CANADA-WIDE STANDARDS FOR DIOXINS AND FURANS

WASTE INCINERATION POLLUTION PREVENTION STRATEGY

CONTEXT

The Canadian Council of Ministers of the Environment (CCME) signed the Canada-wide Standards (CWSs) for emissions of dioxins and furans from waste incinerators in May 2001. An important provision of these CWSs was a commitment to develop pollution prevention strategies, consistent with the principles outlined in the ***Canada-wide Environmental Standards Sub-agreement***, that is:

Pollution prevention is the preferred approach to environmental protection. Governments will place emphasis on a pollution prevention approach when implementing standards under this sub-agreement.

The following is the text of the commitment incorporated in the Waste Incineration CWSs for Dioxins and Furans:

Pollution Prevention Strategy:

In addition to the continuing efforts of waste incinerator operators to destroy or capture emissions of dioxin and furans, emphasis will be placed on identifying and implementing opportunities to prevent the creation of dioxins and furans as well as emissions of air pollutants and ash quality generally. As an initial action with shared responsibility by all jurisdictions, strategies identifying opportunities to minimize waste incineration emissions of air pollutants including dioxins and furans will be developed through a multi-stakeholder process by december 31, 2001 to provide a framework for continual progress towards the elimination of dioxin and furans.

Recognizing that many opportunities for minimizing air pollutant and ash emissions and Specifically avoiding the creation of dioxins and furans fall beyond the exclusive influence of the operators of waste incinerators, preparation of this strategy must engage a wide range of stakeholders.

The range of issues to be addressed in developing the strategy could include:

- *Waste diversion initiatives to minimize the generation of wastes destined for disposal (waste reduction, material reuse options)*
- *Waste segregation initiatives aimed at materials with greater potential to generate emissions of dioxins and furans or other air pollutants of concern (e.g., mercury, other heavy metals) and aimed at diverting those wastes to recycling or other non-incineration disposal options*
- *Combustion control strategies to optimize performance of existing combustors at destroying pollutants of concern*

- *Use of alternative disposal or treatment technologies (e.g., anaerobic digestion of wastes with material recovery and combustion of biogas)*

The Development Committee for the Canada-wide Standards for Dioxins and Furans charged the Incineration Multistakeholder Advisory Group (I-MAG) which it had created to advise on the development of the CWSs with the task of developing the recommended elements of this strategy. This group was comprised of representatives of environmental non-government organizations, health professionals, municipal staff involved in the oversight of incineration operations, engineering consultants serving the incineration sector and private sector incinerator operators. The broad objective for this work was to identify a suite of options and any recommended priorities that jurisdictions could consider in implementing the CWSs.

Members of I-MAG met by teleconference for over a year to discuss the range of issues, and two background papers were commissioned to address policy instruments and approaches as well as technological options. A very wide range of potential options was considered, and significant efforts were made to narrow these to a set of more generally applicable principles which should be useful in setting out a strategy.

It should be noted that the context for this work is pollution prevention for waste incinerators. The Canadian waste management milieu is increasingly becoming one where independent companies own or operate most incinerators and have little or no control over the pollution prevention activities of waste generators. This is a change from the past situation where at one time small units were located on-site in many cases, and larger municipal solid waste units were owned and operated by municipalities directly. Even in the case of sewage sludge incineration, where large municipalities still generally own and operate units serving their sewage treatment systems, operators ultimately must respond to the quality of the sludge feed resulting from the actions of sewer users. As a result, in order to make effective recommendations one must look well beyond what might be expected for industrial unit operations such as iron sintering, electric arc furnaces or wood-fired boilers. The actions of waste generators need to be influenced in order to make strides in pollution prevention for incinerators.

The members of I-MAG came to the conclusion that there were a number of specific items which merited particular consideration and mention, as well as the issues which could be treated as broader “over-arching” policy principles. As a result, while the group did set out these over-arching issues it also decided to bring to the attention of jurisdictions a select number of these specific issues. Members of I-MAG felt strongly that these also require attention and are firstly not covered by the over-arching issues, and secondly not currently addressed in the regulatory or policy requirements of most canadian jurisdictions. Several significant information gaps were also identified.

It should also be noted that to the extent possible, the recommendations are organized to highlight whether the responsibility to act lies with governments (and what level of government if possible), facility owner/operators or other parties.

In drafting these recommendations, I-MAG members achieved a very high degree of consensus; the only area of disagreement came with regard to a proposal from the representatives of environmental non-government organizations that there should be no new incinerators permitted by jurisdictions; this was opposed by the other members. On all other matters, I-MAG was unanimous in making its recommendations to the development committee.

Use of This Document

As noted in the charge to I-MAG, the intent of the CWS pollution prevention strategy is to identify opportunities to minimize emissions of air pollutants from the incineration sector and provide a framework for continuous improvement toward the goal of virtual elimination of dioxins and furans. The I-MAG recommendations provide a set of options for consideration by jurisdictions in developing, or amending, their implementation plans for the CWS for dioxins and furans emissions from waste incinerators. These recommendations are tools or advice to jurisdictions to consider, and it is up to each jurisdiction to decide how to use them, in whole or in part. Each jurisdiction is ultimately accountable to its stakeholders to explain the choices it makes in addressing these issues.

In addition, these recommendations should be taken into account in any future ccme activity which relates to the four waste incineration subsectors addressed by the cwss. Where relevant, these recommendations should be considered for incorporation in guidelines or other guidance documents which may be revised or developed regarding incinerators.

SECTION I - OVERARCHING IMAG RECOMMENDATIONS

For the federal, provincial, territorial and municipal governments:

A – Accountability: When reporting on progress in 2004, 2008 and any subsequent year, jurisdictions are to include details in their reports on: the measures they and others under their jurisdiction (e.g., facilities and municipalities) have taken to implement the pollution prevention strategy recommendations made by the Incineration Multistakeholder Advisory Group (I-MAG); the pollutants expected to be reduced in emission quantity or eliminated due to these measures; and the estimated amount of the emission reductions on an annual basis for each of those pollutants.

B - Extended Producer Responsibility (EPR) programmes: To reduce the potential for emissions of toxics from all kinds of incinerators, the governments should consider cooperating in funding the exploration and implementation of extended producer responsibility (EPR) programmes. EPR programmes are aimed at having manufacturers and distributors take ownership of the environmental impacts of their products through such means as manufacturing with recycled materials, minimizing pollution during manufacturing, minimizing product loss through vendor inventory control, eliminating unnecessary packaging, shipping with reusable packaging, and capturing used products for material recovery.

C - Environmentally Responsible Procurement: The governments should consider implementing eco-procurement programmes. These are programmes through which purchasing actions and policies take into account cradle-to-grave environmental factors as well as performance, cost, safety and other factors. These practices apply to decisions regarding purchasing goods, services, construction and maintenance. The governments should consider implementing eco-procurement practices in their own purchasing habits, as well as requiring that their agencies and other publicly funded organizations, such as hospitals, educational institutions, etc, adopt such practices. Governments should also consider requiring their suppliers to adopt such practices and encouraging large corporate buyers within their jurisdictions to adopt eco-procurement policies.

D – Harmonizing Definitions and Methods: That the jurisdictions should work together, through a multistakeholder consultation process, to develop Canada-wide definitions for the various categories of wastes (particularly hazardous and household hazardous wastes), as well as to standardize the methodologies, data collection and waste stream categorization protocols and performance indicators used for waste stream analysis and in diversion studies, including establishing a common procedure for calculating waste diversion amounts.

E – Reducing Hazardous Materials Use in Society: That the jurisdictions should cooperate to ensure that the use of hazardous materials in products is minimized, in recognition that products or their components eventually end up in one or more waste streams and may contribute to emissions from incinerators as a result; and in particular, that assessment of products continue in order to determine their content of hazardous

materials or use in production and the need for that material to be excluded from such use. Special attention is also needed for products which in the normal course of their use are intended to be disposed of in municipal sewerage systems.

F - Verification of New Technologies while Protecting the Environment: That the jurisdictions encourage the development and application of new, innovative and environmentally effective waste treatment technologies, particularly non-incineration options, and subject them to established and recognized verification programs such as the Canadian Environmental Technology Verification Program (ETV). This would serve to facilitate and promote initial applications of such technologies while ensuring that regulatory initiatives do not inadvertently create artificial barriers to their introduction.

G - Recommendation Concerning the Operation of Waste Treatment Processes: All waste treatment processes should be designed, operated and maintained in a manner that ensures that their operation will at least match the characteristics developed during their initial verification testing. Operators should strive to continually lower emissions by employing effective technologies for the destruction of organic compounds, particularly persistent organic pollutants (POPs). Any by-products from these facilities should be regularly characterized and documented to ensure that performance is being maintained.

SECTION II - PRIORITY RECOMMENDATIONS

For the federal, provincial, territorial and municipal governments:

- That jurisdictions take effective action to control discharges to sanitary and combined sewers. Strategies could include passing/encouraging the development of sewer use by-laws, developing provincial legislation governing sewer use and establishing pollution prevention programs designed to prevent the discharge to sanitary and combined sewers of substances that could pose an environmental/health risk. (**SS-4)**

For the federal, provincial and territorial governments:

- That the jurisdictions, in consultation with municipalities and other interested stakeholders, consider cooperating in funding the exploration and implementation of the most effective mechanisms for achieving waste reduction in all sectors. This exploration should include the consideration of waste reduction and diversion technologies, material recovery systems, funding mechanisms, educational programs and bans on the disposal of specific materials. (**MSW-12)**

- That the jurisdictions consider cooperating in continuing support for existing research programs and institutes, such as the Canadian Centre for Pollution Prevention (C2P2) and the Canadian Environmental Technology Advancement Centres (CETACs) with the express purpose of encouraging these groups to extend their efforts to encourage industry to reduce or eliminate its dependence on hazardous chemicals in the production process. **(HW-2)**

- That the jurisdictions examine ways of building on Canadian Environmental Protection Act's (CEPA) requirements for P2 planning and toxics reduction or elimination to determine if legislative initiatives can be applied to expand upon the results of voluntary initiatives (**HW-4)**

For the federal government:

- That Canada consider prohibiting the retail sale and manufacture of mercury-containing fever thermometers, except for that use at hospitals for which there is no suitable alternative, and establish a target for the virtual elimination of mercury fever thermometers for institutional use. **(BM-2)**

For the provinces and territories:

- That each jurisdiction consider establishing programs designed to prevent the introduction of household hazardous wastes into the municipal solid waste stream. Such programs could include Extended Producer Responsibility strategies, educational and public outreach campaigns and banning specific materials from disposal. **(MSW-3)**

SECTION III –IMAG RECOMMENDATIONS BY SECTOR

BIOMEDICAL WASTE INCINERATION

For the federal, provincial, territorial and municipal governments:

BM-1 That the jurisdictions consider cooperating in funding the exploration and implementation of Extended Producer Responsibility (EPR) programs. EPR refers to the expectation that manufacturers and distributors take ownership of the environmental impacts of their products through such means as manufacturing with recycled materials, minimizing pollution during manufacturing, minimizing product loss through vendor inventory control, eliminating unnecessary packaging, shipping with reusable packaging, and capturing used product for material recovery.

For the federal government:

BM-2 That Canada consider prohibiting the retail sale and manufacture of mercury-containing fever thermometers, except for that use at hospitals for which there is no suitable alternative, and establish a target for the virtual elimination of mercury fever thermometers for institutional use.

BM-3 That Canada consider supporting research and development of PVC-free, DEHP-free and mercury-free alternative products for use in health care facilities.

For the provinces and territories:

BM-4 That each jurisdiction consider developing Memoranda of Understanding (MOU) to phase-out and strive to virtually eliminate, where possible, mercury use in health care. Such MOU would be signed between individual jurisdictions and individual facilities or the appropriate provincial/national health care association.

BM-5 That each jurisdiction consider allowing for the assessment and possible adoption of non-incineration technologies to treat human anatomical waste, cytotoxic waste, and/or other components of the biomedical waste stream for which the only approved method of disposal has traditionally been incineration. Any such alternative technology should be subjected to testing under the Canadian Environmental Technology Verification Program, and any process residues should be unrecognizable as human anatomical parts, organs and/or tissues. This would allow jurisdictions the flexibility to adopt technologies that perform as well as incineration, but produce a net environmental benefit over incineration when considering all impacts on air, land, and water.

BM-6 That each jurisdiction consider banning the non-incidental discharge of untreated blood or any other type of biomedical waste by institutional, commercial or industrial facilities into a sanitary sewer, as this is not, in the IMAG's view, an appropriate alternative disposal measure for biomedical waste.

For individual health care facilities:

BM-7 That facilities implement source reduction through eco-procurement and its contractual processes. Also called Environmentally Responsible Procurement, Eco-procurement is the adjustment of purchasing actions and policies to integrate consideration of cradle-to-grave environmental factors with performance, cost, safety and other factors. Adopting eco-procurement will ensure that considerations of environmental impacts and environmental legislation are included in purchasing decisions respecting goods, services, construction and maintenance works.

BM-8 That facilities purchase mercury-free, PVC-free and DEHP-free products to the fullest extent possible. Further research on the development of such materials for use in health care should be encouraged.

BM-9 That facilities that generate biomedical waste should include Extended Producer Responsibility criteria in their purchasing and contractual processes.

MUNICIPAL SOLID WASTE INCINERATION

SMALL QUANTITY GENERATORS OF HAZARDOUS WASTE - GENERAL

For the federal, provincial and territorial governments:

MSW-1 That the ministers consider establishing Canada-wide definitions of hazardous wastes and household hazardous wastes.

For the federal government:

MSW-2 That Canada consider assessing products containing hazardous materials to determine whether legislation should be passed requiring that the hazardous component be removed from the product, e.g., removing mercury from batteries.

For the provinces and territories:

MSW-3 That each jurisdiction consider establishing programs designed to prevent the introduction of household hazardous wastes into the municipal solid waste stream. Such programs could include Extended Producer Responsibility strategies, educational and public outreach campaigns and banning specific materials from disposal.

SMALL QUANTITY GENERATORS OF HAZARDOUS WASTE – INDUSTRIAL, COMMERCIAL AND INSTITUTIONAL (IC&I) SECTORS

For the federal government:

MSW-4 That Canada consider conducting a study on hazardous wastes from the IC&I sectors that end up in the municipal waste stream

For the provincial and territorial governments:

MSW-5 That each jurisdiction consider passing legislation requiring manufacturers, importers, and sellers of products containing hazardous materials to set up programs that will prevent these products from entering the municipal waste stream. In addition to requiring that these materials be retrieved, the legislation should require that specified reduction, reuse and recycling targets be met for these products.

MSW-6 That each jurisdiction consider passing legislation banning the disposal of hazardous wastes from the IC&I sectors in municipal solid waste incinerators or landfills. Small quantity exemptions for hazardous wastes should be removed from legislation.

OPEN BURNING OF GARBAGE

For the provincial and territorial governments:

MSW-7 That each jurisdiction consider developing and expeditiously implementing effective strategies to phase out or prevent the burning of garbage in open pits or trenches, as well as in apparatus such as burn barrels, fireplaces and stoves.

MSW-8 That each jurisdiction consider developing a public outreach and education program that details the environmental and health risks of open garbage burning. Such programs should focus on behavioural change, stressing waste reduction/minimization, followed by reuse and recycling, as the preferred options for reducing dioxin and furan emissions from this source.

CONICAL WASTE INCINERATORS

For the provincial and territorial governments:

MSW-9 That each jurisdiction consider developing and implementing effective strategies to phase out or prevent the operation of conical waste incinerators.

WASTE REDUCTION

For the federal, provincial, territorial and municipal governments:

MSW-10 That the jurisdictions consider cooperating in funding the exploration and implementation of Extended Producer Responsibility (EPR) programs. EPR refers to the expectation that manufacturers and distributors take ownership of the environmental impacts of their products through such means as manufacturing with recycled materials, minimizing pollution during manufacturing, minimizing product loss through vendor inventory control, eliminating unnecessary packaging, shipping with reusable packaging, and capturing used product for material recovery.

MSW-11 That each jurisdiction consider developing procurement policies that encourage the purchase of products and services that minimize or eliminate waste. All levels of government should also consider encouraging large corporate buyers within their jurisdictions to establish similar policies.

For the federal, provincial and territorial governments:

MSW-12 That the jurisdictions, in consultation with municipalities and other interested stakeholders, consider cooperating in funding the exploration and implementation of the most effective mechanisms for achieving waste reduction. This exploration should include the consideration of waste reduction and diversion technologies, material recovery systems, funding mechanisms, educational programs and bans on the disposal of specific materials. Waste reduction programs should address the residential, industrial, commercial and institutional, and construction and demolition sectors.

MSW-13 That the jurisdictions, in consultation with municipalities and other interested stakeholders, consider developing a common set of methodologies, data collection and waste stream categorization protocols, and performance indicators related to waste stream analysis and diversion studies. Establishing a common procedure for calculating waste diversion should also be considered.

MSW-14 That the jurisdictions consider recommending augmenting the curricula at design schools such that a major component of the educational experience is focussed on designing with waste elimination in mind. Jurisdictions should also consider establishing a curriculum component on greening the supply chain in professional development courses related to supply chain management.

MSW-15 That the jurisdictions consider recommending to the Canadian Council of Professional Engineers and its subsidiary, the Canadian Engineering Accreditation Board, that curricula at engineering schools be augmented such that a major component of the educational experience is focussed on waste elimination.

For the provinces and territories:

MSW-16 That each jurisdiction, in consultation with municipalities and other interested stakeholders, consider moving beyond the currently common 50% waste diversion target and instead focus on continuous improvement towards an ultimate goal of zero waste. Jurisdictions should consider establishing targets specific to waste type (e.g. electronics, PVC-containing materials, tires). All targets should include specific timelines/dates for achievement.

RECOMMENDATIONS UPON WHICH CONSENSUS NOT REACHED

While the IMAG strove to achieve consensus in all areas, there was disagreement on one set of proposed recommendations. The representatives from the ENGO community suggested the following recommendations:

Bans on Construction and Operation of Incinerators

- The provincial and territorial governments should pass regulations immediately banning the construction of new municipal waste incinerators.
- The provincial and territorial governments should pass regulations requiring that incinerators that cannot now meet the CWS for dioxin, furan and mercury emissions from incinerators plan for their closure by 2006. These facilities should not be allowed to upgrade.
- The provincial and territorial governments should pass regulations requiring that incinerators that currently meet the CWS emissions standards be phased out by 2010.

Other stakeholders expressed concerns about these recommendations and thus consensus was not reached.

SEWAGE SLUDGE INCINERATION

For the federal, provincial, territorial and municipal governments:

SS-1 That the jurisdictions consider cooperating in funding research into the sources of metals, dioxins and other contaminants (e.g. nonylphenols) in domestic wastewater, including determining the levels of these contaminants in consumer products which are intended to enter the sewer system through normal use.

SS-2 That the jurisdictions consider cooperating in funding the exploration and implementation of programs and regulations regarding commercial products that would reduce the use, and track the release, of substances (e.g. metals, dioxins, nonylphenols) that are potentially harmful to the environment. Under these measures, initial manufacture and/or importation for sale of products which are intended though normal use to be released to the air, soil, water or sewer system (e.g. aerosol products, fertilizers, bath supplies, dietary mineral supplements, coatings on clothing) would be considered a virtual pollutant release. Such products should be manufactured to minimize their impacts on the environment to the fullest extent possible. Possible implementation strategies could include:

SS-2.1 Inclusion of initial manufacture or import as a release to the environment under release reporting regulations (e.g. National Pollutant Release Inventory, Ontario Regulation 127/01) and release control regulations.

SS-2.2 Requirements for product testing to include environmental and health effects.

SS-2.3 Avoiding the unnecessary use of metals and non-biodegradable/toxic organic compounds in products intended for release.

SS-2.4 Public education regarding the environmental fate and effects of consumer products. Strategies could include encouraging green purchasing/procurement for households and businesses, labeling products that contain substances that are harmful to the environment.

For federal, provincial and territorial governments:

SS-3 That jurisdictions consider taking steps to ensure that biosolids (i.e., treated sewage sludge) use remains a viable alternative to incineration, through:

SS-3.1 Ensuring that clear, adequate, protective controls govern the use of biosolids.
SS-3.2 Promoting and encouraging the appropriate use of biosolids by providing public education on the science, safety and benefits of biosolids recycling.
SS-3.3 Recognizing and controlling biosolids use as a method of recycling and conserving nutrients and organic material, rather than as a method of waste disposal.
SS-3.4 Funding biosolids educational and research programs.
SS-3.5 Providing adequate, visible inspection and enforcement of biosolids use.
SS-3.6 Ensuring that biosolids controls are consistent with controls placed on other organic residuals, soil amendments and fertilizers.
SS-3.7 Implementing programs that are designed to eliminate or reduce the use of materials and substances known to increase contaminant loading in the sewage stream, and may negatively impact the quality of the biosolids.

For federal, provincial, municipal and territorial governments:

SS-4 That jurisdictions take effective action to control discharges to sanitary and combined sewers. Strategies could include passing/encouraging the development of sewer use by-laws, developing provincial legislation governing sewer use and establishing pollution prevention programs designed to prevent the discharge to sanitary and combined sewers of substances that could pose an environmental/health risk.

HAZARDOUS WASTE INCINERATION

After lengthy discussion it was agreed by all that measures that would reduce the use of hazardous chemicals would in turn reduce the need for hazardous waste incineration and thereby have the potential to reduce emissions from this sector. With this in mind the recommendations for P2 measures for hazardous chemicals focus more on enhancing and supplementing existing programs to decrease the use of these materials in industry.

It is also recognized that the cost of disposal of hazardous wastes is high enough to represent a significant economic deterrent to the use of toxic chemicals. The focus then moves to understanding why industry has not adopted alternate feedstocks and/or technologies. The roadblocks to the use of alternatives need to be removed.

For the federal, provincial and territorial governments:

HW-1 That the jurisdictions continue their diligence in identifying waste components of particular environmental concern and pursuing opportunities for reduction or elimination in the use of hazardous chemicals in the production process.

HW-2 That the jurisdictions consider cooperating in continuing support for existing research programs and institutes, such as the Canadian Centre for Pollution Prevention (C2P2) and the Canadian Environmental Technology Advancement Centres (CETACs) with the express purpose of encouraging these groups to extend their efforts to encourage industry to reduce or eliminate its dependence on hazardous chemicals in the production process.

HW-3 That the jurisdictions, in conjunction with the above named organizations, define a strategy for identifying new initiatives that would reduce or eliminate the use of hazardous chemicals and actively champion any research efforts that might be necessary to achieve such reductions.

HW-4 That the jurisdictions examine ways of building on Canadian Environmental Protection Act's (CEPA) requirements for P2 planning and toxics reduction or elimination to determine if legislative initiatives can be applied to expand upon the results of voluntary initiatives.

For the provincial and territorial governments:

HW-5 That the jurisdictions explore innovative measures that will encourage the use of Memoranda of Understanding as a means of reducing or eliminating the use of hazardous chemicals in the product process thereby limiting the potential for emissions of these toxics to the environment by any route.

TECHNICAL OPTIONS

For the federal, provincial, territorial and municipal governments:

TO-1 That the jurisdictions, in consultation with other interested stakeholders, consider cooperating in funding the verification and application of advanced waste treatment processes now in the development stages.

TO-2 That jurisdictions ensure that new legislation does not hinder the development of effective alternative technologies for the treatment of waste materials by presenting artificial barriers to approval, while ensuring protection of the environment.

TO-3 That the jurisdictions, in consultation with other interested stakeholders, consider adopting a common set of methodologies for sampling and analysing by-products created during waste processing activities to ensure that all environmentally relevant characteristics of these materials are regularly and consistently quantified, documented and the potential for variability is understood.

For individual facilities:

TO-4 All incinerators be equipped with state of the art combustion control equipment and that this equipment be properly operated and maintained to ensure that it minimizes the amount of organic material emitted from the incinerator and entering the pollution control system.

TO-5 Incinerator operators are encouraged to employ emerging technologies for the destruction of organic compounds, particularly persistent organic pollutants (POPs) to minimize emissions.