperating Ministries that comprise an inter-ministerial working committee, on the appropriate implementation strategy and the identification of the priority actions for the country. In particular, your task is to recommend to the government what should be considered the best available techniques (BAT) and the best environmental practices (BEP) for the selected categories of sources.

Background. South Arabia is a rapidly growing developing nation who has some considerable offshore oil extraction industry. The oil industry is owned by an international consortium, in which the government has an ownership of 50.1%. Over 90% of the crude oil is exported providing the main revenue to the country. There is only a relatively small oil industry at the capital city of 1.5 million inhabitants using simple distillation and vacuum distillation technologies and also manufactures lubricating oils and bitumen.

The country has 9 million population of which about 60% is younger than 20 years of age. The country has a growing construction industry and some metal manufacturing. In addition to the iron and steel industry, there is secondary aluminium production. Considerable phosphate deposits have recently been found that exploitation has just been commenced. Gypsum that is also available at the site of phosphate deposits has already been used for cement production. The site of the unutilized phosphogypsum has been used for landfilling purposes.

The capital city has modern harbour facilities that would be made available for the phosphate export. However the phosphate deposits are about 400 km from the harbor. Currently an opportunity study is being carried out to investigate the feasibility of establishing a railroad between the phosphate mine and the harbor. Another study investigating the feasibility to invest in a container terminal at the harbor is in progress.

The coastal area of South Arabia is traditionally producing olive oil. The olive processing however generates the so called black liqueur that contains considerable amount of phenolic compounds. The black liqueur is dumped at site and contaminates the land. Investigations have not been carried out if there would be a de novo synthesis of PCBs and other unintentional POPs by the UV range of the sun

light from the black liqueur dumped into the soil. The government is discussing if an environmental impact assessment study should be carried out to investigate the environmental burden of the olive oil processing and the opportunity that the black liqueur of olive processing might be collected and used as biomass conversion to energy (e.g. by diluting poultry manure).

Cement production. Cement is produced using dry process technology in vertical shaft kiln that shows low energy efficiency and poor environmental performance. The nominal capacity of the cement company is about 1,000 tons of clinker per day, the energy consumption is accounting for more than 50 % of production costs. The energy source is mainly crude oil of high tar content. In addition a wide range of other fuel is also used such as various types of waste oils, used tyres, mixed plastic wastes, etc. While the liquid waste oils are fed at the hot end of the kiln, the solid wastes are added at the upper end of the kiln, close to the calciner. Volatile components may be released and could form products of incomplete combustion that then could be released through the stack without being combusted. The clinker leaves the hot end of the kiln at a temperature of about 800-900° C. Cement kiln dust is transported to the site of the local phosphate deposits in open trucks from where the gypsum for cement production is obtained. The cement kiln dust is believed to have an estimated PCDD/PCDF concentration higher than 30 ng TEQ/kg. The pollution control is a simple dust collector of cyclone type. The national development plan includes the revamping of the cement plant to increase its production and decrease the frequent break downs due to the poor maintenance. This plan that is at the approval stage foresees the installation of electrostatic precipitators as well.

Questions for the Senior Technical Advisory Group:

1. Recognizing the importance of the national development plan to increase the competitiveness of the economy, how would you recommend the Ministry of Environment address the following questions:
 - a. Does the existing cement kiln meet the requirements for BAT? If not, what changes/improvements would be necessary?
 - b. Does the use of secondary fuels meet the principles of BEP? If not, what measures should be taken?
 - c. Does the current land filling practice of cement kiln dust meet the principles of environmentally sound management? If not, what measures should be taken?
 - d. What kinds of issues would need to be addressed to establish the process performance and monitoring requirements for BAT?

Iron and steel production. A local company manufactures different products of cast steel and reinforcing steel mainly for the local and sub-regional markets. A substantial amount of the raw materials used are secondary iron and steel products/wastes that are recycled by the company. The pretreatment step for the iron and steel production is the sintering process. Through the sintering process fine ore particles, iron oxide dusts, small iron waste particles and pieces, crushed iron and steel waste materials, etc. produce the porous pieces of sinter which feeds into the blast furnace. Due to the lack of the required amounts of raw material the sintering plant works only periodically and using mainly coke briquette as fuel. Though the iron and steel production is using a modern blast furnace that was installed about 10 years ago and equipped with all required monitoring and control instruments, the sinter plant remained obsolete. It is without almost any environmental monitoring and control equipment and its burden/negative environmental impact has been understood only

during the negotiations of the Stockholm Convention. A study tour of senior technical experts of the Ministry of Trade and Industry and Ministry of Environment have recently visited a few sinter plants in Europe that meets the requirements for BAT. Based on the information gathered in the study tour visit a proposal is being prepared for the decision makers of the Ministries involved.

Questions for the Senior Technical Advisory Group:

2. Recognizing the importance of the national development plan to increase the competitiveness of the economy, how would you recommend the Ministry of Trade and Industry and Ministry of Environment address the following questions:
 - a. As the existing sinter plant does not meet the requirements for BAT, what changes/improvements would be necessary?
 - b. Would the introduction of alternative processes instead of sintering make socio-economic and financial sense? Would you suggest a market study and an environmental impact assessment study be made?
 - c. Does the environmentally sound waste management practices applied in current iron and steel waste collection, processing and storage? If not, what measures should be taken?
 - d. What type of national standards/limit values would need to be established for the process performance and monitoring requirements for BAT?

Residential electricity supply plant/utility boilers. The electricity requirements of the residential areas are provided by fossil fuel fired utilities of different capacities and types. Most of the industrial boilers use crude oil and its distillation residues as fuel. Another part of the residue is used for bitumen (asphalt) production by vacuum distillation process. During this process lubricating oils are also produced. The capacity of the industrial boilers in the country is relatively small; it is less than 30 MW, with the exception of one that supplies electricity to the capital city that has the capacity of 50 MW. Alternative fuels are also used, such as used oil, tyres, waste plastics and wood and spent solvents. The water supply for the steam production is taken from ground water sources of high concentration of silica, calcium, aluminium and iron. The hardness of water creates of problems of scaling and corrosion. To avoid this in most cases a simple chemical softening process is used. Most of the utility boilers are small stoker fired furnaces, and some of the new, larger boilers are tangentially fired. A very large number of smaller units are without any air pollution control device. The larger and relatively new ones have been equipped with electrostatic precipitators. The estimated release to air is about 35 μ TEQ/TJ. PCDD/PCDF concentration in fly ash, bottom ash and soot have not yet been measured or estimated. The bottom ash and slag as well as the collected fly ash and soot is transported with open trucks to the site of the local phosphate deposits.

Questions for the Senior Technical Advisory Group:

3. Recognizing the importance of the national implementation plan for the implementation of the obligations under the Stockholm Convention, how would you recommend the Ministry of Energy and Ministry of Environment address the following questions:
 - a. Do the existing utility boilers meet the requirements for BAT? If not, what changes/improvements would be necessary?

- b. Would the introduction of alternative fuel such as natural gas decrease the environmental burden? Would you suggest a market study and an environmental impact assessment study be made to investigate the introduction of alternative power generation technologies, such as the use of renewable energy sources?
- c. Does the environmentally sound waste management practices applied in the current practices to handle the wastes generated by the utility boilers? If not, what measures should be taken?
- d. What type of national standards/limit values would need to be established for the process performance and monitoring requirements for BAT?

Medical waste incinerators. The medical waste incinerator units are small stove like burners that in most cases smolder for several hours after being fired and the exhaust stacks, that are not high enough, are often close to the air intake system of the hospitals. The release factors have been estimated by the application of the PCDD/PCDF Toolkit.

Questions for the Senior Technical Advisory Group:

- 4. Recognizing the importance of the national implementation plan for the implementation of the obligations under the Stockholm Convention, how would you recommend the Ministry of Health and Ministry of Environment address the following questions:
 - a. Do the medical waste incinerators meet the requirements for BAT? If not, what changes/ improvements would be necessary?

6 COUNTRY PRESENTATIONS

6.1 ARMENIA

Slide 1

**STOCKHOLM CONVENTION
REGIONAL CONSULTATION
FOR CENTRAL AND EASTERN EUROPEAN
COUNTRIES ON THE DRAFT BAT/BEP**

UNITED NATIONS OFFICE IN VIENNA, AUSTRIA
9-11 FEBRUARY 2005

THE ARMENIAN EXPERIENCE – A CASE STUDY

Prepared by: A. Aleksandryn
Z. Csizer

Slide 4

Based on this study the most important source categories in Armenia are as follows:

- Thermal processes in metallurgy industry/metal manufacture
 - Production of ferrous metals;
 - Production of non-ferrous metals (copper, aluminum);
- Chemical industry;
- Cement production;
- Lime production;
- Glass production;
- Asphalt mixing/ production;
- Fossil fuel-fired utility and industrial boilers (communal/ municipal facilities);
- Open burning of wastes at dumps, etc.

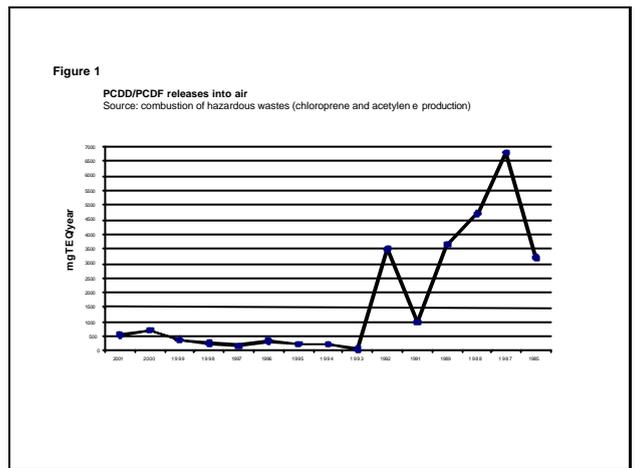
Slide 2

Leading industrial subsectors in Armenia are machine manufacturing, ferrous and non-ferrous metallurgy and metal processing, chemicals and petrochemicals and building materials.

Major products of chemical and petrochemical industries: calcium carbide, sodium hydroxide, chlorine, hydrochloric acid, sulfuric acid, nitric acid, chloroprene rubber and latexes, ammonia, glass, man made fibres, and plastics; many of them are sources of UPOPs.

UPOPs releases have been estimated with the “Standardized Toolkit for identification and Quantification of Dioxin and Furan Releases” prepared by UNEP Chemicals. A representative sample of 354 industrial enterprises has been taken as PCDD/PCDF sources.

Slide 5

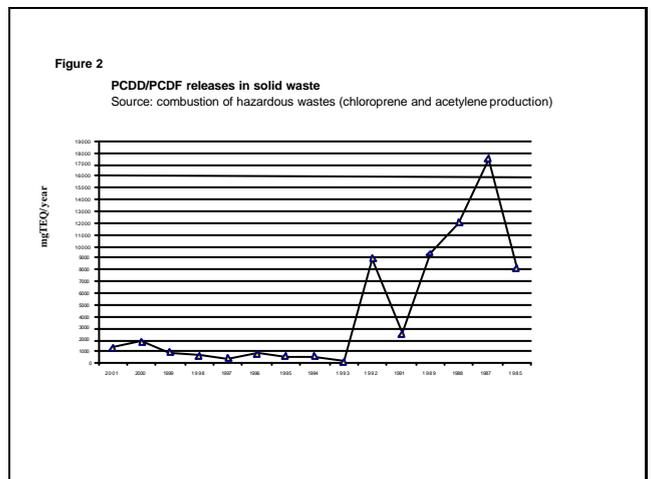


Slide 3

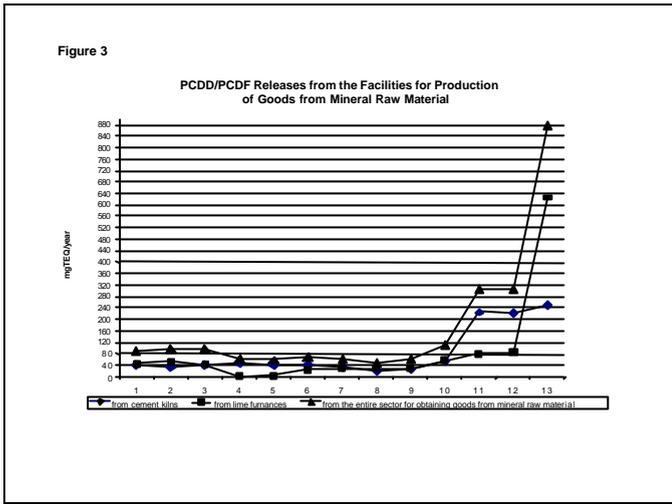
Table 1: Comparative Data on PCDD/PCDF emissions in the Republic of Armenia (g TEQ/ year)

Year	Air	Water	Solid waste/ Soil	Product	Total
1998	2.15	16.48	30.28	0.06	48.96
1999	1.82	11.17	21.66	0.02	34.66
2000	28.36	12.42	108.16	0.03	149.96
2001	5.49	5.27	23.77	17.50	52.03

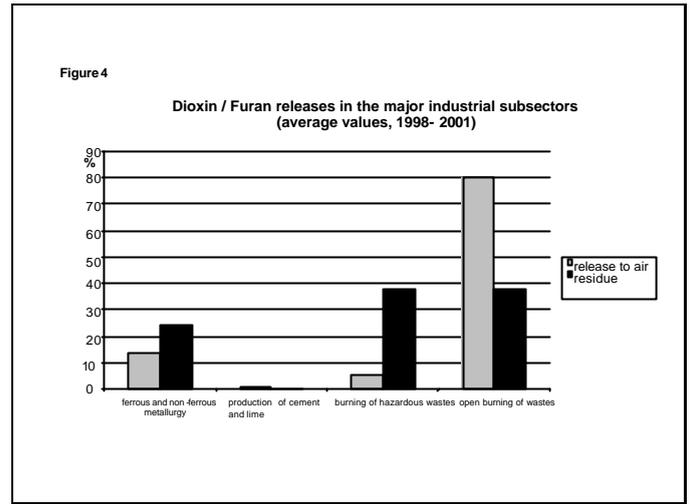
Slide 6



Slide 7



Slide 10



Slide 8

During the last 10-15 years the industrial enterprises in Armenia have been operated at low capacity utilization, hence there is a significant decrease of UPOPs releases.

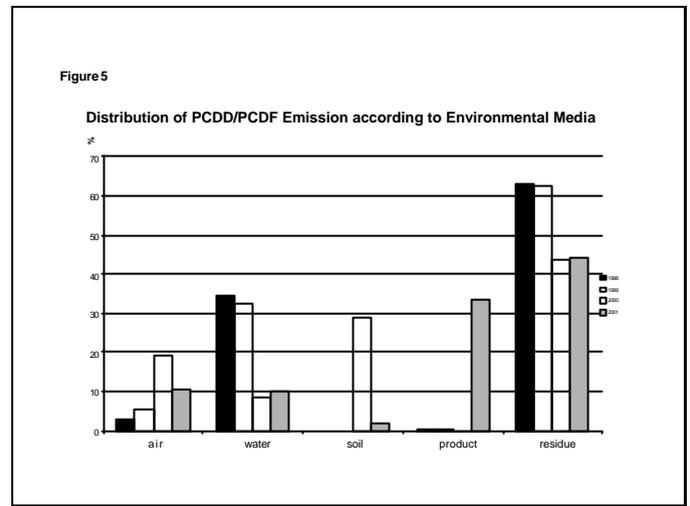
However, similar tendency has not been found at the non-industrial sources, for example, heating of households by burning of fossil fuels (gas, timber), burning of wastes, tires, etc.

Due to the increased energy prices and the economic slow down the majority of population was forced to heat apartment houses by any burning wastes, in particular, paper, timber, mixed domestic wastes, kerosene, diesel-fuel oil, plastics, footwear, clothing, tires, various technical (mineral) oils, including spent oils, rubber, etc. The majority of schools use kerosene or diesel oil for heating resulting in a decrease of in-door air quality as well as air pollution by UPOPs releases.

At present, the ratio of industrial and non-productive sources is more and more shifted towards significant increase of releases from non-industrial sources.

According to assessment/ evaluation of 2000-2001, uncontrolled burning of wastes is the main source of PCDD/DF releases to air; it represents 58.2-91.8% of the total annual PCDD/DF releases.

Slide 11



Slide 9

Table 2: Annual PCDDs/ PCDFs releases to air (%)

Sources	2000	2001
Production of ferrous and non-ferrous metals	5.41	28.9
Production of cement and lime	0.34	1.62
Burning of wastes	2.53	9.89
Open, uncontrolled burning	91.84	58.17
Miscellaneous	0.0002	1.35
Production of electric and thermal energy	0.02	No data available

6.2 BAHRAIN

Slide 1

PUBLIC COMMISSION FOR THE PROTECTION OF
MARINE RESOURCES, ENVIRONMENT & WILDLIFE
General Directorate of Environment & Wildlife Protection

Privatization of Healthcare Waste Treatment Facilities in Bahrain

ENGR. REHAN AHMED
Senior Environmental Specialist
Directorate of Environmental Control

Slide 4

Quantity of Waste Generated in Bahrain & Responsible Agencies

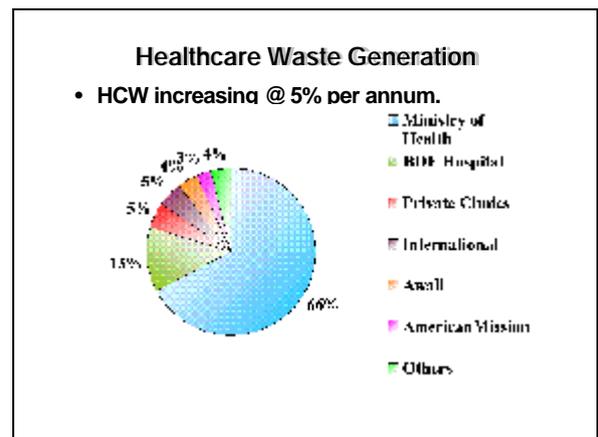
No.	Type of Waste	QTY Tons/Day	Agencies
1	Municipal Waste	1,400	Municipalities
2	Healthcare Waste	3	Ministry of Health
3	Industrial Waste	380	Env. Affairs

Slide 2

Contents of the Presentation

- 1- Healthcare Waste Generation.
- 2- Deficiencies in Previous HCW Treatment System.
- 3- Options for Improvement.
- 4- Process of Privatization.
- 5- Details of Improved System.
- 6- EA's role & Monitoring Methodology.

Slide 5



Slide 3



Slide 6

Previous Problems Associated with HCW Management

1. Unhygienic waste storage, collection & transportation.
2. Polluting HCW Treatment Facilities.
3. No disposal of Ash.
4. Lack of legal framework.
5. Inappropriate monitoring.
6. Lack of awareness & information.

Slide 7

Impacts Due To HCW

- Occupational & Public Health
- Odours
- Socio-economic
- Depreciation of Land Value
- Unaesthetical Surroundings
- Prevalence of Diseases

Slide 10

Options For Improvement of HCW Treatment System

1. Refurbishment of Existing Incinerators by MOH:
 - Limited remaining useful Life
 - Support Facilities Required
 - No Surety of Meeting with the HCW Standards
 - High Treatment Cost
 - Availability of Spare Parts
 - Initial Lost BD 485,000
2. Procurement & Installation of New Incinerators by MOH:
 - No Available Area
 - Technical Manpower
 - Environment Monitoring
3. Privatization of HCW Treatment Facility:
 - 10 Years Concession Period
 - B-O-O Basis

Slide 8

Deficiencies in MOH Incinerators

- Age of Incinerators
- Low Stack Height
- Inefficient Burners
- Low Service Performance
- Non Availability of Spare Parts
- No Pollutant Measurement System
- Cannot Meet EA- HCWM Standards

Slide 11

Highlights of RFP

- * Treatment System to meet HCWM Standards
- * Contract on " BUILD-OWN-OPERATE " basis.
- * Contract Period: 10 years.
- * Interim Revision of treatment Cost.
- * Back-up & Storage facility
- * Emission Monitoring.
- * Performance guarantee.
- * Facilities (Weigh scale, vehicles, Bins etc.)
- * Dual Fuel System.

Slide 9

Abandoned Incinerators of MOH



Slide 12

Response To RFP

1. 26 Bids received from contractors.
2. Short listing of contractors.
3. Detailed technical, financial & Env. evaluation of bids.
4. Selection of bid & contractor.
5. Negotiations with the contractor.
6. Agreement of MOH with the contractor.
7. Procurement of machinery & equipment.
8. Construction of HCWT facilities (July 2001–March 2002)

Slide 13

HCWT Site Selection Parameters

- EIA to be conducted.
- Safe distance from residences & population centers.
- Nearness to municipal landfill site.
- Favorable terrain, topography & geology.
- No risk to ground water sources.
- All weather and easy accessibility.
- No traffic congestion.
- No expected major adverse environmental impacts.

Slide 16

Details of HCWT System

- Continuous on line monitoring parameters : O₂, CO & Dust.
- Fuel for Plant : Gas (Standby on Diesel)
- Disposal of Ash & Spent Chemicals : Askar Municipal Landfill Site.
- Disposal of Fly Ash : Hafira Industrial Landfill Site.
- In put Chemicals:
 - * Sorbalit (NaOH & Carbon) to absorb Dioxins & Furans & dust separation by centrifugal force.
 - * Spongiacal (Na OH + CaCO₃) to neutralize acids (HCl, SO₂, HF etc.)

Slide 14

The Contractor

The project was awarded to Mahmood Akbar Ali Reza (MAAR) & Company who later established

Bahrain Waste Treatment Company W.L.L

Slide 17

Input & Output from Incinerators

- INPUT CHEMICALS
 - Sorbalit (absorbing Dioxins & Furans) 10 Kg/Ton
 - Spongiacal (neutralizing acids) 10 Kg/Ton
- OUTPUT MATERIALS
 - Fly Ash: 2 Drums/day
 - Bottom Ash: 3-4 Drums/ day

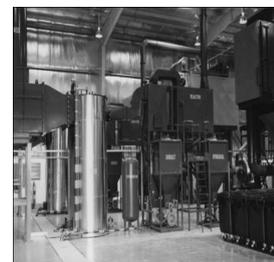
Slide 15

Details of HCWT System

- State – of – the – Art 250 Kg/hr double stage Pyrolytic combustion incinerators from ATI Muller, France with automatic loading & pollution control system (dry scrubbing filtration system).
- No. of units : 2
- Design Life: 30 years.
- Waste Transportation : 3 No. vehicles.
- No. of Bins provided : 136
- Capacity of each bin : 660 liters.

Slide 18

Healthcare Waste Treatment Facility



Slide 19

Components of HCWT System

- * Incinerators area
- * Bin washing area
- * Chemicals storage area facilities
- * Control Room
- * Gate House
- * Services
 - Sweet water tank (3,000 gallons)
 - Diesel tank (6,000 liters)
 - Coolant tank (3,000 liters)
- * Residue storage
- * Electric Substation
- * Bin receiving area
- * Bin storage area
- * Weighing facilities
- * Office

Slide 22

Quantity of Waste Incinerated

- Av. Monthly Waste Incinerated: 75 Tons.
- Av. Daily Waste Incinerated: 2.5 Tons.
- HCW From MOH: 86%.
- HCW From Other HC Facilities: 14%.

Slide 20

Components of Incineration System

- Loading Platform
- Primary Chamber
- Secondary chamber
- Filtration Unit (432 filters/ incinerator)
- Gas Analyzer (O2, CO, Dust)
- Control Panel
- Chemical Feeding System (Sorbalit & Spongiacal)
- Exhaust/ Stack
- Ash Collection

Slide 23

Operational Aspects & Problems

- ✓ Regular Service & check up.
- ✓ Replacement of choked filters.
- ✓ Cleaning of filters.
- ✓ Mechanical replacement of components.
- ✓ Repair of fuel line.
- ✓ Leakage of pressure reducing valve.
- ✓ Checking of Burners.

Slide 21

Operational Details

- HCW collection from:
 - Ministry of Health:
 - Salmaniya Medical Complex
 - Jidhafs
 - Muharaq
 - Awali Hospital
 - American Mission Hospital
 - BDF Hospital
 - Joslin Diabetic Center
 - Laboratories, Clinics Etc.

Slide 24

Manpower Recourses At BWTC

Total operating manpower strength: 13

- One plant engineer.
- Two technicians.
- Three drivers.
- One clerk.
- Five labourers/ helpers.

Level of Bahrainization: 50%.

LEGAL FRAMEWORK ON HCWM

- MINISTERIAL ORDER NO.1 OF 2001 ON HCW MANAGEMENT WAS PROMULGATED & ENFORCED IN MAY 2001.
- Total Chapters :7, Articles: 35 & Schedules: 3
- Purpose & Scope of the Order
- HCW Generator's Responsibilities
- HCW Transporter's Responsibilities
- HCW Treatment Unit Responsibilities
- Import & Export of HCW

EA's Role and Monitoring Methodology

- Issuance of Temporary Env. Operating License.
- Trial Operation of HCWT Facilities in April 2002.
- Emission Monitoring Done in 2002 & 2003.
- Environmental Operating Permit granted in April 2004.
- Regular Site Visits.
- Snap Checks.
- Monthly Progress Report.
 - Quantities of waste transported, received & incinerated from HC facilities.
 - Operational status of transportation vehicles.
 - Status of Personnel.
 - Quantity of Ash generated & disposed.
 - Continuous Emission Monitoring Results.
 - Operational & maintenance problems.

Emission Monitoring Results

Parameter	Standard	June 2002	Sept 2003	May 2004
Dioxins & Furans	1.0	1.43	0.12	0.07
Total Particulate Matter	30	8.29	10.7	14.88
Cadmium & its compounds	0.1	0.02	ND	ND
Mercury & its compounds	0.1	0.02	ND	ND
Other Heavy Metals & compounds *	1.0	0.10	ND	ND
Hydrogen Chloride	30	0.32	1.47	4.17
Hydrogen Fluoride	2	0.25	ND	ND
Volatile Organic Compounds	20	1.73	0.03	0.003
Carbon Monoxide	100	69.5	28	193.75
Carbon Dioxide	-	-	3%	5.6%
Oxides of Nitrogen	-	182	52.6	49.61
Sulphur Dioxide	300	4.17	2.62	7.41

*Includes: total of Arsenic, Chromium, Lead & their compounds
ND - Not Detected

6.3 BANGLADESH

Slide 1

**Regional Consultation on Draft
BAT/BEP Guidelines**

**Experience and Case Studies of
BAT and BEP in Bangladesh**

07-09 March 2005
Bangkok, Thailand

Slide 4

**Implementing Agencies for the POPs
Project**

- **DOE** – is the regulating agency for enforcement of environment legislation in Bangladesh, lead agency for implementing POPs project.
- **DAE** – is the relevant authority regulating pesticides in Bangladesh, they have manpower network through-out the country, co-implementing agency for POPs project.
- **BPDB** - main power distributor in the country and major stakeholder for potential PCB source, co-implementing agency

Slide 2

**Stockholm Convention &
Bangladesh's Position**

- Bangladesh is a Signatory of Stockholm Convention. Bangladesh has signed the Stockholm Convention on Persistent Organic Pollutants (POPs) on 23 March 2001.
- To prepare a National Implementation Plan (NIP) for Bangladesh under the Stockholm Convention, a project is being implemented with GEF assistance.

Slide 5

Specific Role of Implementing Agencies

- **DOE being the lead agency is coordinating, facilitating and ensuring the survey/inventory.**
- **DAE is implementing the survey and inventory of POPs pesticides, their stockpiles and wastes.**
- **PDB is implementing the survey and inventory of PCBs and their potential sources.**

Slide 3

**Phase wise activities of the Project “Bangladesh:
Preparation of POPs National Implementation
Plan (NIP) under the Stockholm Convention**

- **Phase I** : Establishment of Coordinating mechanisms and process organization.
- **Phase II** : Establishment of POPs inventories and assessment of national infrastructure and capacity.
- **Phase III** : Priority assessment and objective setting.
- **Phase IV** : Formulation of NIP.
- **Phase V** : Endorsement and submission of the NIP.

Slide 6

Number of POPs & their groupings :

- Although the POPs are many, the Stockholm Convention has identified presently 12 POPs (informally called the “Dirty Dozen”) as follows :
- Pesticides (8 Compounds) –
 - These are mainly Pesticides namely - Aldrin, DDT, Dieldrin, Endrin, Heptachlor, Chlordane, Mirex & Toxaphene.

Slide 7

**Number of POPs & their groupings :
(Contd.)**

- Industrial Chemicals (2 Compounds):
 - PolyChlorinated Biphenyls (PCB) &
 - HexaChloro Benzene (HCB)
- Unintentional By-Products (2 Compounds):
 - Dioxins &
 - Furans

Slide 10

Dioxins and Furans

- Organic chemicals
- Extremely persistent in nature
- Unintentionally produced as by-products
- Not commercially manufactured except a little use for laboratory.

Slide 8

**Chemicals listed in Annex-C
under the Stockholm Convention**

- PolyChlorinated Dibenzo-p-Dioxins (PCDD)
- PolyChlorinated Dibenzo Furans (PCDF)
- PolyChlorinated Biphenyls (PCB)
- HexaChloro Benzene (HCB)

Slide 11

Probable sources in Bangladesh

- **Production sources**
 - Brick
 - Plastic
 - Ceramic
 - Cement
 - Pulp and paper
 - Iron and steel
 - Textile/leather dyes
- **Combustion sources**
 - Hospital wastes
 - Municipal waste
 - Domestic burning
 - Smoking
 - Agricultural waste burning
 - Forest fire
 - Biomass burning
 - Land fill burning
 - Vehicle fuel combustion
 - Cremation of dead body

Slide 9

**Article 5 of the Stockholm Convention :
Measures to reduce or eliminate from
unintentional production (Bangladesh Context)**

- **Source Categories :**
 - **PCB :** Bangladesh is not a producer of PCB. But the inventory says that there are some PCB containing Transformer Oil used in various transformers. Since the inventory is still going on, so at present the quantification & exact identification of PCB is yet possible.
 - **HCB :** There is no pesticide production industry in B.D. Only formulation plant is exists.
 - **Dioxins & Furans :** Very much exists in B.D. According to UNEP guidelines, in Bangladesh, we have identified **10 main categories**. Some sub-categories also identified in each category.

Slide 12

Category and Emission factor for Dioxins

Sector	Name of Category	Source (e.g: One)	Emission factor (µg TEQ/t)
1.	Waste incineration (0.5-40000)	Hospital waste (no APCS)	15 - 40,000
2.	Ferrous and non ferrous metal production	Lead	80
3.	Power generation & heating	Biomass	10-60
4.	Production of mineral products	Brick manufacturing	0.2
5.	Transportation	Fuel	1.5-3.5
6.	Uncontrolled combustion	Open burning of wood	10-60
7.	Production of chemical and consumer goods	Pulp and paper	8-10
8.	Miscellaneous	Smoking	0.1-2.5
9.	Disposal/land filling	Landfill	30-200

Slide 13

Comparison of Dioxins deposition in some countries

Sl. No.	Name of Countries	Quantity (g/year)
1	Bangladesh	???
2	Brunei Darussalam	1.401
3	Jordan	71.144
4	Lebanon	77.465
5	Philippines	534.100
6	Poland	1038.800
7	Thailand	1699.800
8	Uruguay	28.000
9	Vietnam	68.830

Slide 14

Conclusion

- As a signatory of Stockholm Convention, Bangladesh is now preparing National Implementation Plan (NIP). Since the inventory is still going on, so after completion of the inventory, we will set up our priority objective and then NIP will be formulated.
- we have come this consultation to share our knowledge with other learned participants that how they have prepared their NIP and it will help prepare our document for Uruguay COP-1 discussions.

6.4 BENIN

Slide 1

**DIRECTIVES DIRECTRICES SUR LES
MEILLEURES TECHNIQUES DISPONIBLES
ET LES MEILLEURES PRATIQUES
ENVIRONNEMENTALES SE FONDANT
SUR L'ARTICLE 5 ET L'ANNEXE C.**

Slide 4

✓ Rémanence
 ✓ Persistance
 ✓ Non biodégradable
 ➤ Dioxines, furannes dangereux par leur :
 ➤ Jamais fabriqués INTENTIONNELLEMENT
 ➤ Accompagnent la majorité des process de fabrication

Slide 2

PLAN DE PRESENTATION

Introduction

Présentation du Bénin

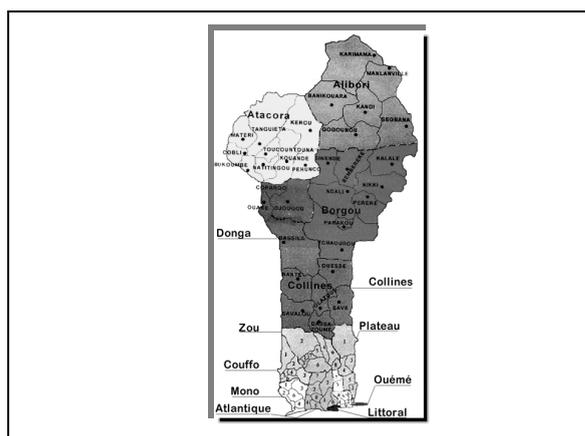
Résultats des inventaires par catégorie de sources principales

Analyses critiques du document directives directrices des meilleures techniques disponibles et des meilleures pratiques environnementales

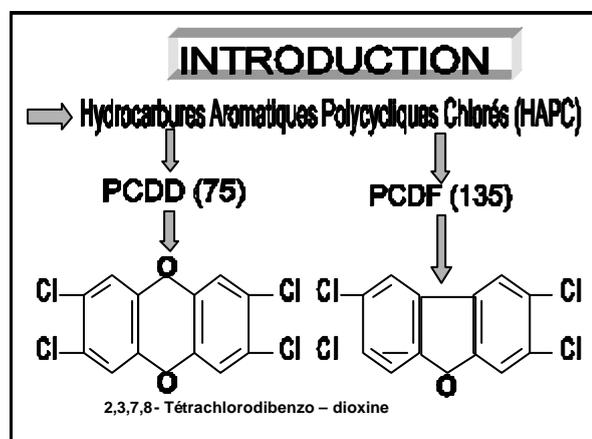
Conclusion

Communication présentée par Mr. Chahî SIKÈ MORAKPAI
Correspondant National Convention de Stockholm sur les POP
Nairobi, 11-13 Avril 2005

Slide 5



Slide 3



Slide 6

PRESENTATION BREVE DU BENIN

SUPERFICIE → 114.163 km²

POPULATION (2002) → 6.769.914 hbt
Femmes:51,5% Hommes:48,5%
densité:59 hbt/Km²

CLIMAT → Nord : Tropical
Sud : Sub-Tropical

LA VEGETATION → Très variée

RICHESSES → Agriculture
Petites Industries
Minières - Pétrolières (Indices)

Exploitations minières à petites échelles
Convention de Stockholm ratifiée le 06/01/2004
Existence de lois réglementaires nationales sur certains POP, mais pas les Dioxines et Furannes

Slide 7

RESULTATS DES INVENTAIRES PAR CATEGORIE DE SOURCES PRINCIPALES

Catégorie 1 : Incinération des déchets

Estimation des quantités de déchets pour 2002:

- Ménagers et industriels: 1.056.379 T

- Biomédicaux: 270.876 T

- déchets de bois: 2.700 T

- Boues d'épuration: essentiellement des eaux usées domestiques
Constats: incinération des déchets à ciel ouvert et dans les décharges. Sauf déchets biomédicaux dans des incinérateurs non conformes.

Toutes les méthodes d'élimination ne répondent pas à la description faite par l'outil spécialisé d'inventaire des dioxines et furannes. Les procédés ci-dessus sont donc envoyés dans la catégorie 6: procédés de combustion non contrôlés.

Slide 10

Catégorie 3 : Génération d'électricité et de chauffage

Les chaudières industrielles ainsi que génération d'électricité sont à combustible fossile (fuel). Dans ce cas des quantités non négligeables des substances inscrites à l'annexe C sont rejetées.

Les cuisines domestiques et autres pratiques de chauffage utilisant essentiellement la biomasse, constituent la source principale des rejets. Elles contribuent jusqu'à 93,43% du total des émissions.

- Centrales à combustibles fossiles: 142.700 TEP (Tonne Equivalent de Pétrole)

- Chauffage domestique et de cuisine: 1.233.026 TEP

Slide 8

Eléments de solution:

1- Mieux organiser la collecte des déchets, l'étendre à toutes les villes et dans les villes à tous les quartiers.

2- Mettre progressivement en place des incinérateurs à process écologiques permettant de minimiser les rejets de PCDD/PCDF.

- Mettre en place un système d'information et de formation des populations, des structures administratives des villes et des campagnes sur les effets des gaz d'incinération des déchets sur la santé humaine et la nécessité d'effectuer les incinérations de préférence pendant la nuit.

Slide 11

Il paraît donc nécessaire de diminuer autant que faire se peut les pressions sur les forêts en continuant à encourager l'utilisation du gaz pour la cuisine par :

- une baisse plus considérable des prix du gaz et des bouteilles

une formation et information de la population sur l'utilisation sécurisante de ce moyen de chauffage et la démythification des dangers qu'il comporte.

Le projet Gazoduc de l'Afrique de l'Ouest doit être une bonne opportunité pour atteindre les objectifs ci-dessus, à la fois pour le chauffage domestique que pour les industries.

Slide 9

Catégorie 2 : Production de métaux ferreux et non ferreux

Au Bénin les travaux ont montré l'existence des fondeurs artisanaux fer et d'aluminium secondaires.

Les procédés existants dépendent de la nature des matériaux de départ utilisés. Les matières de départ consistent en des métaux de récupération. Ces éléments sont souvent contaminés par des huiles ou des revêtements divers, qui ne sont pas souvent enlevés.

La fusion se fait par prétraitement, fusion et affinage dans des fours artisanaux. Leur quantité est négligeable même dans le cas du fer.

1690 T pour les métaux ferreux

1513 T pour les objets en aluminium

Population concernée: analphabète utilisant des équipements non conformes.

Slide 12

Catégorie 4 : Production de produits minéraux

Les produits minéraux ne sont pas produits de façon industrielle au Bénin. Néanmoins il existe des productions artisanales telles que les poteries et quelques activités de l'Office Béninoise des Recherches Géologiques.

Catégorie 5 : Transport

Au Bénin les principaux carburants pour les véhicules sont l'essence et le diesel. Les plus hautes concentrations identifiées dans les émissions de véhicules à l'essence au plomb sont dues au moteur à deux temps. Ces types de moteur occupent le premier rang soit 96,55%. Ce pourcentage élevé s'explique par le nombre élevé des engins taxi motos appelés Zémidjans (1.011.100 T/an).

Signalons que le Bénin est passé de l'essence à plomb à l'essence sans plomb vers la fin de l'année 2004. ce qui pourra réduire le pourcentage de rejets des PCDD/PCDF.

Slide 13

L'effort sera donc mis sur les points suivants :

- Aller progressivement vers le remplacement de l'essence à plomb par l'essence sans plomb (d' déjà réalisé),
- Former et informer les utilisateurs des moteurs à 2 temps sur la nécessité de respecter le pourcentage de l'huile du mélange des carburants et sur celle d'entretenir régulièrement leurs engins,
- Encourager l'achat des engins à moteurs à 4 temps par la révision des tarifs douaniers et la formation des spécialistes pour leur réparation,
- Encourager l'utilisation des carburants à base de GPL (gaz de pétrole liquéfié) pour les moteurs à 4 temps (technologie déjà sécurisante et déjà développée au Ghana et en Côte d'Ivoire).
- Encourager l'importation des véhicules récents par la révision des tarifs douaniers en défaveur des véhicules trop âgés.

Encourager la recherche pouvant aboutir à la mise au point de pots catalytiques à partir des matériaux locaux à prix réduits dans l'espace UEMOA ou CEDEAO.

Slide 16

Catégorie 8: Divers

Il s'agit essentiellement des activités de fumage de poissons et viandes pratiquées surtout par les femmes Béninoises. Cette activité bien qu'étant génératrice de revenu constitue une source d'émission des PCDD / PCDF.

Il importe de rechercher les MTD et les MPE adaptées à coûts réduits pouvant sinon diminuer les émissions mais les orienter vers des espaces plus éloignées des populations.

Dans le cas de l'utilisation des pneus usagés comme source d'énergie, il convient d'inventorier leurs sites afin de les interdire sans omettre toute fois d'aider à la recherche de moyens de substitution aux populations concernées.

Slide 14

Catégorie 6: Procédés de combustion non contrôlés

Le brûlage est à l'air est le moyen de réduction de volume et d'élimination le moins cher, le plus facile et le plus hygiénique pratiqué par bon nombres de personnes surtout dans les milieux paysans. Mais c'est un procédé qui n'est pas acceptable sur le plan de l'environnement, et qui génère des substances chimiques inscrites à l'annexe C de la Convention de Stockholm ainsi que d'autres polluants résultant d'une combustion incomplète. En effet, le brûlage des déchets domestiques constitue la source principale de rejets des PCDD/PCDF dans les résidus. Le brûlage des résidus de l'agriculture dans les champs n'est pas négligeable (1.138.878 T/an).

Surfaces brûlées au Bénin: 6.850.817 Ha

Slide 17

Catégorie 9 : Procédé de traitement/Décharge

Il est basé sur des rejets des déchets de toute nature et leur élimination en vue de la réduction du volume contraignant.

Cette catégorie est la deuxième qui engendre le plus de rejet (22,40%), la première étant les procédés de combustion non contrôlés (76,30%). A l'intérieure, on constate que la sous catégorie des eaux usées et leur traitement donne lieu à la plus grande partie des rejets soit 59,61%.

La situation se caractérise par:

- l'absence d'installations pour le traitement des eaux usées dans les usines.

- Concernant les déchets solides ménagers, une grande dissémination de sites de décharges sauvages et l'absence de tri et d'autres techniques appropriées dans les décharges officielles.

Slide 15

Catégorie 7 : Production de produits chimiques et des biens de consommation

Seules les usines textiles existent au Bénin. La matière première utilisée est le coton fibre. Les données ne sont pas importantes car les usines sont pour la plus part en cessation d'activités pendant la période d'inventaire.

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Total des émissions dioxines et furannes pour année 2002

N°	Cat.S.P	Rejets annuels (gTEQ/an)					Total
		Air (gTEQ/an)	Eau (gTEQ/an)	Terre (gTEQ/an)	Produits (gTEQ/an)	Résidus (gTEQ/an)	
2	MFNF	0,244	0,000	0,000	0,000	0,6	0,844
3	G.E.C	5,516	0,000	0,000	0,000	1	6,616
5	Transport	3,767	0,000	0,000	0,000	0,000	3,767
6	P.C.N.Co	359,116	0,000	79,85	0,000	160,02	598,993
7	Pc BCo	0,000	0,000	0,000	0,030	0,000	0,030
9	P.T/D	0,124	104,7	0,000	42,56	28,29	175,674
	Total	368,80	104,7	79,85	42,6	189,1	785,057

Slide 19

Total des émissions dioxines et furannes pour année 2002

Légende

- gTEQ/an : Gramme toxique équivalent par an
- cat.S.P. : Catégorie de source principale
- MFNF : Métaux ferreux et non ferreux
- GEC : Génération d'électricité et chauffage
- P.C.N.Co : Procédé de combustion non contrôlée
- PeBCo : Produits chimiques et biens de consommation
- P.T/D : Procédés de traitement/ décharges

Slide 22

Catégorie 2 : Production de métaux ferreux et non ferreux

Les catégories sociales concernées par cette activité ne possèdent pas les moyens suffisants pour acquérir des fours décrits dans la directive. Du reste il s'agit d'une activité très peu répandue pour laquelle il peut être conseillé une organisation des producteurs que l'Etat aiderait pour la mise en place des MTD par zone géographique bien définie.

Slide 20

Les sites contaminés

Les sites considérés comme contaminés au terme de l'inventaire sont :

- * Les grands carrefours de nos grandes villes où l'atmosphère est particulièrement polluée par le transport.
- * Les zones d'emplacement des usines pour l'atmosphère, les sols et les cours d'eau.
- * Les dépotoirs sauvages et les décharges officielles de déchets aussi bien ménagers qu'industriels.
- * Les zones d'incinérations sauvages de déchets biomédicaux à l'intérieur ou à l'extérieur des hôpitaux et autres structures de santé.
- * Les sols des garages automobiles et de certaines usines où sont déversées les huiles usagées

Slide 23

Catégorie 3 : Génération d'électricité et de chauffage

-Combustion domestique: les stratégies pour minimiser les rejets comprenant l'éducation du public, programmes de sensibilisation et la formation à l'utilisation des appareils adéquats sont à considérer. Des recherches doivent être menées pour concevoir des fours améliorés et plus efficaces en tenant compte du contexte social, culturel et économique, afin de réduire ces rejets.

-- Chaudières: les MTD et MPE peuvent valablement être mises en œuvre par les industries et autres structures de productions concernées.

Catégorie 5 : Transport

Notre pays étant passé à l'essence sans plomb, les MTD et MPT proposées sont applicables.

-Catégorie 9 : Procédé de traitement/Décharge

Slide 21

ANALYSE CRITIQUE DU DOCUMENT DE MTD § MPE

Catégorie 1 : Incinération des déchets

En raison des moyens limités du Bénin pour acquérir des incinérateurs répondants aux normes, nous optons pour le brûlage à l'air libre tel que décrit dans le document directif. Cependant les produits de tri (objets en PVC, métaux) peuvent subir des opérations de recyclage auxquelles nos populations sont habituées.

Pour les déchets biomédicaux, nous pensons que les MPE décrites qui passent par la ségrégation, la minimisation, ainsi que les techniques alternatives comme la stérilisation à la vapeur ou l'hydrolyse alcaline peuvent être adoptées. Mais aussi l'acquisition des incinérateurs de capacités moyennes pour une zone sanitaire regroupant plusieurs centres de santé peut être envisagée.

Slide 24

Catégorie 9 : Procédé de traitement/Décharge

- Les boues deaux usées: En l'absence d'incinérateurs tels que décrits dans la directive, nous pensons que les techniques alternatives proposées (sites d'enfouissement, compostage, traitement biologique, minimisation, tri à la source etc..) sont concevables. La fusion à haute température est pertinente, mais elle est aussi économiquement peu adaptée au contexte local.

CONCLUSION

L'utilisation de meilleures techniques disponibles et de meilleures pratiques environnementales peut conduire à la minimisation des rejets de substances chimiques inscrites à l'annexe C. Les propositions contenues dans les directives sont faciles à comprendre mais pas toutes facilement accessibles pour des raisons économiques d'une part et le bas niveau technologique de nos pays d'autre part. La grande diversité des activités économiques génératrices de revenus et des rejets de substances nocives, commande que les présentes directives s'intègrent dans la stratégie nationale pour un développement durable. Des recherches sur les meilleures techniques et pratiques environnementales doivent être entreprises dans chaque pays en tenant compte de ses réalités.

Enfin la coopération internationale devra favoriser la formation et le transfert de technologie en vue de l'application des présentes directives.

6.5 BULGARIA

Slide 1

Bulgarian Experience in the field of unintentional produced POPs

***Ministry of Environment and Water
Bulgaria***

Slide 4

• Sources :

- burning processes in production and transformation of energy-49% PCDD/PCDF, 16% PCBs
- Burning processes in trade, administrative and residential sectors, in agriculture, forestry and water economies- 27% PCDD/PCDF, 62 % PCBs
- production processes- 9% PCDD/PCDF,
- Burning processes in industry- 3% PCDD/PCDF, 1% PCBs
- Road transport- 4% PCDD/PCDF, 17 % PCBs
- Other motor vehicles - 5% PCDD/PCDF, 4% PCBs
- Waste treatment and disposal- 3% PCDD/PCDF

Slide 2

Bulgarian Experience in the field of unintentional produced POPs

* Bulgaria signed and ratified the Stockholm Convention on Persistent Organic Pollutants

* Project GF/27-32-4454 between Ministry of Environment and Water of Bulgaria and UNEP- Chemicals

Slide 5

Main problems

- Lack of monitoring system and laboratories for measurement of the concentrations of dioxins and furans in air, soils and water;
- Lack of the significant restructure in industrial sector and insignificant changes in quantity, type and quality of fuels burned in energy production
- Increased consumption of the coals and other solid resources in residential sector
- Lack of enough financial sources and technical expertise for the achievement of the reduction or elimination of the unintentionally produced POPs

Slide 3

The main stages of its obligations are:

- 1. Up-dating and amendment of the National Profile of the Chemicals Management, prepared in 1997 (stage 1)
- 2. POPs inventory in Bulgaria (stage 2)
- 3. Development of NIP and Action Plans (stage 3)

Slide 6

Future aims

- Finalizing development of the NIP and Action Plans;
- Implementation of the abovementioned plans;
- Induction “step-by-step” the BAT and BEP in all sectors;
- Building of the monitoring system and laboratory structure for the unintentionally produced POPs
- Involvement of the stakeholders in process of the reduction or elimination of the sources of POPs
- Other

6.6 CAMBODIA

Slide 1

Cambodian Presentation
on
Unintentional Production (POPs)
Management

Prepared by : Mr. Chea SINA
Mr. Phet PICHHARA

Slide 4

2- Unintended POPs by-products inventory -Cont.

- Conducted training course on POPs
- Undertook preliminary survey on release sources and estimated present release for 4 months based on UNEP Toolkits
- Total release is approximated 606g TEQ/a

Slide 2

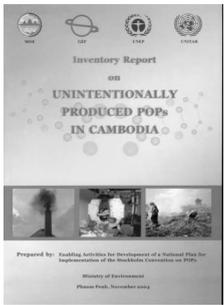
1- Basic Country Profiler

- Light and small industries
 - 78% - Garments and Textile
 - 12% - Food and beverage
 - 10% - Other (wood, secondary metal production, ..)
- Electricity
 - ✓ 92 % - Power plant (Heavy oil)
 - ✓ 7 % - Hydropower
 - ✓ 1 % - Sun light

Slide 5

2- Unintended POPs by-products inventory -Cont.

- Preliminary inventory report was published and distributed to all stakeholders



Slide 3

2- Unintended POPs by-products Invent.

- Starting NIP project in August 2003, and planning to finish in July 2005
- Main tasks in NIP project:
 - 1- Development of NP on Chemicals Mana.
 - 2- Conducting POPs inventories
 - 3- Setting POPs priority and objective for ESM
 - 4- Development of AP and project profiles for POPs ESM

Slide 6

Selected sources for inventory

1- Waste Incineration without APC

- Municipal wastes incinerators



- Medical wastes incinerators



Slide 7

Selected sources for inventory –cont.

2- Ferrous and non-ferrous metal production

- Secondary only (small furnace with using heavy and used oil)
 - Steel production
 - Copper production
 - Aluminum production
 - Lead production

Slide 10

Selected sources for inventory –cont.

5- Production of mineral product

- Brick production
- Lime production



Slide 8

Selected sources for inventory –cont.

3- Uncontrolled combustion

- Waste burning (open landfill and backyard)
- Smoldering copper table and steel car
- tile
- Biomass burning



Slide 11

Selected sources for inventory –cont.

6- Miscellaneous

- Transports
- Crematory
- Smoke houses
- Tobacco smoking

Slide 9

Selected sources for inventory –cont.

4- Power generation and cooking

- Fossil fuel power plant (heavy oil)
- Household cooking (biomass and wastes)

Slide 12

3- Finding from inventory

Released amounts by source categories

No.	Main Source Categories	Annual Total Release (g TEQ / a)					
		Air	Water	Land	Product	Residue	Total
1	Waste Incineration	40.73	0.00	0.00	0.00	0.781	41.511
2	Ferrous and Non-Ferrous Metal Production	0.41	0.00	0.00	0.00	1.00	1.41
3	Power Generation and Heating	10.275	0.00	0.00	0.00	1.692	11.967
4	Production of Mineral Products	0.099	0.00	0.00	0.00	0.00	0.099
5	Transportation	0.005	0.00	0.00	0.00	0.00	0.005
6	Uncontrolled Combustion Process	217.871	0.00	14.56	0.00	315.60	548.031
7	Production and Use of Chemical & Consumer Goods:	-	-	-	-	-	-
8	Miscellaneous	3.641	0.00	0.00	0.00	0.00	3.641
9	Disposal/Landfill	-	-	-	-	-	-
10	Potential Hot-spots	-	-	-	-	-	-
1-10	TOTAL	273.031	0.00	14.56	0.00	319.073	606.664

Slide 13

3- Finding from inventory -Cont.

- Insufficient regulations related to POP's by-product management and weak enforcement
- Lack of local experts in the field of POPs by-products
- Lack of technical guidelines for environmentally sound performance of the release sources
- BAT and BEP for POPs by-products release reduction are not effectively implemented (existing regulations: pollution control, EIA, air pollution control, solid waste management)
- No public awareness on POPs by-products generation and its hazard
- Sound waste management policy has not implemented nationwide

Slide 16

4- Proposed AP for POPs by-prod... -Cont.

Objective 2 :Strengthen capacity and raise public awareness on unintentionally produced POPs issues and its hazard.

- Develop and strengthen the capacity to manage problems related to POPs by-product.
- Develop public awareness raising program on health and environmental impact, unintentionally produced POPs, and the use of alternatives.

Slide 14

4- Proposed AP for POPs by-products Mana.

- Goal :Reduce and eliminate where as possible, the release of unintentionally produced POPs

Slide 17

4- Proposed AP for POPs by-prod... -Cont.

Objective 3 :Improve waste management and prevent uncontrolled burning of waste.

- Improve landfill management (prevent uncontrolled burning).
- Introduce and encourage SM of waste (including 3R principle and wastes separation practices) .
- Introduction and promotion of BAT&BEP in existing waste incineration plant (mun, indu, and haz W)
- Evaluate the possibility of hazardous waste co-incineration in newly constructed cement plant under BAT and BEP conditions.

Slide 15

4- Proposed AP for POPs by-prod... -Cont.

Objective 1 :Revise/develop the legislation related to SM of unintentionally produced POPs.

- Undertake law and policy assessment related to management of unintentionally produced POPs.
- Amend existing laws, or develop new law where necessary, related to the management of unintentionally produced POPs.
- Develop guidelines for the SM of unintentionally produced POPs (BAT/BEP).

Slide 18

4- Proposed AP for POPs by-prod... -Cont.

Objective 4 :Implementation of guidelines on BAT and BEP to existing potential sources release POPs By-products

- Introduce and effectively implement guidelines on BAT and BEP to the release sources unintentionally produced POPs.

6.7 CHINA

Slide 1

The Practice on BAT-BEP in China

POPs Convention Implementation Office
State Environment Protection Administration
CHINA

March 7, 2005

Slide 4

Current Situation on UP POPs Control

- Inventory, strategies & action plans for unintentionally produced POPs (Funded by GEF and implemented by UNIDO)
- Establish Dioxin laboratories (13 established, more than 10 are constructing)

Slide 2

The Practice on BAT-BEP in China

1. *Current Situation and Recent Activities for BAT-BEP*
2. **The BAT-BEP Demonstration project**

Slide 5

Recent Activities for BAT-BEP

- **National workshop on UP POPs toolkit**
 - Some of the emission factor cannot be applied directly
- **National workshops on BAT/BEP guidelines**
 - Developed a Chinese version
 - Involved by sectors of iron and steel, paper-making, non-ferrous; cement industrial, petroleum and chemical industry, etc.
 - Most of the BAT/BEP measures are technically feasible but questionable in financial feasibility

Slide 3

Current Situation on UP POPs Control

- National Standards for waste disposal issued in 2001
- National Hazardous Waste Disposal Plan approved (1.7 billion US\$)
- National Technical Guideline on Hazardous Waste Disposal Issues
 - Minimize the generation of waste—reuse, resource and recovery
 - 3T—Operation Temperature: >1100 ; Residence Time:>2s;Turbulence is required
 - Excessive Oxygen is required

Slide 6

To prepare documents in Chinese

- Edition before 3rd Experts Group Meeting
- Draft version after 3rd Experts Group Meeting (310 pages in A4 size)

1. 总论	20
2. 背景与现状	12
3. 主要问题	12
4. 主要问题 (1) 危险废物焚烧炉尾气处理	14
5. 主要问题 (2) 危险废物焚烧炉尾气处理	14
6. 主要问题 (3) 危险废物焚烧炉尾气处理	12
7. 主要问题 (4) 危险废物焚烧炉尾气处理	12
8. 主要问题 (5) 危险废物焚烧炉尾气处理	12
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102. 主要问题 (99) 危险废物焚烧炉尾气处理	12
103. 主要问题 (100) 危险废物焚烧炉尾气处理	12

Slide 7

Recent Activities for BAT-BEP

- **Organize an International Workshop on POPs from Combustion**
 - In collaboration with USEPA, Japanese Ministry of Environment, Environment Canada
 - About 150 participants from 10 countries and 2 international organizations
 - Exchanged information and gave suggestions on inventory development, monitoring and reduction measures

Slide 10

Project Objectives

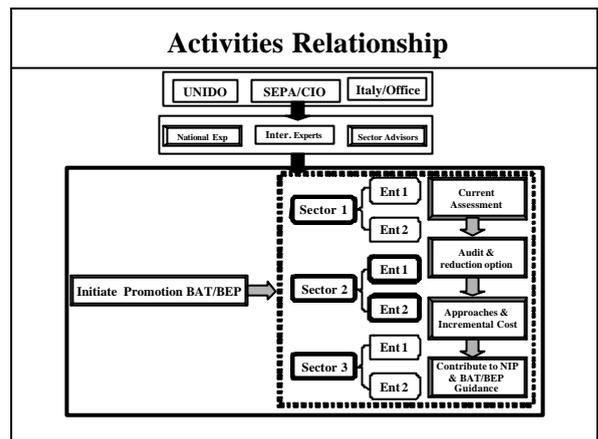
- To demonstrate methodologies to promote the implementation of BAT & BEP for reducing UP POPs in 6 enterprises representative of key industry sectors
- To estimate the incremental costs of implementing BAT and BEP options at enterprise and sector level

Slide 8

Practice on BAT-BEP in China

1. **Current Situation and Recent Activities for BAT-BEP**
2. *The BAT-BEP Demonstration project*

Slide 11



Slide 9

One of the UP POPs Projects in China

- **Strategies to Reduce Unintentional Production of POPs in China: BAT, BEP and Incremental Costs for Selected Sectors of Industry**
- **Support by: Italy, UNIDO**
- **Period: 2004-2006**

Slide 12

Selected sectors and enterprises

Sectors	Enterprises	
Iron & Steel Industry	Shanghai Bao Steel Co., Ltd	Taiyuan Iron and Steel Group Corporation
Paper Industry	Yueyang Linzhi Group Corporation	Huatai Paper Group Corporation
Hazardous Waste Incineration	Jinan HanYang Co., Ltd	Huzhou Incineration Factory

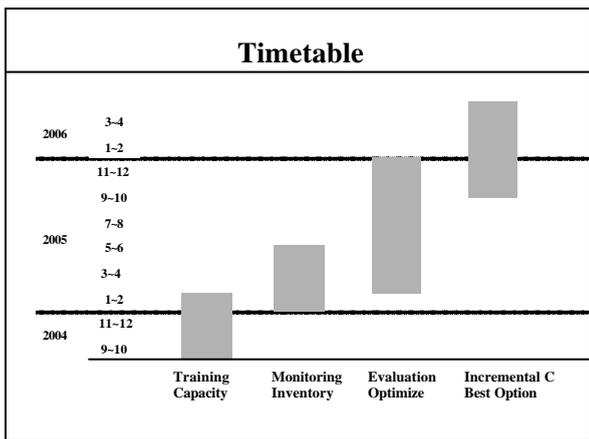
Slide 13

Project Activities	
<ul style="list-style-type: none"> ▪ To sensitize national planners, ministries and associations, to Convention requirements and build enterprise participation ▪ To decide the baseline and establish the monitoring capability (enterprise level) ▪ Do process & operational audit (enterprise level) ▪ To determine the best options, cost modelling & incremental costs (Sector and national level) 	

Slide 16

<p>Stockholm Convention Implementation Office</p> <p>Tel: +86 10 66532432-33 Fax: +86 10 66532424 E-mail: pops@sepafece.org.cn Web: http://www.china-pop.org http://www.china-pop.net</p> <p style="text-align: center;"><i>Thank You</i> </p>
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Slide 14



Slide 15

Comments
<p>BAT & BEP: BEST depends on</p> <ul style="list-style-type: none"> ▪ Technology ▪ Economy ▪ Control standard ▪

6.8 DEMOCRATIC REPUBLIC OF KOREA

Slide 1

**DPR of Korea's Activities
addressing
Best Available Techniques
and
Best Environmental Practices**

*Bangkok, Thailand
7-9 March 2005*

Slide 4

Source Category II
PCDD/PCDF, HCB,PCB

- Waste incinerators
- Cement kilns firing hazardous waste
- Production of pulp
- Thermal processes
 - Secondary cooper production
 - Sinter plants in iron and steel industry
 - Secondary aluminum production
 - Secondary zinc production

Slide 2

Laws and Regulations
to control POPs

- "Law of the Democratic People's Republic of Korea on Environment Protection"
- "Standards for Environment Protection"
- Others

Slide 5

Source Category III
PCDD/PCDF, HCB,PCB

- Open burning of waste
- Thermal process in metallurgical industry
- Residential combustion sources
- Fossil fuel fired utility and industrial boilers
- Firing installations for wood and bio-mass
- Specific chemical production processes

Slide 3

**Key Agencies and Institutions
involved**

- National Coordinating Committee for Environment
- Ministry of Land and Environment Protection,
- Ministry of Chemical Industry
- Ministry of Metal and Machinery Industry
- Ministry of Electronic Industry
- Ministry of Public Health
- Ministry of Agriculture.

Slide 6

Source Category III
PCDD/PCDF, HCB,PCB (Continued)

- Crematoria
- Motor vehicles
- Destruction of animal carcasses
- Textile and leather dyeing and finishing
- Shedder plants for treatment of end of life vehicles
- Smoldering of copper cables
- Waste oil refineries

Slide 7

**General Prevention Measures
relating to
Best Available Techniques**

- Use of low waste technologies
- Use of less hazardous substances
- Promotion of recovery and recycling of wastes and of substances
- Replacement of feed materials which are POPs or where there is a direct link between materials and release of POPs
- Good house keeping and prevent maintenance program

Slide 10

**General Prevention Measures
relating to
Best Environmental Practices
(Continued)**

- Need to prevent accidents and to minimize their consequences for environment
- Need to ensure occupational health and safety at work places
- Comparable processes, facilities or methods of operation which have been tried with success on an industrial scale
- Technological advances and changes in scientific technology and understanding

Slide 8

**General Prevention Measures
relating to
Best Available Techniques
(Continued)**

- Improvements in waste management with aim of cessation of open and other uncontrolled burning of wastes
- Minimizing of these chemicals as contaminants in products
- Avoiding elemental chlorine or chemicals generating elemental chlorine for bleaching

Slide 11

**General Prevention Measures
relating to
Best Environmental Practices
(Continued)**

- (b) General release reduction measures
- Use of improved methods for flue gas cleaning such as thermal or catalytic oxidation, dust precipitation, or absorption
 - Treatment of residuals, waste and sewage sludge by thermal treatment or rendering them inert or chemical processes that detoxify them

Slide 9

**General Prevention Measures
relating to
Best Environmental Practices**

- a) General considerations
- Nature, effects and mass of release concerned techniques may vary depending on source size
 - Commissioning dates for new or existing installations
 - Time needed to introduce BAT
 - Consumption and nature of raw materials used in process and its energy efficiency

Slide 12

**General Prevention Measures
relating to
Best Environmental Practices
(Continued)**

- Processes changes that lead to the reduction or elimination of releases such as moving to closed systems
- Modification process designs to improve combination and prevent formation of the chemicals through the control parameters such as incineration temperature or residence time

Slide 13

Problems encountered

- No Presence of specific laws and regulation
- Lack of alternative technologies information and materials
- Lack of trained experts
- Lack of exchange of achievements and experiences
- Shortage of analytical techniques to identify sources of release of POPs

Slide 14

Ways to Settle the Problems

- The only and general way to solve the problems is to prepare and implement as soon as possible the National Implementation Plan which covers the Action Plan

6.9 GABON

Slide 1

Sources de Dioxines et Furannes

Communication préparée et présentée par le Dr. **Hubert BINGA**, Point Focal de la Convention de Stockholm, Directeur Général Adjoint du Centre National Anti-Pollution.
Libreville, 2005

Slide 4

Sources de dioxines et furannes

- Elles peuvent être issues à partir des entreprises industrielles ;
- Ou encore des autres origines.

Slide 2

Plan de la Communication

- Introduction
- Sources de Dioxines et de Furannes dans les entreprises industrielles au Gabon
- Autres sources de Dioxines et Furannes
- Conclusion

Slide 5

Entreprises industrielles

- Cim Gabon, ou Société de Cimenterie du Gabon, qui a trois usines de broyage de Clinker et de préparation de ciment ;
- Sucaf, Société sucrière de Franceville, basée dans la province du Haut-Ogooué ;
- Sogara, Société Gabonaise de raffinage des hydrocarbures, située à Port-Gentil ;
- Copalmo, Compagnie des palmistes de Moabi, dans la N'Gounié. Cette coopérative agricole a une raffinerie d'huile de palmiste.

Slide 3

Introduction

- Les Dioxines et furannes font parties 12 polluants retenus par la Communauté internationale. Ce sont des sous-produits toxiques issus des activités anthropiques ;
- Au niveau du Gabon, la connaissance de ces sous produits et de leur nocivité demeure approximative ;
- L'Administration compte sur les résultats des travaux du Projet POP'S pour en faire une préoccupation majeure du point de vue de la santé humaine et de la gestion écologiquement rationnelle de ces sous-produits toxiques.

Slide 6

Entreprises industrielles (suite)

- Smag, Société meunière du Gabon, qui a le monopole de la régie du tabac au Gabon

Slide 7

Autres origines

- Le parc automobile du Gabon qui est actuellement marqué par de nombreux automobiles d'occasion venant de l'Europe, notamment de la Belgique et de l'Allemagne ;
- Les pratiques et les techniques traditionnelles de culture sur brûlis qui peuvent également produire ces sous-produits surtout durant la grande saison sèche où les villageois aménagent des nouvelles plantations pour les cultures vivrières.

Slide 8

Conclusion

Selon certains enseignements que l'on peut tirer de campagnes d'inventaires effectuées sur le terrain, il apparaît que les dioxines et les furannes sont difficiles à inventorier. Mais leurs sources ont été identifiées et connues au niveau du Gabon.

6.10 GHANA

Slide 1

**UNEP REGIONAL CONSULTATION
FOR THE AFRICAN COUNTRIES
ON THE DRAFT BAT/BEP
GUIDELINES
NAIROBI, KENYA, 11-13 APRIL, 2005
COUNTRY EXPERIENCE - GHANA
By
SAM ADU-KUMI, POPs PROJECT
COORDINATOR**

Slide 4

Status Of Country NIP Cont...

- **Stakeholder Participation**
 - ✓ **Government Ministries and Agencies**
 - ✓ **Non-Governmental Organizations (Including Women and Children groups)**
 - ✓ **Academia and Research Institutions**
 - ✓ **Media (Electronic and Print)**
 - ✓ **Regional Economic Integration**
 - ✓ **International organizations (UNIDO, UNEP, UNITAR Etc)**

Slide 2

Outline of Presentation

- **Status of Country NIP**
- ✓ **Summary of NIP Preparatory Phases**
- ✓ **Stakeholder Participation**
- **Assessment of the POPs Issue in Ghana**
- ✓ **Institutional, Policy and Regulatory Framework**
- ✓ **Assessment of Annex A, Part II Chemicals (PCBs and PCB Containing-Equipment)**
- ✓ **Assessment of Releases from Unintentional Production of Annex C Chemicals (PCDD/PCDF, HCB and PCBs)**
- ✓ **Potential sources of releases of Annex C chemicals in Ghana**
- **Strategies and Action Plans**
- ✓ **Framework for Developing Priority Project for the Ghana NIP on Reduction of PCDD/PCDF, HCB, PCB releases**

Slide 5

Status of POPs in Ghana

Name of Chemical	Current status/control action	Details e.g. reason for control action, remaining allowed uses, etc.
Aldrin	Banned since 1985	Chemical is persistent. Safer alternatives preferred.
Chlordane	Banned since 1985	Chemical is persistent. Safer alternatives preferred.
Dieldrin	Banned since 1985	Chemical is persistent. Safer alternatives preferred.
DDT	Banned since 1985	Chemical is persistent. Other cheaper and safer alternatives such as synthetic pyrethroids for insect control for public health and agriculture are preferred
Heptachlor	Banned since 1985	
Hexachloro-benzene	Banned since 1985	Chemical is persistent. Safer alternatives preferred.
Mirex	Banned since 1985	Chemical is persistent. Safer alternatives preferred.
Dioxins & Furans (PCDDs/PCDFs)	There is limited information on release into the environment	-
PCBs	Importation is prohibited. Still present in old transformers and capacitors	-
Toxaphene	Banned since 1985	-

Slide 3

Status Of Country NIP

- **Summary of NIP Preparatory Phases**
 - ✓ **Establishment of Coordinating Mechanism and Process Organization;**
 - ✓ **Establishment of POPs Inventories and Assessment of National Infrastructure and Capacity;**
 - ✓ **Priority Assessment and Objective Setting;**
 - ✓ **Formulation of National Implementation Plan;**
 - ✓ **Endorsement and Submission of NIP**
 - **Draft NIP formulated and endorsed by national Stakeholders**

Slide 6

**Assessment of POPs in Ghana
Institutional, Policy and Regulatory Framework**

- **Existence of a policy framework for the management of potentially bio-accumulative and toxic substances, which include POPs in Ghana**
- **Framework is inadequate and incapable of dealing with the specific requirements of the Stockholm Convention**
- **Need for a comprehensive legislation to deal with all chemicals advocated. Currently there are 17 chemical related laws in place**

Slide 7

Assessment of POPs in Ghana
Institutional, Policy and Regulatory Framework
Cont...

- Existing laws that have some relevance to the POPs Convention do not address the dangers posed to humans and the environment by the chemicals in question.
- Stakeholder institutions that deal with POPs do not have the resources to monitor or research into their disposal as required by the Convention.

Slide 10

Preliminary Assessment of Source Releases of Unintentional Production of Annex C Chemicals (PCDD/PCDF, HCB and PCB)

- Uncontrolled combustion processes, medical wastes incineration, power generation/heating and transport are the main sources of PCDD/PCDF in Ghana, for which also the most reliable data are available.
- A total of 386 g I-TEQ of PCDD/PCDF were emitted from known sources to air in 2002.

Slide 8

Assessment of Annex A, Part II Chemicals (PCBs and PCB Containing-Equipment)

- PCB applications by location include, electricity (including distribution networks), industrial facilities, residential and commercial buildings, among others
- Main potential PCB-containing applications at the target locations are transformers and capacitors.
- Electricity Company of Ghana (ECG) and the Volta River Authority (VRA) are the main users of transformers and capacitors
- Official importation of PCB-containing transformers and capacitors prohibited since 1972.
- 455 pre-1972 possible PCB-containing transformers and 147 pieces of 11kVA and 33kVA possible PCB-containing capacitors found countrywide.

Slide 11

Preliminary Assessment of Source Releases of Unintentional Production of Annex C Chemicals (PCDD/PCDF, HCB and PCB) Cont...

- Uncontrolled combustion processes (particularly bush fires) accounted for 372 g I-TEQ of PCDD/PCDF corresponding to 94.5% of the total emissions to air.
 - ✓ Forests = 219g I-TEQ (56%)
 - ✓ Savannah grassland = 129g I-TEQ (33.5%)
 - ✓ Waste dumps = 25g I-TEQ (6.4%)
- Releases from power generation, waste incineration, transport and miscellaneous (e.g crematoria) accounted for remainder of 15g I-TEQ of PCDD/PCDF (5.5%).

Slide 9

Preliminary Assessment of Source Releases of Unintentional Production of Annex C Chemicals (PCDD/PCDF, HCB, PCB)

- The main potential source categories of PCDD/PCDF in Ghana have been identified as:
 - ✓ Waste Incineration (e.g. medical)
 - ✓ Ferrous and Non-Ferrous Metal Production
 - ✓ Power Generation and Heating
 - ✓ Mineral Production
 - ✓ Transport
 - ✓ Uncontrolled Combustion Processes
 - ✓ Production, Use of Chemicals & Consumer Goods
 - ✓ Disposal
 - ✓ Miscellaneous (e.g. crematoria)

Slide 12

Preliminary Assessment of Source Releases of Unintentional Production of Annex C Chemicals (PCDD/PCDF, HCB and PCB) Cont...

- Uncontrolled combustion processes emissions of PCDD/PCDF to land in 2002 was 278g I-TEQ .
 - ✓ Forests = 175g I-TEQ (62.3%)
 - ✓ Savannah grassland = 103g I-TEQ (37%)
- Uncontrolled combustion processes (particularly bush fires) have been identified as the major source of PCDD/PCDF releases in Ghana in 2002.

Slide 13

Measures in Place to Control Releases and Options for Further Release

Reductions

- Release from household heating (biomass) is currently being addressed indirectly through the promotion of a variety of gas fired stoves and ovens to meet the cooking and heating needs of the populace.
- Awareness raising on the harmful effects of dioxins and furans to exert public pressure for appropriate policy formulation on the need to reduce/eliminate PCDDs/PCDFs.

Slide 16

Strategies and Action plans Cont...

- Identify and promote feasible and affordable alternatives to activities, which are chlorine based, and sources of releases
- Review and develop by-laws, guidelines and procedures for uncontrolled burning activities.
- Intensify on-going educational and awareness programmes on effects of uncontrolled burning activities.
- Develop alternative methods of bush clearing instead of burning.
- Promote other income generating activities for the youth.

Slide 14

Measures in Place to Control Releases and Options for Further Release

Release Reductions

- Phase out of leaded fuel for use in automobiles (implemented since January 1, 2004)
- Releases due to uncontrolled combustion processes which was the major source of PCDD/PCDF emissions in 2002 are also being curbed through on-going awareness creation programmes initiated several years ago and is yielding results.

Slide 17

Strategies and Action plans Cont...

- Enforce ban on bush and waste burning at dumpsite by local authorities
- Construct well-designed waste incinerators. e.g. waste to energy plants
- Implement policy to ban burning of products containing chlorine or processed with chlorine, such as chlorinated chemicals, polyvinyl chloride plastic and chlorine bleached paper
- Strengthen institutions to implement cleaner technologies
- Phase out old incinerators and Construct modern ones with designs to improve combustion of medical waste.

Slide 15

Measures to Reduce Releases from Unintentional Production (Article 5)

Strategies and Action plans

- Introduce substitute technologies or modify materials and processes to prevent formation and releases
- Institute a chemical and materials policy, which aims to reduce/eliminate PCDD/F, HCB and PCB
- Integrate industry commitment into existing EPA permitting system
- Education and awareness of stakeholders
- Identify and develop phase out programmes for activities using chemicals containing chlorine (e.g. PVC production, chlorine in water treatment, pesticides)

Slide 18

Strategies and Action plans Cont...

- Sustained policy on reliance on mass transportation system to reduce fuel consumption
- Develop best practice guidelines on the selection of scrap metal for processing for small-scale foundry set-ups.

Slide 19

Framework for Developing Priority Projects
for the Ghana NIP on Reduction of
PCDD/PCDF, HCB, PCB Releases

- **Conduct comprehensive inventories on sources of releases**
- **Determine options for reduction of releases and based on the inventories**
- ✓ **Identification of environmentally sound alternative energy sources**
- ✓ **Implementation of options and possible clean up of contaminated sites**

6.11 IRAN

Slide 1

The Experiences of I.R. Iran in Addressing
BAT & BEP in the Development of NIP

Reza Alamikia National Project Manager of POPs Enabling
Activity
Roxana Maleki, Expert of Conventions on Chemicals
Department of Environment, I.R. Iran

Slide 4

OBJECTIVES

- Identify the main locations where POPs are emitted and used;
- Assess knowledge, attitudes and practices of industry and the general public, with regard to POPs handling, storage and application ;
- Identify main uses and quantities of POPs which have not been prohibited and develop alternative use (e.g. waste transformer oils);

Slide 2

POPs Enabling Activity Project

Slide 5

- Intensify efforts in the implementation of the Stockholm Convention on POPs and to create awareness amongst decision makers, managers, industry, end-users and the general public on POPs in order to facilitate the identification of alternative chemicals;

Slide 3

- Project Number: IRA/02/G31
- National Executing Agency:
Ministry of Foreign Affairs (MFA)
- National Implementing Agency:
Department of Environment (DOE)
- International Executing Agency: *UNDP*
- Source of Fund: *GEF*
- Project Duration: 2 Years (1 Jan 04- 30 Dec 05)

Slide 6

POPs Categories

- Pesticides
 - Aldrin, Chlordane, DDT, Dieldrin,, Endrin, Heptachlor, Mirex, Toxaphene, Hexachlorobenze
- Industrial Chemicals
 - Polychlorinated Biphenyls (PCBs), Hexachlorobenze (HCB) .
- Unintentional By-products
 - PCBs, HCB, Dioxins and Furans

Slide 7

Addressing BAT & BEP in NIP

Slide 10

Health Care Waste Incinerators

Over 1000 hospitals exist in the country and there is a growing need for ESM of this kind of wastes.

- Prevention of application of old incinerators by hospitals to reduce unintentional POPs emissions.

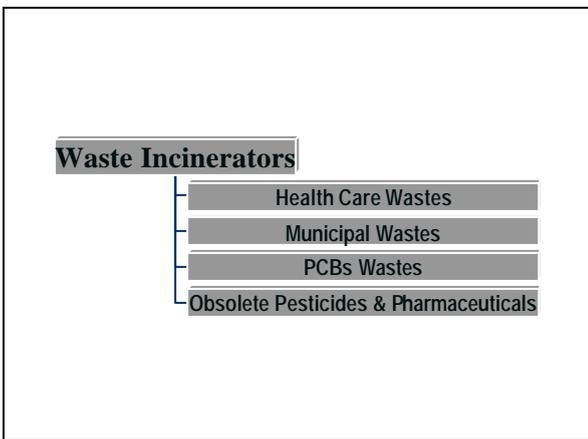
Slide 8

- Waste Incinerators
- Fuel Systems Improvement
- Cement Kilns
- Inventory
- Capacity Building & Awareness Raising

Slide 11

- Encouraging hospitals to apply hydroclaves for sterilization of infectious wastes.
- Promotion of a project on establishment of a central incinerator for disposal of waste of all hospitals in Tehran.
- Providing a guideline for environmentally sound separation, gathering, transfer and disposal of hospital wastes.

Slide 9



Slide 12

Municipal Waste Incinerators

The Problems that the country is facing with :

- High percentage of the wet municipal wastes which makes application of incinerators difficult.
- None separation of waste in the origin.

Slide 13

At the present time there is no incinerator for disposal of Municipal Wastes,
A project on landfills establishment is under promotion. Under this project the country is divided into 9 regions and one landfill will be established in each region.

Slide 16

Fuel System Improvement

- Converting heavy fuel systems to light fuel systems in industrial units and housekeeping applications.
- Equipping a great number of vehicles particularly public vehicles to CNG fuel system.

Slide 14

PCB Incinerators

There is a need for construction of a PCBs incinerator for disposal of PCBs and PCBs polluted oils in old transformers and condensers in power plants and different industrial units.

Slide 17

Cement Kilns

- Equipping several cement factories to electro-filters, back-filters and cyclones;
- installation of online monitoring systems to register emissions of Dioxine and Furans.

Slide 15

Obsolete Pesticides and Pharmaceuticals

There is an incinerator, especially allocated to the non-chlorinated expired drugs and pesticides.

Slide 18

Dioxine & Furan Inventory

Slide 19

Table 1: Screening Matrix – Main Source Categories

No.	Main Source Categories and Subcategories	Air	Water	Land	Product	Residue
1	Waste Incineration	X				X
2	Ferrous and Non-Ferrous Metal Production	X				X
3	Power Generation and Heating	X		X		X
4	Production of Mineral Products	X				X
5	Transport	X				
6	Uncontrolled Combustion Processes	X	X	X		X
7	Production and Use of Chemicals and Consumer Goods	X	X		X	X
8	Miscellaneous	X	X	X	X	X
9	Disposal	X	X	X		X
10	Identification of Potential Hot-Spots	Probably registration only to be followed by site-specific evaluation				

Slide 22

PCBs Inventory Workshop

- One day (1st of Dec. 2004)
- 120 Participants from:
 - DOE experts, all provinces, water and soil pollution and laboratories bureaus (35 people)
 - Ministry of Energy, power plants (25 P.)
 - Ministry of Industry and Mine (20 P.)
 - Ministry of Health (15 P.)
 - Ministry of Oil (5 P.)
 - M.Sc. And Ph.D. students (15P.)

Slide 20

- Inventory on 4 categories:
 - 1-Chemical industries
 - 2-Ferrous and non-ferrous metal production
 - 3-Production of Mineral Products
 - 4-Power generation

Slide 23

PCBs Inventory Workshop

- Presentations:
 - POPs EA Project overview, Inventory outcomes & goals by National Project Manager
 - Existing situation and current actions on PCBs by Mr. Manafi, PCBs subtask leader
 - Basic considerations on PCBs Inventory by Mr. Martin Murin, International project coordinator and PCBs Inventory Consultant
 - POPs Monitoring, sampling and analyzing by Mr.Badkoubi, National monitoring TT consultant
 - PCBs Inventory, Goals & Objectives by Dr.Ganjodoust, National PCBs TT consultant

Slide 21

Capacity Building & Awareness Raising

Slide 24

Unintentional POPs Inventory Workshop

- 2 days (15-16th Dec. 2004)
- 120 participants
 - DOE experts, all provinces, water and soil pollution and laboratories bureaus (35 people)
 - Ministry of Energy, power plants (25 P.)
 - Ministry of Industry and Mine (20 P.)
 - Ministry of Health (15 P.)
 - Ministry of Oil (5 P.)
 - M.Sc. And Ph.D. students (15P.)

6.12 KENYA

A case study of Panafrican Paper Mills Ltd, Webuye, Kenya. “Minimization of dioxins and furans during the bleaching of sulphate pulp. *by J. J. Lukorito*

Summary

Panafrican Paper Mills (E.A) Ltd., (Panpaper), is an integrated pulp and paper mill producing bleached and unbleached sulphate pulp for manufacture of paper and paper boards. The main cooking reagent is sodium hydroxide and sodium sulphide. Sodium hydroxide is generated from the reaction between lime obtained by burning limestone/lime sludge from the plant and sodium carbonate obtained from dissolving smelt, a product of burnt black liquor (spent cooking liquor).

Depending on the amount of alkali used in the cooking and other cooking parameters such as hold time at pressure and temperature two types of pulps are obtained. Soft pulp is cooked to a kappa number of 22 – 26 (K.No. 16 – 18) while hard pulp is cooked to a kappa number of 48 – 58 (K.No. 26 – 29). Only soft pulp is beached using to the sequence (CEpH1H2).

C= Chlorination

Ep= Extraction using caustic and peroxide

H1 = First hypo addition stage

H2 = Second hypo addition stage

It is during bleaching at the elemental chlorine stage that comparatively high formation and release of dioxins, furans, hexachlorobenzene and polychlorinated biphenyls occur.

Of these compounds only polychlorinated dibenzo-?-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF) have been identified as being unintentionally produced during the production of pulp using elemental chlorine. Of the 17 PCDD/PCDF congeners with chlorine in the 2,3,7 and 8 positions, only two congeners – namely 2,3,7,8 – tetrachlorodibenzo – ? – dioxin (2378 – TCDD) and 2,3,7,8 – tetrachlorodibenzofuran (2378 – TCDF) – have been identified as potentially being produced during sulphate bleaching using chlorine (Guidelines on BAT and Guidance on BEP, 2004 Draft).

The following primary measures can be taken for elimination and decreasing the formation of 2378 – TCDD and 2378 – TCDF are:

- Eliminate elemental chlorine by replacing it with chlorine dioxide (ECF bleaching) or with chlorine – free chemicals (TCF bleaching).
- Reduce application of elemental chlorine by decreasing chlorine multiple or increasing the substitution of chlorine dioxide for molecular chlorine.
- Minimize precursors like DBD and DBF entering the bleach plant by using precursor – free additives and thorough washing.
- Maximize knot removal.
- Eliminate pulping of chips contaminated with polychlorinated phenols

INTRODUCTION

Panafrican Paper Mills (E.A) Ltd (Panpaper) was conceived in the late sixties by the Government of Kenya not only to exploit the vast forest plantations but also for socio economic development of the Western region. Tree planting had already started in the forties and the main species were pine and cypress. These are fast growing trees with a high yield. Later, eucalyptus was introduced.

The Kenya Government then embarked on shopping for an investor to put a factory for processing wood into pulp and paper products. However, many developed countries turned down the offer on the argument that Kenya was not ripe for the industry.

Orient Paper and Industries (OPI) of India had at this time been running two such factories in India and one in Nigeria. Back in India, it was a model outfit with its headquarters in Kolkata. It was Honourable Mwai Kibaki while serving as Kenya's minister for commerce and Industry who contacted OPI as an emissary of the Kenyan Government. The subsequent negotiations led to the formation of the company in 1969. It started with three partners, Kenya Government, Orient Paper and Industry (O.P.I) and International Finance Corporation who held one third each of the shares. OPI provided technical know how and management services to Panpaper since inception. With the support of OPI, several technologies were introduced and Panpaper made considerable progress during this period. Panpaper has introduced many specialized paper grades in the Kenya and the regional markets. The company had been fine – tuned for the East African Community market but soon the community collapsed and there was no option but to resort to all avenues of exportation apart from utilizing the local market.

Panpaper started production in 1974 with a rated capacity of 45,000 tons per annum (tpa). The company has been a blue chip company until recently having gone through several diversified expansions and de – bottlenecking programs, raising its rated capacity to 120,000 tpa of paper and boards without any fresh injection of equity capital but by reinvesting its cash surplus and arranging loans from international and local financial institutions.

Panpaper employs 1500 people directly and 30,000 indirectly. Over 7700 people have been benefited from Panpaper organized or sponsored trainings in various crucial fields, a figure that is acknowledged to be the biggest by any company in the country. The company has an asset base of Ksh 17 billion.

- Highlights of the Company
 - Savings of foreign exchange by import substitution and exports; over Sh 5 billion per annum.
 - Direct payment to exchequer e.g. VAT, duty on fuel oil, customs duty, royalty on wood etc. Sh 1 billion and
 - Payment to parastatals, KPL and Kenya Railways, Sh 1 billion per annum.
- Re-afforestation Program
 - Panpaper assisted the Government in the Re-afforestation program
 - Total area of plantation established so far is approx. 41,000 ha as against 23,000 ha clear felled. Panpaper assists implanting (3) trees for every tree cut. Panpaper has a capacity of raising 6 million seedlings per annum in its nurseries in Kaptagat and Webuye.

The company's biggest challenge is the stiff competition by foreign countries and the local market remains fragmented and stagnant to large extent. The recent incidents of power rationing badly undermined the capacity to hold onto the hitherto traditional markets which were easily taken over by competitions some of whose production in home countries are always subsidized.

Currently the stiffest competition is coming from European countries and South Africa all whose production is helped by the availability of large reserves of coal, which produces energy, and hence production costs affordable as compared to the local situation. Over – dependence on imported fuel oil from the Middle East makes Panpaper spend up to 47% of the total production cost on energy.

The company currently relies, apart from the local market, on exports to countries like the Great lakes countries of Uganda, Rwanda and Burundi who still provide some degree of reliability as markets. Our products are of international quality. These products are exported, directly and indirectly, to East African community, West Africa, Europe, Egypt, Middle East, India and other countries.

Raw Materials and Requirements for the Pulp and Final Products

At Panpaper, pulps for paper are manufactured using both sulphate and mechanical pulping methods. The wood species used are Cupressus lustanica, Pinus patula, and Eucalyptus saligna. Wood represents

a complex mixture of some substances cellulose (40 – 45 %), hemicelluloses (25 – 35%), lignin (20 – 30) and extractive (2 – 15 %).

Pulping and bleaching effort required vary widely depending on the grade of paper being manufactured.

PROCESS DESCRIPTION

Pulping Methods

The main processes involved in making pulp and paper products are: raw material handling and preparation, storage, wood debarking, chipping, de – knotting, pulping, pulp processing and bleaching if required and paper & paper board manufacturing.

The manufacture of pulp at Panpaper utilizes mechanical and chemical (Sulphates) methods. Mechanical pulping processes use grinding of logs whereby mechanical shear forces are used to pull the fibres apart, and the majority of lignin remains with the fibres, although there is still some significant dissolution of organics. Mechanical pulps can often be used without bleaching, but where brightening is applied it is achieved using compounds such as peroxides.

In sulphate pulping, the fibres are broken down chemically – chemicals are used in a cooking process to enter the fibre lumen and dissolve lignin in cell wall to gain access to the compound middle lamella. Lignin has to be removed from the middle lamella to free the fibres. The lignin and many other organic substances are thus put into solution by use of a mixture of sodium hydroxide and sodium sulphide under alkaline conditions to dissolve the lignin from wood. This occurs in digesters, which are heated and pressurized. Spent cooking liquor (back liquor) is recovered to generate white liquor for the first pulping step. With soda recovery on site, most of the dissolved wood substances are combusted to generate steam while the inorganic constituency of black liquor recovered in form of smelt is causticized to generate white liquor. The wastewater mainly contains the organics in condensates and at bleach plant, the substances dissolved during bleaching and the residues of the bleaching chemical. This process is the dominating pulping process worldwide constituting 84% of the world's chemical pulp production and 63% of total chemical and mechanical pulp production.

Bleaching

Bleaching after pulping is a chemical process applied to pulps in order to increase their brightness. All lignin cannot be removed selectively enough in a single bleaching stage, hence at Panpaper pulp is bleached in four stages. The first two stages primarily release and extract lignin, and the subsequent stages removes the lignin residues and finish the product. These bleaching sequences are applied to minimize the bleaching effect of each component are Chlorination, Alkaline extraction, Hypo chlorite and Hypo chlorite (CEHH), depending on the final brightness requirements. Whenever high brightness is required peroxide is incorporated in the bleaching sequence. These bleaching sequences in which chlorine – based chemicals are used are called Chlorine Chemical Bleaching (CCB). Water is used to perform intermediate washes to remove extracted waste from the pulp.

Bleaching with Elemental Chlorine and Hypochlorous acid

Elemental chlorine and hypochlorous acid are electrophilic bleaching chemical agents which react with all unsaturated structures, namely lignin structures, with polysaccharide degradation products, such as hexenuronic acid, as well as with extractive structures that contain carbon – carbon double bonds. These electrophilic bleaching agents are able to react with different unsubstituted aromatic carbon atoms in lignin to either:

- a) Chlorinate (when the carbon is not bonded with an oxygen atom),
- b) Chlorinate and depolymerize (via displacement of an a – hydroxyl group), or
- c) Merely depolymerize without chlorination (via hydroxylation).

These chlorination or depolymerization reactions make lignin alkaline soluble, and it can be removed from pulp in the alkaline bleaching stages of the bleaching sequence.

Formation of 2378 – TCDD/F

Most of the formation of the 2378 – TCDD and 2378 – TCDF is generated in the Chlorination stage via the reaction of chlorine with precursors of TCDD, namely dibenzo – ? – dioxins (DBD), and with the precursor of TCDF which is unchlorinated dibenzofuran (DBF). When these precursors are chlorinated, the key reaction is electrophilic aromatic substitution. The rate of this reaction will depend both on the concentration of the precursor and the concentration of chlorine. The levels of 2378 – TCDD and 2378 – TCDF are not determined by the content of the lignin in pulp.

The chlorination of non – aromatic structures, such as hexenuronic acid, does not lead to the formation of polychlorinated aromatic degradation products. The unchlorinated dioxin precursors are prevalent in certain mineral oils, which are part of some defoamer formulations used in pulp and paper industry and are the major source of precursors. Wood itself may act as the source of dioxin precursor. Compression wood in particular contains higher concentrations of precursors than normal wood. The compression of wood also entails higher levels of coumaryl – type lignin which may be a source of DBD- and DBF – like precursors.

Elimination Mechanisms for 2378 – TCDD/F

Preventing the formation of 2378 – TCDD and 2378 – TCDF in the bleaching will be achieved mainly by decreasing the amount of chlorine used in the first bleaching stage. This can be accomplished by reducing the atomic chlorine multiple by improving washing prior to chlorination by using an oxygen and peroxide – reinforced extraction stage as well as by increase chlorine dioxide substitution.

Measures undertaken to Eliminate/Decrease the Formation of 2378 – TCDD and 2378 TCDF

- Reduction at source i.e. prevent formation by replacing elemental chlorine with chlorine free bleaching chemicals such as chlorine dioxide.
- Reduce use of elemental chlorine decreasing its multiple effects.
- Minimization entry of TCDD and TCDF precursors such as DBD and DBF into the bleach plant.
- Efficient washing of brown stock to enable the reduction of chlorine multiple.
- Efficient screening of the pulp for maximum knot (compression wood) and dirt removal.
- Avoid pulping of chips contaminated with polychlorinated phenols.

Measures/Technologies adopted at Panpaper

- Reduction of the application of elemental chlorine to decrease the multiple effects by introducing peroxide (H₂O₂) in the bleaching sequence i.e. peroxide reinforced extraction stage).
- High delignification i.e. Kappa number 20 - 22 from Kappa number 22 – 26 and efficient washing to reduce chlorine demand during bleaching.
- The mill demand of bleached pulp is only 16 – 20 % of the total daily pulp demand.
- Strict process control monitoring and optimization. To be able to reduce different pollutants simultaneously and to maintain low releases, improved process control is required. Raw material specification and monitoring of raw materials for precursor materials.
- Training, education and motivation of personnel on the measures to reduce discharges of harmful substances.
- Environmental Management System ISO 14001:1996 has been incorporated in process change controls. The system clearly defines the responsibilities for environmentally relevant aspects in a mill. It has raised awareness and includes goals and measures, process and job instructions, check lists and other relevant documentation.

- Monitoring of the releases absorbable organic halides (AOX) in the effluent is carried out on quarterly basis by a reputed laboratory in France. The values are well within the specified limits of IFC/World bank guidelines. (see attached AOX analysis results)
- An environmental Audit is carried out annually to meet NEMA requirement as well as monitoring of the drains from the bleach plant and pulp mill in general.
- Panpaper has carried out a pilot trial on pulp bleaching using enzyme to enhance pulp brightness and reduce use of chlorine/hypochlorite. The trial was not successful to the desired level since the unbleached pulp pH is about 10 instead of 7.0 – 8.5. However a new enzyme to work at pH of 9.5 has been identified for further trial.
- Panpaper produces an average of 60 tons of bleached pulp per day. The Company's bleached products are mainly newsprint (60%), and the rest is distributed to white top kraft liner, cream wove, writing paper. Solid and coated board, etc. Newsprint pulp is bleached to low brightness (78%PV) which results in low chlorine demand. When Panpaper studied the option of adopting ECF bleaching sequence, it was found not economically feasible. In its present situation Panpaper requires over USD 16 million to have elemental chlorine free bleaching plant. Panpaper is prepared to look into this option if long term financial assistance is available.

Of the industrial chemicals, polychlorinated biphenyls (PCB) is used in transformers. Panpaper purchased 20 numbers pyranol (PCB) filled distribution transformers of various capacities ranging from 1MVA to 5 MVA from GE (USA) during 1972/73 and pyranol filled capacitors for power factor correction.

Panpaper contacted the manufacturer (GE – USA) through the supplier in 1999, and it was indicated that in the USA, transformers installed prior to the ban of PCB will be treated under the Grandfather laws (are not subject to the ban, unless of course they develop a leak). However new installations are non – PCB transformers / capacitors. A list of serial numbers of pyranol filled transformers in use were given to the supplier for advice.

From various literatures, it is gathered that there are very few facilities even in advanced countries to dispose off PCBs and PCB contaminated equipment safely. The outstanding is that all PCBs filled equipment had to be replaced with non-PCB filled equipment and old equipment to be returned to disposal facilities for safe disposal. We would like to know the practices followed in advanced countries like USA and Europe where large number of PCB filled electrical equipment are in service.

6.13 LAOS

Slide 1

POPs Enabling Activities Project

Sivannakone Malivarn

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Science Technology and Environment Agency,
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Laos
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Slide 4

1. Co-ordinating Mechanism and Organizing the Process determined
2. POPs Inventory Established and National Infrastructure and Capacity assessed
3. Priorities Set and Objectives Determined
4. National Implementation Plan and specific Action Plans on POPs formulated and.
5. NIP Endorsed by Stakeholders.

Slide 2

Enabling Activities to Facilitate Early Action on the Implementation of The Stockholm Convention on Persistent Organic Pollutants (POPs) in Lao PDR

- ✦ **Laos signed the Stockholm Convention on 5 March 2002.**
- ✦ **UNIDO has the status of Executing Agency with expanded opportunities for implementing GEF projects.**

Slide 5

For POPs inventories

- ✦ We conducted the training for POPs inventories to the task teams
- ✦ Preliminaries inventories for POPs as follow:
 - ✦ Pesticide
 - ✦ PCB
 - ✦ Dioxin/furan

Slide 3

- ✦ **The project started at the middle of 2003**
- ✦ **Duration of the project 2 years.**

Project expected outcomes:
The main outcome of this project is the National Implementation Plan (NIP), which will have been developed by following five steps and appropriate activities such as:

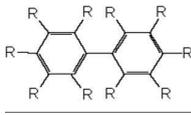
Slide 6

For Pesticides inventory:

- ✦ Almost finished, still in the calculation process (so do not have total number to show in this workshop)
- ✦ The usage of pesticides in Laos is still at a moderate level compared to the neighbouring countries. Legislation is in place, "Regulation on management and Usage of Pesticides"
- ✦ However, prohibited pesticides are still imported and sold on the market.

Slide 7

Polychlorinated biphenyls



- Hazardous properties
- Production & use
- Inventory procedures
- PCBs Management

Inventory of PCBs have been started since the last November 2004 and still in the process, and we have select 10 provinces in 18 provinces for PCBs inventory

Slide 10

Equipment containing PCBs

Identification
Testing and Labeling

Safe use / manipulation / disposal

Safe and controlled waste handling

Slide 8

PCBs Inventories

✦ The inventory process as Follow:

1. Stockpiles
2. Wastes
3. Equipment containing PCBs
4. Polluted sites
5. Unintended emissions

Slide 11

For Dioxin/Furan

Selected sources for inventories as follow:

- Traces of dioxins remains still from the spraying of Agent Orange during the Second Indochina War, also known as the Vietnam War (Take sample and send to Lab for analysis and still waiting for the result it suppose to get with in the last of March 2005)
- Waste Incineration
- Ferrous and non-ferrous metal production
- Uncontrolled combustion (open burning of household waste, forest fire,)
- Power generation and heating
- transportation.
- Production of Mineral Products
- Production and Use of Chemical & Consumer Goods etc...

Some of the Sub-categories that mention in the UNEP guideline are difficult for us to identified due to lack of data.

Slide 9

Inventory of PCBs equipment

- Electro industry
- - other use
- Total amount of using PCBs equipment (Trasformer and Capacitor) about 5193 transformers used in the country and 820 of them are produced before the year 1990 that need to:

Slide 12

Conclusion and finding

The inventories phase still behide the schedule due to

- Lack of local and international experts
- No public awareness on POPs
- Difficult to get some information within the institutions concerned
- In our plan we have to finished all inventories and also the inventory report by the end of May 2005

6.14 LEBANON

Slide 1

Stockholm Convention: Regional Consultation for West Asian Countries on the Draft BAT/BEP Guidelines, Manama, Bahrain 21-23 March 2005

Ministry of Environment Lebanon

Slide 4

Source Categories Existing in Lebanon

Part II of Annex C

Waste incinerators, including co-incinerators of municipal, hazardous or medical waste or of sewage sludge	✓
Cement kilns firing hazardous waste	✗
Production of pulp using elemental chlorine or chemicals generating elemental chlorine for bleaching	✓
Thermal processes in the metallurgical industry:	
-Secondary copper production	✓
-Sinter plants in the iron & steel industry	✗
-Secondary aluminium production	✓
-Secondary zinc production	✗

Slide 2

Background

- Lebanon signed the Stockholm Convention in May 2001 and ratified it in August 2002
- An agreement was made between UNEP Chemicals and MoE (Ministry of Environment) for the development of a NIP for the management of POPs: 12 Countries Project
- NIP Implementation Party → **MoE**

Slide 5

Part III of Annex C

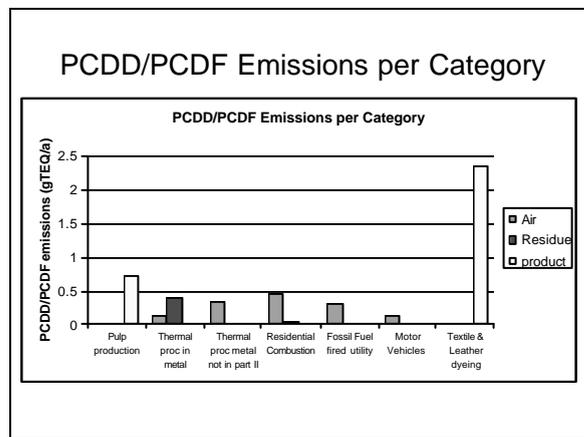
Open burning of waste, including burning of landfill sites	✓
Thermal processes in the metallurgical industry not mentioned in Part II	✓
Residential combustion sources	✓
Fossil fuel-fired utility and industrial boilers	✓
Firing installations for wood and other biomass fuels	✗
Specific chemical production processes releasing unintentionally formed persistent organic pollutants, especially production of chlorophenols and chloranil	✗
Crematoria	✗
Motor vehicles, particularly those burning leaded gasoline:	✓
Destruction of animal carcasses:	✗
Textile and leather dyeing (with chloranil) and finishing (with alkaline extraction)	✓
Shredder plants for the treatment of end of life vehicles:	✗
Smouldering of copper cables	✗
Waste oil refineries	✗

Slide 3

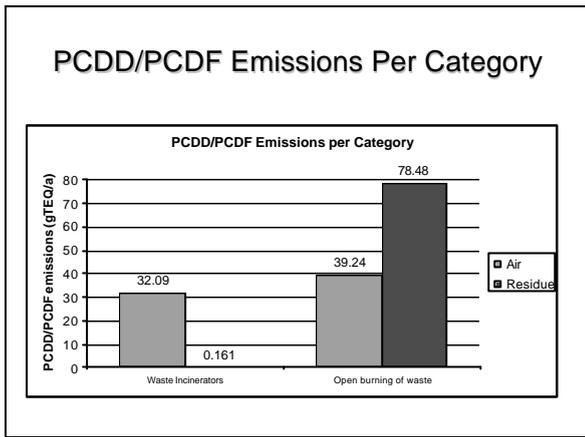
Steps of POPs project

1. **Step 1:** Determination of coordinating mechanisms and organization of process
2. **Step 2:** Establishment of a POPs Inventory and Assessment of National Infrastructure
 - Developing:
 - PCB Inventory
 - Pesticides Inventory
 - Dioxins and Furans Inventory
 - National Profile
3. **Step 3:** Priority Setting and Determination of Objectives
4. **Step 4:** Formulation of a Prioritized and Costed NIP and Specific Action Plans on POPs
5. **Step 5:** Endorsement of the NIP by Stakeholders

Slide 6



Slide 7



Slide 10

Medical Waste

- **Decree 13889 (30/9/2004, replacing 8006) on Health Care Waste promulgated**
 - Provide guidelines on the reduction, collection, transport and disposal of health care waste
 - Infectious waste must be sterilized within 24 hours of their generation
 - Sterilization must be done in facilities certified by MoE after conducting an EIA
- **A GEF/UNDP project titled “Demonstrating and Promoting Best Techniques and Practices for Reducing Health Care Waste to Avoid Environmental Releases of dioxins and Mercury”**
 - Techniques for Waste minimization
 - Segregation of infectious wastes from ordinary wastes
 - Selection and utilization of appropriate waste treatment approaches

Slide 8

PCDD/PCDF Emissions per Category

Categories	PCDD/PCDF Annual Release (gTEQ/a)			
	Air	Product	Residue	Total
Waste incinerators (medical waste)	32.09		0.161	32.251
Production of pulp		0.705		0.705
Thermal processes in the metallurgical industry:				
– Secondary copper production	0.002		0.0252	0.0272
– Secondary aluminium production	0.138		0.38	0.518
Open burning of waste, including burning of landfill sites	39.24		78.48	117.72
Thermal processes in the metallurgical industry not mentioned in Part II	0.348			0.348
Residential combustion sources	0.4455		0.037	0.4825
Fossil fuel-fired utility and industrial boilers	0.302			0.302
Motor vehicles, particularly those burning leaded gasoline	0.1493			0.1493
Textile and leather dyeing (with chloranil) and finishing (with alkaline extraction):				
– Textile		2.247		2.247
– Leather		0.1		0.1
Total	72.71	3.052	79.08	154.85 (150)

Slide 11

Open Burning of Waste, Including Burning of Landfill Sites

Name	Material burned (t/yr)	Air		Residue	
		Emission Factor (mg TEQ/t)	Annual Release (g TEQ/a)	Emission Factor (mg TEQ/t)	Annual Release (g TEQ/a)
Uncontrolled Domestic Waste	130,821.08	300	39.24	600	78.48

Intentional anthropogenic burning is prohibited *but not explicitly* by law. Some regions (local authorities) have started the promotion of recycling, etc. A solid waste management scheme is required.

Slide 9

Medical Waste Incineration

□ 160 Hospitals: 2140 t/yr are incinerated

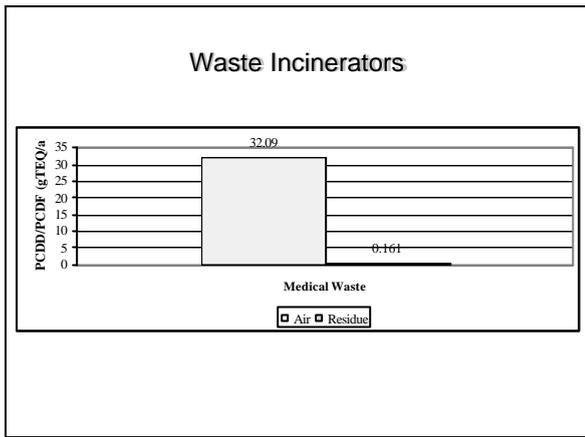
APC Status	Percentage (%)
Uncontrolled batch type combustion, no APC	66.66
Controlled batch combustion, no or minimal APC	33.33

Slide 12

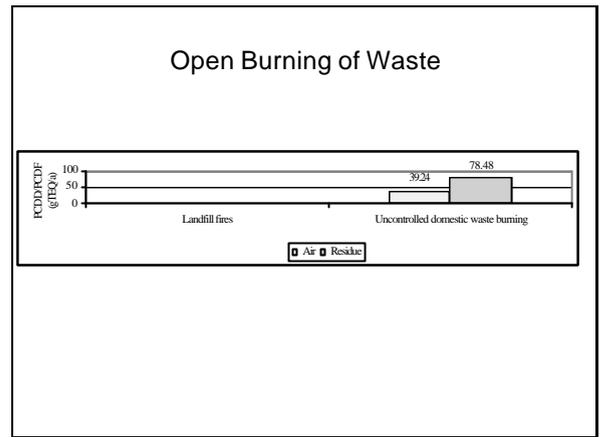
PCDD/PCDF Emissions per Category

Category	PCDD/PCDF Annual Release (gTEQ/a)					Total
	Air	Water	Land	Product	Residue	
1. Waste Incineration	32.09				0.161	32.251
2. Ferrous and Non-ferrous Production	0.488				0.4056	0.8936
3. Power Generation	0.8921				0.037	0.9291
4. Production of Mineral Products	0.41				1.107	1.517
5. Transport	0.1493					0.1493
6. Uncontrolled Combustion	44.98		0.0173		79.748	124.74
7. Production and use of chemicals and consumer goods				3.052		3.052
8. Miscellaneous	0.000517					0.000517
9. Disposal/Landfill		1.203			1.079	2.282
10. Hot Spots						
Total	79	1.203	0.0173	3.052	82.53	165.8

Slide 13



Slide 14



6.15 LIBERIA

Slide 1

ENVIRONMENTAL PROTECTION AGENCY OF LIBERIA (EPAL)

COUNTRY PRESENTATION
ON
BAT AND BEP
PRESENTED BY
HENRY O. WILLIAMS
FOCAL POINT, STOCKHOLM CONVENTION
DATE: APRIL 11, 2005
PRESENTED AT
THE REGIONAL CONSULTATION ON THE
BAT/BEP GUIDELINES FOR THE AFRICAN
COUNTRIES, 11-13 APRIL, 2005

Slide 4

STATUS OF THE STOCKHOLM CONVENTION CONT.

- In an effort to facilitate the on going process to strengthen national capacity and capability to prepare the NIP for the effective management of POPs, a two days Inception Workshop was held on May 18 and 19, 2004 at the YMCA Conference Room in Monrovia. The national inception workshop was very important as it provided an opportunity to gather the various relevant and interested stakeholders to discuss issues of actions, problems and strategies of actions. This was followed by a National Training Workshop on POPs Inventory procedures from 18-20 October, 2004 in Monrovia. The training was done to prepare the Task Teams to conduct POPs inventories. The inventories commenced in November and ended in February 2005. The findings were assessed by the UNIDO Project coordinator in March, 2005 and will be followed by a validation workshop in May 2005.

Slide 2

SITUATIONAL REPORT

- The Environmental Protection Agency of Liberia (EPAL) is responsible for the environment in Liberia. Major environmental projects under the various Convention are implemented by the EPAL. One of the projects being implemented is the Persistent Organic Pollutants (POPs) Enabling Activity Project of the Stockholm Convention. This project is to produce a National Implementation Plan for Liberia.
- STATUS OF THE STOCKHOLM CONVENTION
The Stockholm Convention on Persistent Organic Pollutants was open for signature and adoption at a Diplomatic Conference in Stockholm, Sweden on 22nd May 2001.

Slide 5

BEST AVAILABLE TECHNIQUES AND BEST ENVIRONMENTAL PRACTICES

- The type of activity and technology used for each route (Air, Water, Land, Products etc) determines the emission factors of each activity and without equipment or appropriate technology, this cannot be accurately determined.
- PART II SOURCE CATEGORIES
Polychlorinated dibenzo-p-dioxins and dibenzofurans, hexachlorobenzene (HCB) and Polychlorinated Biphenyls (PCBs) are unintentionally formed and released from thermal processes. In Liberia, these releases can happen in waste incinerators (medical) and Cement kilns, Sewage Sludge and hazardous waste incinerators, however these releases have not been verified.

Slide 3

STATUS OF THE STOCKHOLM CONVENTION CONT.

- The objective of the Stockholm Convention is to protect Human Health and the Environment from POPs. Liberia became a party to the convention on May 23, 2002.
- Article 7 of the Stockholm Convention requires Parties to prepare National Implementation Plans (NIPs) and to assess their countries capacity to implement the plan. The Global Environmental Facility (GEF) is the principal entity entrusted with the operations of the financial mechanism on an interim basis and is required to support the execution of the preparation of NIPs.
- In Liberia, the United Nations Industrial Development Organization (UNIDO) is the GEF implementing Agency for the POPs Enabling Activity.

Slide 6

PART III SOURCE CATEGORIES

- Municipal Waste incineration is done crudely by the open burning system in open dumps some of which are near residential areas. Emission can also occur in firing installations for wood especially in cooking, baking and drying of fish, motor vehicle and waste oil refining. But no data on emissions are available. In conducting the POPs inventory the UNEP Toolkit was used and this was very helpful and useful. The Task Team members tried to look for issues and avenues that prevent or minimizing releases.

Slide 7

MEASURES CONSIDERED IN BEP

- Low Waste Technology: This was hardly in use.
- The use of less hazardous substances cannot be verified
- Recovery and recycling of waste. There are no technologies for recovery and for massive recycling of substances generated and used.
- Good housekeeping and prevention maintenance programs have not been practiced but will now be considered.
- Proper waste management options have been considered but the lack of infrastructure and experts and the political will are hindering progress. The integrated waste management system is not being practiced.

Slide 10

BAT CONT.

- The need to prevent or reduce releases has been stressed in the NIP workshops and the impacts have been clarified during visitations to sites hosting these installations. As these are not pronounced in workplaces the need for occupational health and safety measures at workplaces were stressed during the inventory process and in other workshops. The need for technology transfers should be a must for scientific knowledge to be transferred also. There are also needs to improve combustion and to prevent the formation of Annex C Chemicals. We hope that these observations will be considered in the guidelines that will be developed at the COP. THANK YOU VERY MUCH. MERCI BEAUCOUP

Slide 8

BEST AVAILABLE TECHNIQUE (BAT)

- The concept of BAT is not too prominent in Liberia though this was reflected during the POPs inventory.
- Dioxins and Furans emissions are mostly from the following types of activities/sources:
 - Uncontrolled burning of domestic/municipal waste
 - Domestic heating facilities (wood combustion)
 - Uncontrolled Forest Fires and Agricultural Fires

The Toxic equivalent Factor (TEF) and the Toxic Equivalent Quantity (TEQ) could not be accurately computed as there is no equipment to measure the amount of residue produced.

Slide 9

BEST AVAILABLE TECHNIQUE CONT.

- Thus results are assumed or estimated. There is no local emission factors.
- Incinerators or combustion facilities used in medical waste disposal are locally and crudely built without good emission control systems. Some are poorly located and emissions pollute the surrounding environments. This situation is even made difficult to remedy with the refusal of institutions to allow access to these poorly constructed systems. As a result of these actions there are no emission data and no commissioning dates for the existing installations. Implementation of the BAT will now start since the NIP has started.

6.16 MAURITIUS

Slide 1

Dioxin/Furan Emissions

Enabling Activities for the Stockholm
Convention on Persistent Organic
Pollutants in Mauritius

Slide 2

Data on Mauritius

- Republic of Mauritius: two islands in the Indian Ocean, 550 km distant from each other
 - Mauritius: population 1.2 M
1850 km²
 - Rodrigues: population 36,000
110 km²

Slide 3

Status of Convention in Mauritius

- Signature: 23 May 2001
- Ratification: 13 July 2004
- Convention in force: 11 October 2004

Slide 4

Status of POPs Project

- Started in Dec 2003
- Inventories completed in July/Aug 2004
- Priority Setting in Sept 2004
- In the process of drafting
- NIP document ready by mid June 2005

Slide 5

Inventory for PCDD/PCDFs

- As per UNEP toolkit
- Agreed Emission factors for different processes
- No values for bagasse burning: Emission factors derived from 4 analyses of ash samples coming from bagasse burning

Slide 6

PCDD/Fs Levels in bagasse ash samples

Sample Site	Sample type	[PCDD/Fs] (pgTEQ/g dw)
Medine	Bag-Fly ash after wet scrubbing	1.9
FUEL	Bag-Fly ash after wet scrubbing	0.13
Belle Vue	Bag-fly ash before wet scrubbing	220
Deep River	Bag-fly ash before wet scrubbing	39

Slide 7

Emission Factors for Bagasse burning

- Bagasse fired
 - Annual consumption : 1524383 tons
 - Heat produced : 13719 TJ
 - Emission factors (mg TEQ/TJ of fuel burnt)
 - Air: 500
 - Water : 140
 - Residue: 5
- Annual release (mg Air: 6858.5)
 - Water: 1920.7
 - Residue: 68.6 TEQ)

Slide 10

BAT/BEP For Mauritius

Technical meetings with stakeholders and discussion on the use of Best Available Technology (BAT) and Best Environmental Practices (BEP) to minimise emission of dioxins/furans for the following:

- Bagasse burning
- Uncontrolled waste burning
- Medical waste incineration

Slide 8

DIOXIN INVENTORY FOR MAURITIUS

Annual release of PCDD/Fs per Source Categories for Mauritius for 2003

Source Categories	Annual Releases (g TEQ/a)				
	Air	Water	Land	Products	Residue
Waste Incineration	6.91	NA	NA	NA	0.3
Ferrous + Non-Ferrous Metal Production	0.20	NA	NA	NA	0.67
Power Generation and Heating	6.92	2.01	NA	NA	0.22
Production of Mineral Products	0.00	NA	NA	NA	0.01
Transportation	0.05	NA	NA	NA	NA
Uncontrolled Combustion Processes	5.15	NA	0.32	NA	3.29
Product. of Chemicals + Consumer Goods	NA	NA	NA	0.5	NA
Miscellaneous	0.36	NA	NA	NA	0.00
Disposal/landfilling	NA	3.40	NA	NA	NA
Identification of Potential Hot-Spots	NA	NA	NA	NA	NA
Total	19.59	5.41	0.32	0.50	4.58

Grand total (sum of all release vectors): 30.40 g

Slide 11

Bagasse

- Dry bagasse before combustion: difficult to implement as may not be practicable
- Replace wet scrubbers by appropriate APCS: high cost implication, may be difficult to implement
- Improved Control of combustion process (e.g. temperature, oxygen content, etc.): Already done so as to maximize heat production
- Use of fabric filters for those having ESP: Feasible

Slide 9

Ranking of activities

Activity - Source Category	Total	%	Rank
Power Production - Bagasse	8.85	29.1	1
Uncontrolled Waste burning	6.20	20.4	2
Medical waste incineration	5.51	18.1	3
Landfill leachate	2.82	9.3	4
Accidental fires	1.83	6.0	5
Incinerators owned by CEB*	1.33	4.4	6

UNITS: g TEQ of PCDD/Fs

CEB*: Central Electricity Board

Slide 12

Uncontrolled waste burning

- For Rodrigues: construct proper landfill
- For Mauritius: enforce law, better solid waste collecting system, awareness raising

Slide 13

Medical waste incineration

- No BAT incinerator exists in Mauritius: could be difficult to upgrade as cost implication may be very high
- Segregation of waste so as to minimize waste for incineration: already in place / feasible
- Avoid combusting chlorine containing wastes e.g plastics: feasible
- Increase stack height: feasible
- Construction of Haz. Waste incinerator by 2010: medical waste will also be incinerated

Slide 14

Some comments

Some BAT/BEP may not be possible to implement:

- resistance to change
- economic implication
-

6.17 MONGOLIA

Slide 1

POPs in Mongolia

Dr. L.Jargalsaikhan
National adviser of POPs project

Bangkok, Thailand 7-9 March, 2005

Slide 4

POPs in Mongolia

Objective of enabling activities project

- to strengthen national capacity
- enhance knowledge and understanding amongst decision-makers, managers, the industry, NGOs and the public
- to develop and formulate a National Implementation Plan (NIP)

Slide 2

POPs in Mongolia

Mongolia signed the Stockholm Convention
on
17 May 2002

State Great Hural (Parliament) of Mongolia
ratified the Stockholm Convention
on
7 November 2004

Slide 5

POPs in Mongolia

The main problems of POPs in Mongolia due to the following:

- Lack of data on the quantities of POPs and their geographical locations in the country
- Lack of knowledge of existing alternatives to POPs;
- Low levels of education and awareness among users, decision makers and the general population

Slide 3

POPs in Mongolia

Project entitled "Enabling activities to facilitate early action on the implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs)" has started in Mongolia by support of GEF since 2003

Slide 6

POPs in Mongolia

Activities

Organizing workshops on POPs to discuss risks, causes and possible preventive measures/ alternatives

Education and awareness raising on POPs among the general public, national institutions, scientists, professionals, policy makers, industrialists, etc

Carrying out Inventory of POPs chemicals

Slide 7

POPs pesticides in Mongolia

Name of chemical	Situation in Mongolia
Aldrin	used a little and importation banned since 1997
Chlordane	used a little and importation banned since 1997
Dieldrin	used a little and importation banned since 1997
DDT	used in huge amount until 1990s and importation banned since 1997
Endrin	not used and importation banned since 1997
Heptachlor	not used and importation banned since 1997
Hexachlorobenzene HCB	used and importation banned since 1997
Mirex	not used
Toxaphene	not used and importation banned since 1997

Slide 10

POPs in Mongolia

Name of chemical	Situation in Mongolia
Polychlorinated biphenyls (PCBs)	Used in existing electric transformers, capacitors. Inventory carrying out. Importation banned since 1997 but not banned

Slide 8

Pesticides in Mongolia

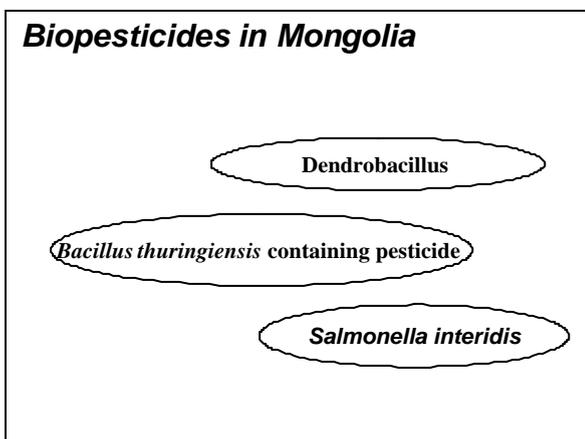
Decis
Sumitsidin
Karate
Cypermetrin
Avermonic
Almonzol

Slide 11

PCB in Mongolia

- 10% of the transformers - Japan, China (1990-2000)
- 90% of the transformers - Russia (until 1990s)

Slide 9



Slide 12

Dioxin and furans in Mongolia

Resources of dioxin and furans:

- Medical waste incineration
- Household heating and cooking
- Power plants
- Cement production
- Lime production
- Brick production
- Asphalt mixing
- Transport
- Waste dump /uncontrolled combustion/
- Textile plant
- Leader plant
- Crematoria
- Sewage treatment
- Metal production

Slide 13

Medical waste incineration

Furness for incineration
of medical wastes

Slide 15

Dioxin and furans in Mongolia

- Fuel gas of most great factories has special filtration system and monitoring

- Small factories hasn't filtration system and monitoring

Slide 14

Household heating and cooking

- Coal
- Wood
- Biomass

6.18 NEPAL

Slide 1

Nepalese Context: BAT&BEP for Reduction of Annex C compounds of Stockholm Convention

Slide 4

Source categories of Nepalese relevance

Domestic Cooking/Heating

- Firewood constitutes the largest source of energy >85%
- Agriculture refuse and animal dung constitute the second biggest cooking energy sources in the rural villages
- Kerosene, LPG and electricity as a cooking energy source limited only to urban population which is > 15% of the total population

Slide 2

POPs Enabling Project

- Nepal signed convention on 5 April 2002
- Took part in almost all INC meetings of POPs
- Not ratified the convention due to technical problem
- Undertaking POPs Enabling project together with UNIDO

Slide 5

Source categories of Nepalese relevance

- Municipal Waste Incineration
 - No municipal waste incinerator exists in the country
 - Solid waste collection < 60% in urban areas
 - Uncollected and non segregated wastes are often open burned
 - Many small urban centers use non segregated wastes (including biodegradable waste) for land filling as a part of land development for construction

Slide 3

Source categories of Nepalese relevance

- Domestic Cooking/eating
- Municipal Waste Incineration
- Health Care Waste Incineration
- Industrial Emission
- Open Burning of Agricultural Refuses
- Secondary production of Al, Cu, Zn, Pb and Fe
- Pulping
- Others

Slide 6

Source categories of Nepalese relevance

- Health Care Waste Incineration
 - No proper hazardous waste incinerator exists in the country
 - A very rudimentary infectious waste burning site at the rear end of the hospital with couple of meter tall stack
 - Guideline for health care waste handling and disposal has been brought recently
 - Kathmandu Metropolis together with private health care center developing a common waste disposal [site](#)

Slide 7

Source categories of Nepalese relevance

- Industrial Emission
 - No Emission Standards enforced for the industry as of today
 - Most of the industries use biomass (rice husks) as major energy sources
 - Coal is used as primary source for brick and cement kilns
 - Kerosene and furnace oil as second major sources of energies in industrial boilers

Slide 10

Source categories of Nepalese relevance

- Pulp and Paper Industry
 - Industrial effluent standards enforced
 - No restriction on using elemental chlorine bleaching
 - Waste water treatment doesn't require PCDD/F reduction requirements

Slide 8

Source categories of Nepalese relevance

- Open burning of agricultural refuses
 - Most of the agricultural refuses are used as primary/secondary energy sources in rural houses
 - Excess refuses are on site open burnt
 - Waste generated from garden/backyard in cities are too open burnt
 - Waste are burnt in dry season, ie, Feb to April

Slide 11

Source categories of Nepalese relevance

- Crematoria
 - Burning the corps is virtually the only method of Cremation
 - Cremation is carried out in the river banks
 - Some of the sites (holy sites for cremation) witness scores of corps burnt every single day

Slide 9

Source categories of Nepalese relevance

- Secondary production of Al, Cu, Zn, Pb and Fe
 - No primary metallurgical industry in the country
 - Domestic collection of scrap and imported scrap are used as metal sources for handicraft and metallic products
 - No guidelines on environmental performance, the basic consideration is installation cost reduction

Slide 12

Source categories of Nepalese relevance

- Inventory is underway, so no clear picture has emerged as yet
- Technology assessment is under way too
- Some policy level works have been done

6.19 PALESTINE

Slide 1

BAT/BEP Experience in Palestine

Manama, Bahrain, 21-23 March 2005

Eng. Atef Jaber
Stockholm Convention Focal Point
Environmental Quality Authority - EQA

Slide 4

Agriculture Waste

- *The agricultural sector generates unknown quantities of empty and unused pesticide containers that are hazardous. These containers end up in adjacent land.*
- *Furthermore, 52% of farmers dispose of unused pesticide solution by pouring them onto soil.*
- *Using expiry pesticides.*
- *About 122 to 132 pesticides have been in use in Palestine, 20 of them are banned or restricted internationally.*

Slide 2

Major Sources of Pollution

- **Industrial Waste**
- **Medical Waste**
- **Agriculture waste**
- **Domestic Sector Waste**
- **Energy Sector Waste**
- **Radioactive waste**

Slide 5

Achievements

- Palestinian Environmental Law**
- Palestinian Environmental Strategy**
- Palestinian Environmental Assessment Policy**
- POPs inventory in Gaza**
- Enabling Activities/UNDP**
- Cooperation with Ministry of Agriculture**

Slide 3

Industry in the Palestine

- Food processing
- Textiles
- Tanneries
- Shoe manufacture
- Metal construction
- Wood furniture
- Aluminum manufacture
- Electronic component manufacture
- Electroplating and surface-coating industry
- Paint

Slide 6

Policy of Ministry of Agriculture

- Using of Alternatives (organic materials)
- Using of biological treatment
- Integrated Pest Management
- Legislations
- Public Awareness

Slide 7

Article (11)

The Ministry, in coordination with the competent agencies, shall issue one or more lists of hazardous substances and wastes

Article (12)

No person shall be authorized to manufacture, store, distribute, use; treat, or dispose any hazardous substance or waste whether it is solid, liquid, or gas, unless in accordance with the orders and directives specified by the Ministry in coordination with the competent agencies.

Slide 10

- Take precautions with regard to asbestos.
- Sample and clean up illegally dumped hazardous waste.
- Establish a collection system for used oil.
- Ensure that settlements manage their hazardous waste.
- Measure the activity of radioactive materials.
- Set up a pilot project for medical waste management.
- Set up a pilot project for the recycling of tyres.
- Process used batteries.
- Take care of sewage sludge and septage.

Slide 8

Pesticides and Fertilizers

Article (14)

The Ministry, in coordination with the competent agencies shall designate the environmental conditions for the import, distribution, manufacturing, use, and storage of pesticides, substances, and agro-chemical fertilizers, which may pose hazards to the environment.

Article (15)

The Ministry, in coordination with competent agencies, shall set instructions and standards specified for the agro-chemicals that are allowed to be imported, manufactured and distributed in Palestine.

Slide 11

Gaza Hazardous Waste Cell:

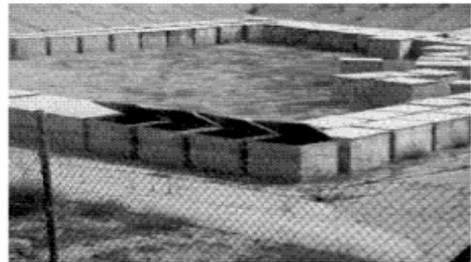
- It is used for expired medicine and chemical laboratory waste,
- The concrete cell has a life span of eight years only
- It receives both liquids and solids wastes. But these wastes are not treated before permanent storage.

Slide 9

Recommendation of the Desk Study

- Establish state-of-the-art sanitary landfills.
- Increase the level of recycling.
- Apply the polluter pays principle.
- Classify and separate hazardous waste.
- Introduce regulations and other policy tools.
- Minimize the amount of hazardous waste.
- Establish a cleaner production centre.
- Introduce economic incentives.
- Launch public awareness campaigns.

Slide 12



Hazardous waste temporary storage facility in Gaza

6.20 PHILIPPINES

Slide 1

Priority Setting for the NIP

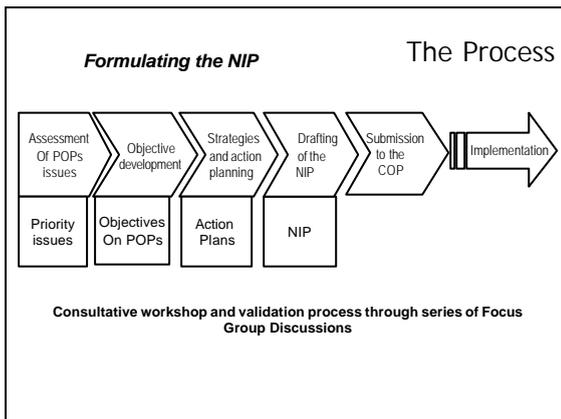
Dioxin & Furan

Slide 4

Cont'd Objective no.2

- o Assist LGUs to issue resolution and/or enact ordinances to promote BAT/BEP for D/F
- o Coordinate with DeptEd and CHED to integrate BAT/BEP in the curricula ;
- o Develop incentives/rewards system for D/F sources adopting BAT/BEP
- o Develop and adopt financing program for sources adopting BAT/BEP
- o Develop performance evaluation of the BAT/BEP

Slide 2



Slide 5

Objective No. 3 Formulate and enforce appropriate policies and regulations

- o Set up experts group to initiate the activities
- o Review existing local and international regulations and policies pertaining to D/F
- o Require new sources to adopt BAT/BEP and EIS system
- o Include BAT/BEP in the occupational health and safety standards in reporting requirements
- o Set ambient criteria and standards for emissions for BAT/BEP
- o Enforce and monitor compliance

Slide 3

Objective No. 2 Develop and Implement BAT/BEP promotion, adoption and monitoring programmes within 3 years across at least four of the significant D/F source categories

- o Set up experts group to initiate the activities;
- o Identify the four significant d/f categories;
- o Identify BAT/BEP appropriate to the four significant D/F sources and set performance criteria for each BAT/BEP
- o Develop and implement BAT/BEP/IEC programmes ;

Slide 6

How do we achieve our Goal?

- o (1.) Integration of issues on policy, management and technology
- o (2.) From awareness raising to acquiring practical skills
- o -from concept to practice-

Slide 7



Slide 10

DOST - Industrial pollution prevention and control guidelines for industries

- o Objective: to help them reduce pollution generation and treat residuals; (R& D on management of plastics residual wastes from municipal solid wastes;
- o cleaner production and energy efficiency guidelines to reduce energy consumption;

Slide 8

Existing BAT/BEP guidelines

- o Pollution prevention
- o cleaner production
- o energy efficiency
- o waste treatment

Slide 11

Development Bank of the Philippines

- o Published environmental management guidebooks for manufacturing and service sectors to orient bank account executive and potential clients on the benefits of properly managing environmental impacts;
- o Also includes environmental management systems;

Slide 9

EMB- Industrial Environmental Management Program

- o Production of Pollution management guides for 10 industry sectors:
 - industry profiles
 - waste generation and characteristics
 - waste minimization options
 - financial evaluation of options;

Slide 12

Department of Energy

- o Pursuing a renewable energy program:
 - do not require combustion
 - promotes the usage of methyl esters and ethanol to fuel the transport industries
 - renewable energy fuels do not have chlorine and therefore should not be a source of D/F

Slide 13

Department of Agriculture and
Department of Health

- o Integrated Pest management
- o Integrated vector management

6.21 SAMOA

Slide 1

Samoa's Experiences and Case Studies of BAT and BEP

Regional consultation on draft
BAT/BEP Guidelines for the Asia
Pacific countries, Wellington, NZ,
2-4 March 2005

Slide 4

NIP Strategy for Reduction of Releases of Unintentional POPs:

- Actions 1. Regulatory frameworks to promote the reduction of unintentional releases... from incomplete combustion processes, such as internal combustion engines & power generation plants
- 2 Improve air pollution control systems for all major technology, eg incinerators & industries
- 3 Implement actions of the Waste Management Strategy which supports separation of higher dioxin releasing chemicals
- 4 Further assess and monitor the releases of dioxins/ furans

Slide 2

Contents

- * Samoa Case Study
- * UNEP Questions

Slide 5

National Actions Implementation

- * National Waste Management Policy Implementation – Recycling, Encouragement of Environmentally friendly technology for disposal
- * Fukuoka Landfill system
- * National solid waste collection
- * Tin and aluminum cans and metal recycling (Tafaigata)

Slide 3

Samoa Case Study

- Enabling Activity C Assess National Infra-structural and Institutional Capacity, 3 Assess capacity to establish ...BAT and ...BEP for POPs source categories – Natl. Task Team agenda
- Annual Reports 2002, and 2003 note lack of capacity for BAT/BEP
- Institutional Capacity Assessment Report p.34 H2.1 Natl. legislation for dioxins/ furans:
 - LSE Act 1989 (burning on Gov't. land only);
 - Forest Act 1967 regulate lighting fires on all lands;
 - Remedial actions/ Options "Reduction using BAT/BEP"
- NIP Section 3.3.3.3 Unintentional Introduction of POPs: Dioxins and furans' last paragraph:
 - "Nevertheless, complacency in reducing dioxins and furans could pose some impacts in the future if appropriate Best Environmental Practices (BEP) and Best Available Technology (BAT) options are not used for waste incineration and transport in particular."

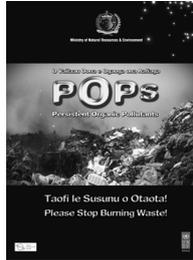
Slide 6

National Actions Implementation cont'd

- * National Health care Waste Management plan
- * Waste Separation
- * New Incinerator – double chamber
- * New vehicle testing station – targets control of emission levels (need proper equipment)
- * Public Awareness for emission reduction – T-shirts, video, TV Spots, Poster

Slide 7

"Please Stop Burning Waste!" Poster



Slide 10

Improvement including Sub-regionally?

- INC7 query of releases in breast milk and perhaps also blood serum
- Article 5(a) "Develop an action plan or, where appropriate, a regional or sub-regional action plan within 2 years of the date of entry into force... implementation plan specified in Art.7... Annex C & to facilitate implementation of subparagraphs (b) to (e)... Promote, in accordance with its action plan, the use of BAT & BEP – nationally driven hence locally based prioritization
- Canada consultations report of higher dioxin-producing coastal firewood (20-90 times inland) –same kind of information for our sub-region
- Recognition of regional legal instruments in the transfer of BAT and BEP

Slide 8

UNEP Questions - Guidance document comprehensive?

Revisions noted:

- Added to Introduction IC Chemicals listed in Annex C: Definitions, Risks, Toxicity; Refs. could include: <http://pops.gpa.unep.org> for dioxins etc
- Added IE Relationship to Basel Convention but not Regional (eg, Waigani)
- Add IIC1 Health, safety and environmental consideration
- Added IIIC Cross-cutting considerations
- Added IV Compilation of summaries of Sections V & VI
- Added V & VI Summary boxes
- Deleted Annex I Applicable existing national and sub-national standards, guidelines or guidance for BAT.
- Annex II References in relevant sections. eg IIIC(ii)/(iii)

Hence generally comprehensive.

Slide 11

Ways/ means to provide additional input?

- formerly through Subregional expert (Pacpops@yahoogroups.com)
- COP1
- Processes/ mechanisms for future development of GD?
- Experts Group BAT/ BEP (EGB) cont'd., &/ or COPs refer to reconstituted EGB
- Possibility of new grouping spearheading negotiations?

Slide 9

Guidelines User friendly?

- Revisions largely so, eg IC & IE; IIC1, IIIC, IV, V & VI Summary boxes; but deleted Annex I standards useful;
- deleted Annex II references more accessible in sections
- Abbreviated form for Small Island Developing States/ LDCs would be more so, eg pp.1-50, 82f medical waste, 162f open burning, & 287f motor vehicles

6.22 SRI LANKA

Slide 1

Experience in Addressing
BAT/BEP in the
Development of NIP in
Sri Lanka

Slide 4

Uncontrolled Combustion

	Activity statistic	Estimated annual release, g I-TEQ			
		Air	Water	Land	Residue
Landfill fires	25,000 t CMC 73,500 t (rest of country)	98.5	ND	ND	ND
Accidental fires in buildings	No data	ND	ND	See residues	ND
Uncontrolled burning of domestic and other wastes	44,000 t	13.2	ND	See residues	26.4
Accidental fires in vehicles	No data	ND	ND	ND	ND
Open burning of waste wood	No data	ND	ND	ND	ND
Total		112			26.4

Slide 2

Status of NIP Implementation

- The project is in five phases:
 1. Establishment of Coordinating Mechanism and Process Organisation;
 2. Establishment of POPs Inventories and Assessment of National Infrastructure and Capacity;
 3. Priority Assessment and Objective Setting;
 4. Formulation of National Implementation Plan; and
 5. Endorsement and Submission of NIP.

Slide 5

Policies and Strategies

- National Strategy for solid waste management
- National CP Policies and Strategy (Action Plan under preparation)
- Sectoral CP policies (under preparations)
 - Manufacturing industries
 - Agriculture
 - Fisheries
 - Health
 - Forestry

Slide 3

Major findings of the Inventory of the unintended by products (g I-TEQ)

No.	Main Source Categories and Subcategories	Air	Water	Land	Product	Residue
1	Waste Incineration	20.3	0.055			0.133
2	Ferrous and Non-Ferrous Metal Production	5.52				49.8
3	Power Generation and Heating	19.3				0.096
4	Production of Mineral Products	1.37				0.002
5	Transport	0.54				
6	Uncontrolled Combustion Processes	121				29.4
7	Production and Use of Chemicals and Consumer Goods				0.446	
8	Miscellaneous	3.46				0.074
9	Disposal		0.024		6.0	0.022
	Total	171	0.079		6.450	79.5

Slide 6

Comments on the BAT/BEP Guidelines

1. Inadequate coverage of traditional source categories
2. Difficulties in monitoring
3. Absence of site/location/regional specific BAT/BEP
(Uncertainty in emission factors in relation to open burning of domestic waste etc.)

6.23 SYRIA

Slide 1

UNITED NATIONS ENVIRONMENT PROGRAMME
Secretariat of the Stockholm Convention
UNEP-Chemicals UNEP/ROWA

Regional Consultation on the Draft BAT & BEP
Guidelines for the West Asian Countries
Manama, Bahrain, 21-23 March 2005

Syrian Presentation
Prepared by :
Dr. Marwan Dimashki and Eng. Fouad El-OUK

Slide 4

III – Potential sources of PCDD/PCDF in Syria

1- Waste incineration :

- Medical/Hospital waste incineration is practiced at several sites in Syria with uncontrolled batch combustion. A recent visit and emissions measurement (NO_x, SO₂, CO, and Soot/Particulates) of the medical waste incineration plant in Najha (40 Km south of Damascus) had shown that the plant is operated under poor combustion conditions with no control of emissions to air and land.
- Illegal municipal solid waste burning.

Slide 2

I – The status of the Stockholm Convention implementation in Syria

- Syria signed the convention in February 2002.
- Achieved the N.C.P in 2002
- Achieved a preliminary PCBs inventory in 2003.
- Achieved a preliminary inventory on POPs pesticides in 2003.
- Signed an agreement with GEF/UNEP at the end of 2002 to develop and achieve NIP for POPs . The first stage of the project was executed and necessary arrangements were made to perform and to develop the required inventories. Nevertheless, and for administration difficulties/reasons, there have been a considerable delay in performing the inventories since the beginning of 2004, however, steps have been taken forward to finish and complete the inventories before the end of 2005.
- Took the action to ratify the Stockholm convention. It is anticipated that Syria will ratify the convention before the middle of this year in this year.

Slide 5

2- Ferrous and Non-Ferrous metal production:

- Hama Iron Plant for processing clean and dirty iron scrap, has limited control on emissions to air, water, and land.
- Coke production in Homs refinery , no cleaning of exhaust and flue gases.
- Copper smelting and casting in small workshops, uncontrolled emissions.
- Processing scrap Al, minimal treatment of inputs, simple removal.
- Recycling of lead from scrap batteries. No control of emissions to air and land.

Slide 3

II – Regarding the materials Annex (c)

- There are no information or data on the emission levels of Dioxins and Furans nor on their concentrations in the Syrian environment. This is due to the lack of analytical capabilities for accurate determination of PCDD/PCDF in environmental samples.
- According to the preliminary inventory of PCBs, it was demonstrated that there are a small number of transformers contained PCBs and some analysis data available for the Syrian coast area.
- The use of HCB is banned by to Ministry of Agriculture.

Slide 6

3. Power generation and heating:

- There are 8 thermal power plants in Syria powered by fossil fuels (figure below is the electric power plant in Banyas on the Syrian coast, which uses heavy fuel oil). It should be mentioned that most of the thermal power plants in Syria use a combination of heavy fuel oils and natural gas for combustion. Nevertheless, most power plants in Syria are also still lacking a proper air pollution control equipment to prevent or minimize air emissions, including releases of PCDD/PCDF).
- Domestic heating and cooking with fossil fuels (mainly Diesel oil for space heating and LPG for cooking).

Slide 7

4- Mineral products:

- Cement production: There are 7 cement production plants in Syria, utilizing the dry production method. Most of them are fitted with cyclones and electrostatic precipitators, and some with bag-house filters. However, maintenance and operation of these air pollution control equipment is often poor. Nevertheless, It should be mentioned that cement plants in Syria do not burn refuse, wastes, or hazardous wastes. They burn heavy fuel oils or natural gas.

Slide 10

6- Uncontrolled combustion processes:

- Open burning of municipal solid waste: intentional, accidental, or spontaneous burning of municipal wastes in barrels, dumps and landfills do happen sometimes due to the high ambient temperatures usually encountered in summer.
- Accidental fires: The recent devastating forest fire in Latakiah on the Syrian coast (2004) had demolished about 2000 hectares. Of course the estimated releases of PCDD/PCDF will be entered into the national inventory using the emission factors available in the toolkit.
- Burning of biomass and agricultural residues: the burning of biomass is usually practiced in villages, countryside, and remote areas. Indeed, the burning of agricultural residues is usually practiced in the east and northern eastern part of the country after harvesting wheat, corn, and other crops.

Slide 8

- Lime production ; Brick production ; Glass production; Ceramics production.
- Asphalt mixing: asphalt mixing plants are a major source of air pollution in Syria . Some are owned by municipal governments, and some by the private sector. Some employ wet scrubbers and some utilize bag house filters. emission of dust and particulate matter to the atmosphere.

Slide 11

7- Production and use of chemicals and consumer goods:

- Pulp and paper production: there is only one plant in the eastern part of Syria, owned by the government for the production of pulp and paper . The plant produces chlorine (by the Mercury method) for bleaching the pulp. However, the plant suffers from malfunctioning and improper operations.
- Chemical and petrochemical industry: major chemical industries are the chemical fertilizer production and LAB.
- Petroleum industry: There are only two oil refineries in Syria (Homs and Banyas)
- Textile production
- Leather refining: leather refining is an old industry in Syria and mainly concentrated in Damascus and Aleppo.

Slide 9

5-Transport:

The transport sector is a major source of air pollution in large cities in Syria like Damascus and Aleppo. The photo below (left) shows the magnitude of air pollution problem indicated by the brownish air shed over Damascus, mainly caused by the huge amounts of soot emitted by diesel engines (right photo).

However, it should be mentioned that petrol vehicles in Damascus and Aleppo are mostly powered by unleaded petrol, which are known to have lower PCDD/PCDF emissions than leaded petrol (UNEP Toolkit 2003).

Slide 12

8 – Miscellaneous:

- Dry cleaning
- Tobacco smoking

9 – Disposal/ landfill:

- Landfill and waste dumps
- Sewage and sewage treatment
- Composting

10 – Hot spots:

- Production sites of chlorine: in 2003 a proposal was granted the permit for the construction of a Chlorine/Alkaline production plant 40 Km east of Aleppo.
- PCBs – filled transformers
- Dumps of wastes.

Slide 13

IV – Some facilities exist in Syrian activities may reduce the PCDD/PCDF

- cyclon ,fiber ,electrostatic filters in cement factories.
- Using the natural gas instead of fuel oil in cement factories
- Extend the composting method for municipal waste
- Encouraging recycling the mineral used oil instead of burning
- Using the natural gas in power generators plans instead of Heavy fuel oil

Slide 15

2. The BAT/BEP Guidelines document is user friendly and structured and organized in a way that users can look-up for the primary and secondary measures for different source categories in a similar manner.
3. More information is still needed on the emissions and releases of PCDD/PCDF from waste oil refining, as this sector is growing in some developing countries. Also, to include in the future an appendix on names and addresses of suppliers of techniques and BAT for the reduction of PCDD/PCDF releases.
4. To establish a sub-site at UNEP-Chemical Web-site for frequently asked question regarding BAT/BEP.
5. To hold regional workshops and training courses for decision makers and responsible authorities describing and illustrating the benefits of using the BAT/BEP. Also, to hold regional courses for “training of trainers” on BAT/BEP and how to use the guideline document with some illustration from local and regional case-studies.

Slide 14

V – Comments and answers to UNEP/Chemical questions on the BAT/BEP Guidelines Document

1. From a regional and international perspective, we believe that BAT/BEP Guidelines can be considered as general standardized and universal guidelines which can be used by different countries around the world in order to fulfill their obligations to the Stockholm Convention for the reduction of Dioxins/Furans releases into the environment. The document is comprehensive and covers all the source categories listed in Annex C of the Stockholm Convention. However, from a national and local perspective, we believe that the present BAT/BEP Guidelines did not address the limitations and obstacles, which might restrict the application of BAT/BEP in different countries due to the :
 - lack of appropriate techniques (BAT) in the local markets,
 - lack of skilled personnel for operation and maintenance of BAT,
 - Lack of sufficient financial resources required for installation and operation of BAT, and
 - the social and economic conditions of the country.

6.24 TANZANIA

Slide 1

Dioxin and Furans Inventory and Action Plan: Tanzania Experience

Prof. JHY Katima

Slide 4

Sources

- ✓ Mineral Production (e.g. cement production, lime production, brick production, glass production, ceramics production, and asphalt mixing)
- ✓ Transport (all types of engines)
- ✓ Uncontrolled combustion processes (e.g. biomass burning, Waste burning and accidental fires)
- ✓ Production and use of Chemicals and consumer goods (e.g. pulp and paper mills, Chemical industry such as Cl₂, chlorophenols etc. petroleum refinery, textile industry, leather plants)
- ✓ Miscellaneous (e.g. Drying of biomass, crematoria, smoke houses, dry cleaning residue, tobacco)

Slide 2

Definitions and Their Formation

- Dioxins is a short form of Polychlorinated dibenzo-p-dioxins (PCDD)
- Furans stands for Polychlorinated dibenzofurans (PCDF)
- They are formed as unintended by-products of thermal and chemical processes.
- They may also be present in manufacturing processes as raw materials.
- PCDD/PCDF are persistent in the environment and transfer can occur between media.
- The inventory focussed on activities under direct human control

Slide 5

Sources

- ✓ Disposal/landfill (e.g. landfills and waste dumps, sewage/sewage treatment, composting, open water dumping, waste oil disposal)
- ✓ Hot spots (production sites of chlorinated organics, chlorine, chlorinated phenols etc.)

Slide 3

Sources

- Sources of PCDD/PCDF include:
- ✓ Waste Incineration (e.g. municipal waste incineration, Hazardous waste incineration, Sewage sludge incineration, waste wood and biomass incineration etc.)
- ✓ Ferrous metal and Non-Ferrous Metal Production (e.g. Iron ore sintering, coke production, Iron and steel production, copper production, aluminium production, lead production, zinc production etc.)
- ✓ Power generation and heating (e.g. fossil power plants, Biomass power plants, Landfill/Biogas gas combustion, Household heating and cooking (Biomass), Domestic heating (Fossil fuel))

Slide 6

Methodology

- Literature and documentary review
- Field visits (15 Regions of the United Republic of Tanzania and about 100 companies/institutions were visited)
- The survey instruments were mainly the standard questionnaire provided in Standardised Toolkit for Identification and Quantification of Dioxin and Furans Releases
- Emission factors provided in the toolkit were applied throughout the study

Slide 7

Methodology

- Extrapolation of results was based on national statistical data such as population, per capita energy consumption, per capita waste generation, land use etc.
- Identified potential sources in Tanzania were: Medical Waste Incineration, Iron and steel production and foundries, Fossil Fuel Power Plant, Biomass Power Plants, Household heating and cooking, Cement Production, Lime Production, Brick Production, Glass Production, Transport and uncontrolled combustion

Slide 10

Results

- Key
- A = Waste Incineration
- B = Ferrous and non-ferrous metal production
- C = Power generation and heating
- D = Production of Mineral Products
- E = Transport
- F = Uncontrolled combustion processes
- G = Production of chemicals and consumer goods
- H = Miscellaneous
- I = Disposal/land land filling
- J = Hotspots

Slide 8

Results

	Annual release (g TEQ/a) Air	Annual release (g TEQ/a) Water	Annual release (g TEQ/a) Land	Annual release (g TEQ/a) Product	Annual release (g TEQ/a) Residual
A	112.84	0	0	0	0.017
B	0.23	0	0	0	0.044
C	12.89E3	0	0	0	0.3038
D	0.807	0	0	0	0.0310
E	0.599	0	0	0	0

Slide 11

Results Continued

- Information Gaps
- ✓ There is a serious lack of information on unintended releases. As such information is still needed in the following areas: unintended waste burning, accidental fires, production and use of chemicals, miscellaneous, disposal/landfill and hot spots.
- ✓ In other areas of potential releases there was reluctance to release data (e.g. from crematorium).
- ✓ Also the absence of concrete emission factors in the tool kit for specific releases (specific in Tanzania/developing country) context
- ✓ And the diffusive nature of the information required.
- ✓ contributed to the information gap.

Slide 9

Results Continued

	Annual release (g TEQ/a) Air	Annual release (g TEQ/a) Water	Annual release (g TEQ/a) Land	Annual release (g TEQ/a) Product	Annual release (g TEQ/a) Residual
F	2.50E3	0	38.8	0	0
G	0	0	0	0	0
H	0.00037	0	0	0	0
I	0	0	0	0	0
J	ND*	ND	ND	ND	ND
Total	15.51E3	0	38.8	0	0.39582

Slide 12

Results Continued

- Existing Management Practices
- ✓ There are air pollution control systems in for example cement factories (electrostatic precipitators), foundry factories (scrubbers) etc. While these may be reducing the amount of PCDD/PCDF released into the environment their efficiency was not established.
- ✓ However, it should be mentioned that these were not installed for the purpose of controlling PCDD/PCDF.

Slide 13

Results Continued

- Existence of capacity to monitor PCDD/PCDF
- ✓ There is neither experience no capacity to monitor PCDD/PCDF releases in Tanzania this may be attributed to the fact that the subject matter is quite new.

Slide 16

Constraints

- Low knowledge / awareness
- Lack monitoring (infrastructure/personnel)
- Size of installations are small (installation of BAT may be expensive)
- Diffusive nature of Dioxins/Furans sources
- Lack of standards
- Lack of appropriate emissions factors
- Weak institutional framework (e.g. lack of enforcement)

Slide 14

Results Continued

- Best Available Technologies and Best Environmental Practices
- ✓ Currently this area is still being worked upon globally. The survey did not establish any in Tanzania.
- ✓ This is an area where we need to build national capacity.

Slide 17

Action Plan Development

- The PCDD/PCDF management comprises of both mandatory and discretionary elements, therefore the NIP focuses on:
 - **Policy and Legislative Issues**
 - **Institutional arrangement**
 - **Capacity Building**
 - **Training and Research**
 - **Awareness Raising**

Slide 15

Results Continued

- Information Dissemination Strategies
- ✓ Unfortunately there is lack of planned information platform except occasional advertisements.
- ✓ But there exist several environmental dissemination initiatives which have been successfully conducted or are still being conducted that may be used to experience from, for the dissemination of PCDD/PCDF issues. Some of these are covered in my next presentation.

Slide 18

Action Plan Development (Policy and Leg. Issues)

Issue	Strategy
Efficacy of existing policies and Legislation	Review of relevant policies and legislations
Availability of Test methods	Develop emission standards, monitoring schemes, national emission factors, upgrade test labs, accreditation of some labs
Safety data sheets	Develop a mechanism for communication on PCDD/PCDF releases
Reduce overlaps in jurisdictions	Streamline of government departments to reduce overlaps

Slide 19

Action Plan Development (Policy and Leg. Issues)	
Issue	Strategy
Incorporation of a rights-based approach	Right to know and right to clean and safe environment to be incorporated into law
Institutional co-ordination	Develop a structure for coordination
Compliance and enforcement	Strengthen enforcement agencies

Slide 22

Action Plan Development (Public Information and Awareness)	
Issue	Strategy
Training programmes	Develop training programmes commensurate to the needs of different target groups Prepare tailor made short courses for practitioners
Professional development initiatives	Support professional development programmes for workers working in PCDD/PCDF prone areas
Research	Support research activities that may enhance the understanding of PCDD/PCDF releases and their impacts to human health
Capacity of NGOs that may be used in the training	Strengthen/support NGOs that are working on PCDD/PCDF issues

Slide 20

Action Plan Development (Institutional Framework)	
Issue	Strategy
Capacities of existing institutional	Strengthen: OSHA (occupational health and safety), GCLA and some private/public labs (analytical methodologies) OSHA and Municipal Councils (occupational health related to waste management), DoE and NEMC (classification of PCDD/PCDF impact on the environment)
Co-ordination	Strengthen inter-ministerial technical committees, Government department, NGO, Public Interest Group etc.
Compliance and enforcement	Strengthen enforcement capabilities
Support for NGO implementing agencies	Facilitate/improvement of knowledge and skills

Slide 23

Action Plan Development (Public Information and Awareness)	
Issue	Strategy
Information	Put in place a mechanism to collect, store and disseminate information on PCDD/PCDF Adapt/adopt information for use in Tanzanian situation
Create, Strengthen and extend existing awareness raising programmes to include PCDD/PCDF	<ul style="list-style-type: none"> Review content of the awareness raising programme Make use existing environmental management programmes Identify awareness raising providers Put in place monitoring framework for awareness raising programmes

Slide 21

Action Plan Development (Capacity Building)	
Issue	Strategy
Capacities of to monitor	Strengthen capacities of relevant institutions in monitoring
BAT and BEP	Build capacity to analyse suitable BAT/BEP and implement them
Appropriate Technology	Develop capacity to develop appropriate non-combustion processes

Slide 24

Action Plan Development (Public Information and Awareness)	
Issue	Strategy
Establish and implement specific interventions, such as awareness raising, to assist community, shop floor stewards etc	<ul style="list-style-type: none"> Specific interventions and assistance will be required by other sectors to facilitate implementation of initiatives within the communities, especially to communities living close to contaminated sites. For workers and shop floor stewards this could include introduction of hazard communication information into the educational curricula, extending chemical safety awareness programmes industry associations, labour federations, environmental organisations and CBOs.

Action Plan Development (Public Information and Awareness)

Issue

Harmonise awareness raising within and along the value chain

Strategy

- Co-ordination of programmes within each sector and in the sectors along the product life cycle. This will ensure that all target audiences are addressed and where feasible co-ordinated cross-sectoral programmes are implemented.

6.25 TOGO

Slide 1

**ELEMENTS DU PLAN D'ACTION NATIONAL
POUR LA GESTION DES SUBSTANCES
INSCRITES A L'ANNEXE C DE LA
CONVENTION DE STOCKHOLM**

PRESENTATION DU TOGO

Prof Komla Sanda
Coordonnateur technique du Projet POPs

Slide 4

**SITUATION NATIONALE SUR LES SOURCES
DE REJETS (Article 5; REF: ANNEE 2002)**

Conclusion

Les catégories nationales identifiées et quantifiées incluent:

Incineration des déchets biomédicaux (Cat. 1);
Procédés de combustion non contrôlés (Cat. 6);
Génération d'électricité et le chauffage (Cat. 3);
Transports (Cat. 5);
Production des minéraux (Cat. 4);
Traitement/décharge (Cat. 9);

Slide 2

**SITUATION NATIONALE SUR LES SOURCES
DE REJETS: INVENTAIRE INITIAL**

METHODOLOGIE

Utilisation de la Méthodologie standardisée du "Toolkit" pour identifier les sources pertinentes et quantifier leurs rejets annuels afin de calculer la contribution nationale durant l'année de base (2002)

Slide 5

**SITUATION NATIONALE SUR LES SOURCES
DE REJETS (Article 5; REF: ANNEE 2002)**

Conclusion

Les rejets se font essentiellement dans:

Air;
Terre;
Résidus

Slide 3

**SITUATION NATIONALE SUR LES SOURCES
DE REJETS (Article 5; REF: ANNEE 2002)**

Cat	Catégories de Sources	Rejets Annuels (g TEQ/a)				
		Air	Eau	Terre	Produits	Résidus
1	Incineration de déchets	40,00	NA	NA	NA	0,20
2	Production des métaux ferreux et non ferreux	NA	NA	NA	NA	NA
3	Génération d'électricité et chauffage	10,57	NA	NA	NA	9,99
4	Production des produits minéraux	0,15	NA	ND	ND	0,00
5	Transport	0,63	NA	NA	NA	ND
6	Procédés de combustion non contrôlés	380,58	0,00	13,96	0,00	62,40
7	Production de produits chimiques, biens de consommation	0,00	0,00	0,00	0,00	0,00
8	Divers	0,00	NA	NA	NA	0,00
9	Procédés de traitement/décharge	0,05	0,12	NA	NA	0,00
10	Identification des points chauds					
1-9	Total	431,98	0,12	13,96	0,0	72,39

Slide 6

**ELEMENTS DU PLAN D'ACTION
NATIONAL: PRIORITES**

Les priorités identifiées incluent:

Adaptation de l'outil standardisé « Toolkit » au contexte national afin de mieux caractériser l'ensemble des sources avérées et potentielles (secteur informel);

Création de nouveaux formats de statistiques nationales adaptés aux exigences de collecte des données d'activité;

Recours aux BAT/BEP selon que faisable dans le contexte national

Slide 7

ELEMENTS DU PLAN D'ACTION NATIONAL: PRIORITES

Les priorités identifiées incluent:

Adaptation de l'outil standardisé « Toolkit » au contexte national afin de mieux caractériser l'ensemble des sources avérées et potentielles (secteur informel).

Il s'agit surtout de caractériser un certain nombre d'activités:

- Teinturerie artisanale
- Fonderie artisanale (Al; Pb; Cu, etc.)
- Activité de forge
- Pyrolyse du bois en charbon
- Sciage du bois (Scie électrique)
- Etc.

Slide 10

ELEMENTS DU PLAN D'ACTION NATIONAL: PRIORITES

Les priorités identifiées incluent:

Recours aux BAT/BEP selon que faisable dans le contexte national

2- Contrôle des feux de brousse (Cat. 6)

En quoi consisteraient les BAT/BEP dans ce cas?

Slide 8

ELEMENTS DU PLAN D'ACTION NATIONAL: PRIORITES

Les priorités identifiées incluent:

Création de nouveaux formats de statistiques nationales adaptés aux exigences de collecte des données d'activité

Les services nationaux pourvoyeurs de statistiques doivent être renforcés pour rendre disponibles des données fiables notamment en ce qui concerne:

- Le secteur des déchets municipaux
- Les déchets médicaux/biomédicaux
- Les feux de brousse
- La biomasse-énergie
- Etc.

Slide 11

ELEMENTS DU PLAN D'ACTION NATIONAL: PRIORITES

Les priorités identifiées incluent:

Recours aux BAT/BEP selon que faisable dans le contexte national

3- Gestion écologique des déchets solides municipaux (Cat. 6)

Encourager le tri, la réutilisation, le recyclage.

Encourager le compostage de la fraction biodégradable (le compostage génère moins de dioxines/furanes que le brûlage non contrôlé)

Slide 9

ELEMENTS DU PLAN D'ACTION NATIONAL: PRIORITES

Les priorités identifiées incluent:

Recours aux BAT/BEP selon que faisable dans le contexte national

1- Elimination écologique des déchets médicaux/biomédicaux (Cat. 1)

Examiner les différentes options proposées par la Convention de Bâle au titre du plan d'action pour la gestion des déchets d'activités de soin (Incinération et enfouissement).

Il faut absolument parvenir à interdire la mise en décharge publique de ce type de déchets en raison de leur nocivité.

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ELEMENTS DU PLAN D'ACTION NATIONAL: PRIORITES

Les priorités identifiées incluent:

Recours aux BAT/BEP selon que faisable dans le contexte national

4- Cuisine et chauffage avec biomasse (Cat. 3)

Dans l'industrie, appliquer les BAT/BEP pour les chaudières et centrales à biomasse.

Dans les ménages, réduire l'utilisation du bois-énergie par la promotion de l'utilisation des énergies fossiles (gaz, pétrole)

Amélioration de la performance des foyers domestiques

Slide 13

**ELEMENTS DU PLAN D'ACTION
NATIONAL: PRIORITES**

Les priorités identifiées incluent:
Recours aux BAT/BEP selon que faisable dans le contexte national

5- Centrales à fuel lourd/léger (Cat. 3)

Encourager l'utilisation du gaz en lieu et place des combustibles fossiles liquides pour la production d'électricité thermique.

Promouvoir l'hydroélectricité; mais les conditions pluviométriques sont de plus en plus défavorables

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**ELEMENTS DU PLAN D'ACTION
NATIONAL: PRIORITES**

Les priorités identifiées incluent:
Recours aux BAT/BEP selon que faisable dans le contexte national

6- Etude de cas (Cat. 3)

Au Togo, on utilise beaucoup de charbon pour la fourniture d'énergie primaire; ceci peut être considéré comme BEP par rapport à l'utilisation directe du bois. Or la pyrolyse du bois en charbon est une activité pertinente en termes de rejet de dioxines. En quoi consisteraient alors les BAT/BEP en vue d'une production plus propre de charbon de bois?

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**ELEMENTS DU PLAN D'ACTION
NATIONAL: PRIORITES**

Les priorités identifiées incluent:
Recours aux BAT/BEP selon que faisable dans le contexte national

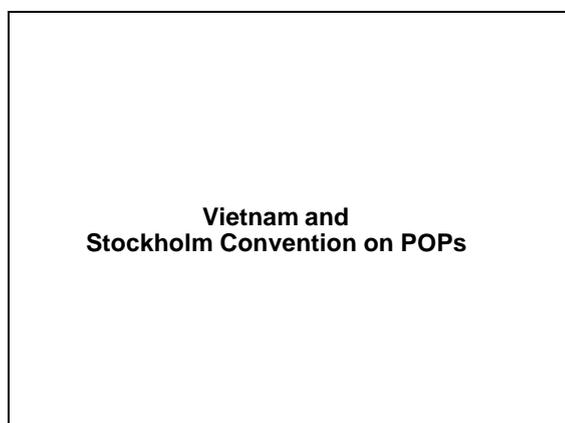
5- Transport (Cat. 5)

Limiter l'âge des véhicules usagés importés.

Remplacer l'essence au plomb par de l'essence sans plomb.

6.26 VIETNAM

Slide 1

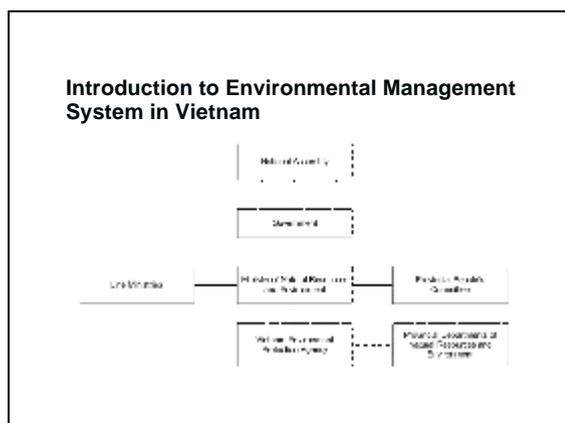


Slide 4

Task and mandates

1. Participate in preparing national policies, legal instruments, strategies, programs, and plans on the environment;
2. Submit to the Minister, for decision making, workplans for implementing the national strategy on environment protection, the national biodiversity plan, the State's planning schemes and plans, the national and critical programs on environment protection, and organise the implementation on the Ministry's assignment;
3. Exercise the right of making specialised environmental inspection, deal with disputes, protests, accusations related to environment protection, and handle any violations of the law on environment protection; Control and manage wastes, check and monitor the compliance with the stipulations on environment protection;

Slide 2



Slide 5

Task and mandates (cont.)

4. Construct, for submission to the Minister, the planning scheme of the national environment monitoring network; Uniformly manage survey and monitoring data on the environment; Manage a number of environment monitoring stations; Conduct the national environment monitoring on the Ministry's assignment;
5. Conduct investigations and assessments on biodiversity, sensitive ecosystems, rare and endemic species of plants and animals, environment quality of the severely polluted and degraded areas (both on the mainland and in the sea), and propose measures for environment protection and sensible use of the natural resources;
6. Implement the tasks of socialising the environment protection cause, raising awareness, propagandising, disseminating, and providing education on, environmental law and information; Develop models for community participation in environment protection; Coordinate the task of rewarding organisations and individuals having outstanding achievements in the environment protection activities;

Slide 3

Introduction to Environmental Management System in Vietnam (cont.)

- The Environment Protection Agency is the body directly belonging to the Ministry of Natural Resources and Environment, exercising the function of assisting the Minister in implementing the State management function on environment protection at the aspects of inspecting, checking, monitoring, preventing and fighting against pollution, improving the environment quality, biodiversity conservation, technology application, and environment awareness raising for the community.

Slide 6

Task and mandates (cont.)

7. Make arrangements for and conduct research, application of technological and scientific advances to pollution and environmental incident prevention, waste treatment and recycling, environment improvement, ecosystem restoration, and the development of green technologies, eco-industrial parks, and environment-friendly technologies;
8. Implement and coordinate the related international conventions, bi-lateral and multi-lateral cooperations international programs and projects in the field of environment protection, on the Ministry's assignment;
9. Provide advice and guidance to industries and localities, organisations and individuals, at the legal, technical, professional, and environmental technology aspects;
10. Be the focal point to coordinate the Vietnam's Environment Protection Fund, raise and receive funds provided by the State, domestic and overseas organisations and individuals as the support for the environment protection tasks;

Slide 7

Task and mandates (cont.)

1. Be the focal point to assist the National Committee for Damage Mitigation of Toxic Chemicals used by the US in the Vietnam War;
2. Manage and use, in an effective manner, the assets and budgets allocated to the Agency and its affiliated divisions;
3. Maintain a good organisational and personnel management, provide relevant professional training to the staff of the Agency;
4. Inventorise and prepare periodical and un-periodical reports on the implementation of the tasks assigned;
5. Undertake other tasks assigned by the Minister.

Slide 10

Activities undertaken to implement Convention in Vietnam

In order to prepare for Vietnam to comply with obligations of the Convention when it enters into force, MONRE organises series of activities, as follows:

- Participate in meetings of the Inter-governmental negotiating committee (INC) to discuss issues related to the implementation of the Convention.

Slide 8

Organization structure

- *The units assisting the Director comprise:*
 1. The Office of the Agency
 2. The Pollution Control Division;
 3. The Nature Conservation Division;
 4. The Environment Improvement;
 5. The Technology Application Division;
 6. The Integrated Coastal Zone Management Division;
 7. The Information and Data Division;
 8. The Community Awareness Raising Division;
 9. The Environmental Inspection Division;
 10. The Environment Protection Magazine;
 11. The Environment Consultancy and Training Centre;
 12. The Regional Environment Protection Branches of the Agency in Ho Chi Minh City, Da Nang, and Can Tho.

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Activities undertaken to implement the Convention (cont.)

- MoNRE/VEPA collaborates with other Ministries to develop legal framework for management of POPs (e.g. Directive 29/1998/CT-TTg).
- Developed and issued Procedures for technological options to collect and treat obsolete organic phosphate and organic chlorinated pesticides.
- Issued Decision No 60/2002/QĐ-BKHCMNT dated 07/8/2002 by Minister of MOSTE on technical guidelines on land-filling of hazardous wastes.

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Implementation of the Stockholm Convention

Competent authority and focal point

- Vietnam ratified Stockholm Convention on 22/7/2002, becoming 13th member among parties and signatories to the Convention.
- Ministry of Natural Resources and Environment (MoNRE) assisted by VEPA acts as Interim focal point of Vietnam to the Convention.
- The competent authority and the focal point are assisted on daily basis by Pollution Control Division within VEPA.

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Activity to be undertaken to implement to Convention (cont.)

- VEPA is implementing GEF/UNDP funded enabling activity project on development of National Implementation Plan to implement Stockholm Convention when it enters into force.
- Promote other co-operation activities with other international organisations and donor agencies, including UNEP Chemicals, USAEP, NORAD, SDC in the field of POPs management and eliminations.
- Promote regional co-operation, especially within ASEAN, in the field of dealing with POPs management, implementation and enforcement of MEAs.

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Activity to be undertaken to implement to Convention (cont.)

- We developed technical guidelines on handling of certain chemical wastes, as well as provided training on POPs.
- Organised workshops on PCB inventory, on inventory of dioxin and furan releases;
- Organised two-day training workshop on inventory of obsolete pesticides for 200 managers from Ministries and 61 Provinces of Vietnam.
- Participate in activities, meetings, projects organised by the Convention Secretariat.

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GEF/UNDP funded enabling activity project (cont.)

- development of treatment and disposal technologies for POPs waste,
- building analytical capacity, and
- application of cleaner production to reduce releases of POPs into environment.

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GEF/UNDP funded enabling activity project

Project Objective:

- The project is aimed to develop and enact National Implementation Plan, contributing to the protection of environment and human health through environmentally management of POPs in Viet Nam.

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GEF/UNDP funded enabling activity project (cont.)

Project Activities:

- Strengthening capacity of appointed Focal Point and Competent Authority(ies) and organisation of the National Steering and Co-ordinating Committee
- Establishment of initial POPs inventory and assessment of national infrastructure and capacity

Slide 15

GEF/UNDP funded enabling activity project (cont.)

Project Objective:

- Project objectives include development of recommendations on:
 - development of infrastructure and disposal capacity for POPs, on building knowledge,
 - exchange of information and experience,

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GEF/UNDP funded enabling activity project (cont.)

Project Activities:

- Setting of priorities and determination of objectives of NIP;
- Formulation of a National Implementation Plan, and specific Action Plans on POPs;
- Comments and feedback on NIP from stakeholders and its submission to the Prime Minister for approval

Slide 19

GEF/UNDP funded enabling activity project (cont.)

Project Expected Outcomes:

- Established and capacity-strengthened National Focal Point, Competent Authorities and National Steering Committee, which consists of relevant Ministries, government agencies and stakeholders (the Government decided on functions and tasks of the Committee).
- Final Draft of the National Implementation Plan for the implementation of the Stockholm Convention on POPs and submission to the Prime Minister for approval.

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Potential cooperation areas (cont.)

- Advanced Technology to treat pollution caused by POPs and hazardous waste (water, air)
- Restoration of eco-systems, land, natural resources and environment

Slide 20

GEF/UNDP funded enabling activity project (cont.)

Project Expected Outcomes:

- Established mechanism to exchange information and to report to authorised agency relating to POPs issues and established capacity to process data and information and to report on POPs to the Convention.

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GEF/UNDP funded enabling activity project (cont.)

Project Expected Outcomes:

- By-products of the development of the NIP, which include: National Inventory of pesticides, releases of dioxins, furans and PCBs; Technical Guidelines relating to collection, treatment and disposal of POPs and POP contaminated wastes; Proposed Action Plans on reduction and minimisation of use of POPs in Vietnam.

6.27 ZAMBIA

Slide 1

Zambia's Experience in Addressing BAT/BEP

David Kapindula
Environmental Council of Zambia

Slide 4

Main Sources Releasing PCDDs/PCDFs in Zambia

Source Category	Release Vector/Annual Release(gTEQ/a)		
	Air	land	Residue
Waste Incineration	29.6	0.0	0.2
Ferrous and Non- Ferrous Metal Production	9.1	0.0	26.1
Power Generation and Heating	8.6	0.0	0.0
Production of Mineral Products	0.9	0.0	0.2
Transportation	0.2	0.0	0.0
Uncontrolled Combustion Processes	241.3	48.4	83.6
Disposal/Land filling	0.0	0.0	34.9
Total	289.7	48.4	145.0
GRAND TOTAL	483.1		

Slide 2

INTRODUCTION

- ❖ Zambia signed the Convention in May 2001 in Stockholm, Sweden
- ❖ Zambia was chosen as one of the 12 pilot countries to prepare a NIP for the selected 12 POPs
- ❖ 15 –16 August 2002, four (4) Working Groups were formed namely:
 - DDT**
 - PCBs**
 - POPs Pesticides and**
 - Dioxins & Furans.**
- ❖ The Project is currently in Phase 4

Slide 5

Single largest sources emitting PCDDs/PCDFs to Air

- ❖ Land fires, agricultural residual burning, uncontrolled domestic waste burning and medical waste incineration are the major sources of PCDD/PCDF emissions in Zambia

Slide 3

INVENTORY

- ❖ (2003-2004) Inventory of POPs conducted Nation wide
- ❖ Identified significant potential sources of unintentionally produced byproducts.
- ❖ Identified alternative technologies or best available techniques (BAT) using best environmental practices (BEP).

Slide 6

Application of BAT/BEP Guidelines in Zambia

- ❖ Transpose BAT/BEP guidelines and incorporate them into regulations
- ❖ Transpose BAT/BEP guidelines and make them mandatory for existing and new sources (EIA Process)

Slide 7

Application of BAT/BEP Guidelines in Zambia

- ❖ Enforce existing regulations & incorporate BAT/BEP guidelines on crematoria, animal carcasses burning, etc.
- ❖ Transpose BAT/BEP requirements in the management of municipal and industrial waste

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BAT/BEP Guidelines

- ❖ Need for extensive discussion of the guidelines by all stakeholders at National, Regional and International levels
- ❖ Additional input can be provided through inventory findings, questionnaires and workshops

Slide 8

Effects of BAT/BEP as a Management Option in Zambia

- ❖ High implementation costs in some cases where high technology may be required e.g. copper production
- ❖ Limited infrastructure and trained human resource
- ❖ High risks for technologies that may not be robust
- ❖ Some technology is not user friendly

Slide 9

BAT/BEP Guidelines

- ❖ Generally accepted as comprehensive
- ❖ Summaries by source category makes the document user friendly

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