



Canadian Council of Ministers
of the Environment Le Conseil canadien
des ministres de l'environnement

GUIDANCE DOCUMENT FOR CANADIAN JURISDICTIONS ON OPEN-AIR BURNING

**PN 1548
ISBN 978-1-77202-024-3 PDF**

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ACKNOWLEDGEMENTS

The Canadian Council of Ministers of the Environment (CCME) Guidance Document for Canadian Jurisdictions on Open-Air Burning was developed by CCME with the assistance of Cheminfo Services Inc.

LIST OF ACRONYMS

CAAQS	Canadian Ambient Air Quality Standards
CCME	Canadian Council of Ministers of the Environment
CO ₂	Carbon dioxide
PCDDs	Polychlorinated dibenzo dioxins
PCDFs	Polychlorinated dibenzo furans
PM _{2.5}	Airborne particles less than 2.5 microns in diameter
SLCF	Short Lived Climate Forcers
TEQ	Toxic Equivalency Quotient

A list of applicable definitions can be found in Appendix 1: Part 1.

EXTERNAL WEBSITE LINKS

There are websites linked to and from this Guidance Document that are operated or created by or for organizations outside of CCME. Those organizations are solely responsible for the operation and information (including the right to display such information) found on their respective websites. These linked websites may or may not be available in French.

CCME does not assume and is not responsible for any liability whatsoever for the linking of any of these linked websites, the operation or content (including the right to display such information) of any of the linked websites, nor for any of the information, interpretation, comments or opinions expressed in any of the linked websites. Any comments or inquiries regarding the linked websites are to be directed to the organization for whom the particular website is being operated.

1.0 PURPOSE

The Guidance Document for Canadian Jurisdictions on Outdoor Open-Air Burning (the GDOAB) has been developed by the Canadian Council of Ministers of the Environment (CCME) to assist governments, municipalities and Aboriginal communities with their response to air quality problems associated with open-air burning. The GDOAB may be considered as either a voluntary or regulatory tool to address wood smoke problems, where applicable.

1.1 About the Guidance Document

The tools and information in the Guidance Document have been designed to enhance local air management programs by providing: best practices to help ensure residential, agricultural, and ecological open-air burning activities are conducted in a responsible manner, thereby minimizing potential adverse human health and environmental impacts. In addition, examples of regulatory elements for the creation of provincial/territorial regulations or municipal by-laws, if needed, are provided in Appendix 1.

The best practices outlined in the Guidance Document were developed based on a review of regulations and other risk management instruments implemented in all 13 Canadian provinces and territories, all 50 American states, as well as selected international jurisdictions. Jurisdictional background information on wood smoke management can be found in *Review of Municipal, Provincial, Territorial and Federal Policies for Open-Air Burning in Selected Canadian and International Jurisdictions* (2016) (www.ccme.ca).

The Guidance Document has been developed to be flexible by providing options for local communities (both urban and rural) and government agencies to choose best practices most suitable for their unique circumstances, and to be responsive to continual improvement as additional information is gathered. In general, regulatory elements of the Guidance Document are directed at municipal governments (e.g., at the by-law level) but in the absence of municipal jurisdiction these guidelines could be applied at the provincial/territorial level, if needed. This Guidance Document is also structured in the form of a toolkit in order to identify the key policy priorities that governments may need to consider in their decision-making process. In addition to the regulatory elements, governments may want to seek public input into the development of any regulatory or risk management instrument addressing open-air burning issues. Appendices to this Guidance Document also provide templates that may be used for public education campaigns on open-air burning.

In addition to these guidelines on open-air burning, CCME has published the complementary Code of Practice for Residential Wood-Burning Appliances to address the issue of particulate matter from wood burning appliances and fireplaces issue (see www.ccme.ca).

1.2 Community Air Zone Management Planning

In 2012, the Canadian Council of Ministers of the Environment, with the exception of Québec, agreed to begin the implementation of a new Air Quality Management System (AQMS). The

AQMS includes Canadian Ambient Air Quality Standards for pollutant concentrations in outdoor air and is supported by an air zone management framework that provides guidance on the nature of the management, monitoring and reporting actions to be implemented at the air zone level (see www.ccme.ca). This Guidance Document and the Code of Practice for Residential Wood Burning Appliances may help to avoid potential air quality problems resulting from multiple sources of burning.

1.3 Scope and Limitations

When developing their own by-laws, fire permit programs, or other programs to manage open-air burning, government agencies should ensure that their practices are suited or modified to fit their particular needs and consider factors such as geographic location, terrain, population density, burn frequency, meteorology and socio-economic situations. Each jurisdiction is unique and in particular some of Canada's northern communities require additional planning and considerations to manage and dispose of any waste other than wood waste¹ to ensure the practice of open-air burning of such waste is eliminated.

Waste generators located in remote areas may have limited options for cost-effective and environmentally sound waste management. Although it is an undesirable practice, in some cases, open burning of waste may be necessary for managing waste other than wood waste. This should only be considered in cases where there is severely limited waste management infrastructure, and should not be considered as a long term solution. In all cases, reduction and diversion should be the primary waste management objectives, prior to considering any disposal option. Unsegregated waste should never be burned due to its potential for containing household hazardous wastes. For guidance on burning of waste other than wood waste, readers should consult Environment Canada's 2010 publication entitled *Technical Document for Batch Waste Incineration*²

Governments should obtain legal advice when drafting and developing their own environmental regulations or guidelines based on this Guidance Document (GDOAB). Nothing in this Guidance Document should be construed as legal advice nor should any provisions contained herein be relied upon in lieu of obtaining legal advice. The by-law or regulatory elements provided in this document are only provided as guidance and do not represent a comprehensive by-law or regulation. In addition, users of the GDOAB (including municipalities developing by-laws based on the document) must still refer to and comply with all provincial/territorial laws or other requirements pertaining to both fire prevention and environmental protection with respect to burning of waste. Municipalities, territories or provinces with existing by-laws or regulations which are more stringent than those listed in the GDOAB should maintain those requirements.

Finally, discussions on open-air burning should collectively consider both air management and fire prevention and safety issues. Governments should consider the strategic directions being

¹ See Appendix 1, Part 1: Definition 1.21 - Wood Waste

² Environment Canada. 2010. Technical Document for Batch Waste Incineration. Available at: <http://www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=F53EDE13-1>. 2013-10-28.

undertaken for emerging wildfire management issues at the Canadian Council of Forest Ministers (<http://www.ccfm.org/english/index.asp>).

2.0 BACKGROUND

2.1 What is Open-air Burning?

Open burning or open-air burning means any fire or burning practice that is conducted outside a building and includes but is not limited to, small confined fires and large confined fires (e.g., some bonfires), fires in burn barrels, in air curtain incinerators, outdoor recreational fireplaces, prescribed burning, and construction site and demolition site fires.

2.2 What is Emitted?

Smoke from open-air burning contains a complex mixture of air pollutants³, including a number of “non-threshold pollutants” for which there is some probability of harm at any level of exposure (e.g., PM_{2.5}). Exposure to these substances should always be minimized.

Pollutants of particular health and environmental concern from open-air burning include:

- PM_{2.5} (airborne particles that are 2.5 micrometres or less in aerodynamic diameter)
- Black carbon (soot) particles that include aggregates of PM_{2.5}
- polychlorinated dibenzo dioxins (PCDDs) and polychlorinated dibenzo furans (PCDFs)⁴
- polyaromatic hydrocarbons, including known carcinogens such as benzo(a)pyrene.

Some of the other pollutants of concern found in the smoke can include nitrogen oxides, carbon monoxide, arsenic, mercury, lead, hydrochloric acid, and volatile organic compounds. The ash produced from a burn may also contain some of these pollutants.

It is anticipated that through a combination of policy options and voluntary (non-regulatory) programs such as those described in this Guidance Document, open-air burning emissions of PM_{2.5}, dioxins and furans as well as other pollutants can be substantially reduced.

2.3 Health and Environmental Impacts

Open-air burning may not be widely recognized as being potentially harmful. However the pollution it creates can potentially cause a range of health and environmental problems.

³ It is difficult to quantify all emissions from open-air burning due to variation in open burning practices.

⁴ In Canada, the open burning of garbage produces more dioxins and furans than all industrial activities combined.

Health Effects

People most susceptible to the negative health effects of smoke emissions from open-air burning are young children and older adults, especially those with existing respiratory conditions (e.g., asthma, chronic obstructive pulmonary disease etc.), cardiovascular diseases, or vascular complications from diabetes. Studies of wood smoke have linked long-term exposure with elevated levels of airborne particulate matter to reduced lung function, development of asthma and chronic bronchitis, heart problems and premature mortality. Short-term exposure has been associated with acute bronchitis, asthma attacks, aggravation of lung diseases and increased susceptibility to respiratory infections.

Exposure to polyaromatic hydrocarbons, dioxins and furans have been linked to certain types of cancers, liver problems, impairment of the immune system, endocrine system and the reproductive system, and effects on the developing systems of the young. A source for these contaminants may come from the open-air burning of plastics, especially chlorinated materials such as polyvinyl chloride (PVC) products.

Environmental Effects

Open-air burning is mostly practiced in rural and agricultural areas so there is concern about pollutants settling on crops, in lakes and rivers and in areas where animals graze or live. Overall, these pollutants can affect all parts of the ecosystem, from micro-organisms and plants to fish and mammals, and some pollutants can pass from one part of the ecosystem to another. For example, dioxins produced from open-air burning (e.g., from the burning of plastics) can be deposited on plants and eaten by livestock. The pollutants are then absorbed into the animals (bio-accumulation) and stay in the food chain, eventually ending up in meat and dairy products.

Smoke from open-air burning also contains black carbon or “soot” which is part of a group of substances known as short-lived climate forcers (SLCF). Though SLCFs remain in the atmosphere for much less time than long-lived greenhouse gases like carbon dioxide (in the case of black carbon, mere days or weeks), they are considered to be responsible for a significant portion of current global warming. Black carbon has a two-fold warming effect; it absorbs solar radiation, thereby directly warming the surrounding air and, when deposited on snow and ice surfaces, it reduces the reflection of solar radiation, leading to accelerated melting. Reducing black carbon and other SLCFs locally offers an opportunity to reduce the rate of both local and global warming in the near term.

Nuisance problems from smoke can include haze and odour problems. For example, when there are geographical barriers and/or little wind to clear the air from open-air burning activities, visibility is often obscured by fine particulate matter and aerosols and the scent of burnt material may be noticeable both indoors and outdoors. These nuisance conditions can have real impacts on personal health and on the general quality of life in a community.

Additional Resources:

Emissions of Organic Air Toxics from Open Burning: A Comprehensive Review. Progress in Energy and Combustion Science (30) 2004, Pages 1-32: <http://www.zendergroup.org/docs/Emissions-Open-Burning-Lemieux-et-al-2004.pdf> or <http://www.sciencedirect.com/science/article/pii/S0360128503000613>

3.0 TYPES OF OPEN-AIR BURNING PRACTICES

Open-air burning in Canada generally occurs in rural locations where the risk of public exposure to smoke is lower, relative to urban locations. Many urban centres have prohibited open-air burning due to the risk of exposure to smoke, fire spreading and nuisances. In rural areas, open-air burning is one method of reducing brush. Open burning is often applied for clearing large volumes of brush, trees and stumps as needed for renewing or creating agricultural and forested lands.

The types of open-air burning outlined below are sometimes allowed in jurisdictions provided that certain conditions of safety are being met and that there is no measurable adverse effect on air quality. In most jurisdictions, an open-air burning permit is required prior to these activities being initiated. Section 3.1 provides typical examples of open-air burning activities that are allowed under certain situations. Those activities that are allowed, and their restrictions, will vary across jurisdictions.

3.1 Included Activities

General Public

- Providing warmth or cooking food on other than commercial premises
- Recreational, decorative, religious or ceremonial purposes, outdoor fireplaces, campfires and bonfires
- Elimination of wood waste by property owners at the property site which they own.

Agricultural, Habitat, and Ecosystem Renewal

- Prescribed burning for forest management, agricultural soil conditioning, crop and pasture production, and other resource management objectives (see the definition of Prescribed Burning in Appendix 1, Part 1, section 1.14)
- Prevention or control of weeds (e.g., along fence lines, canal and ditch banks), control of insects or disease
- Wildlife and watershed habitat management for productivity
- Fire hazard abatement, providing the hazard is so declared by the fire agency having jurisdiction.

Community Applications

- Training firefighting personnel
- Brush clearing for construction and maintenance of right-of-way areas (transportation corridors and utility lines)
- Elimination of wood waste at municipal landfills, transfer stations and municipal recycling centres where wood waste recycling, material reuse or landfilling is not feasible
- Elimination of other materials at the discretion of the jurisdictional authority.

3.2 Excluded Activities

While this Guidance Document applies to many outdoor open-air burning activities, it will be important to define and communicate to the public that any exclusions in subsequent legislation, regulations, by-laws or programs. Suggested exclusions in this Guidance Document may not apply to:

- Grilling or cooking using charcoal, wood, wood pellets, propane or natural gas in cooking or grilling appliances including barbeques.
- Use of propane, acetylene, natural gas, gasoline or kerosene in a device intended for heating, construction or maintenance activities.
- Emergency safety/signaling flares or industrial flares used for the combustion of flammable gases.
- Structures that may be burned exclusively for fire suppression training, or testing of firefighting equipment, provided that all asbestos materials have been removed from the structure and the structure has been inspected by a licensed asbestos inspector.
- Burning of materials, including contraband, for law enforcement activities as authorized by the municipal authority or other law enforcement authority.
- Forest or resource management operations with mandated or regulated activities that require disposal of woody debris or prescribed burning – often these are on crown, public or protected lands.
- Campfires in private campgrounds, provincial or federal parks or permitted campfires covered under other fire prevention legislation.
- Burning of explosive or dangerous material by police or other public safety organization, for which there is no other safe means of disposal.
- Burning wood waste at solid waste disposal or transfer sites, if carried out in accordance with a permit or approval prescribing such activity under regulation (e.g., environmental protection acts).

Note: provincial, territorial or federal jurisdictions should be contacted to determine what legislation may apply, and what level of approval may be required for the burning of dangerous, hazardous and contraband materials or wastes.

4.0 WOOD SMOKE MANAGEMENT TOOLKIT – OPEN-AIR BURNING

This section provides an overview of a wood smoke management toolkit that should be considered when developing policies to address open-air burning issues. This toolkit will provide governments with guidance where needed to reduce any significant adverse effects due to open-air burning by way of improving local air quality and protecting the environment.

The five main tools in the toolkit are:

1. Regulating Open-Air Burning
2. Air Quality Advisories and Burn Restrictions
3. Alternatives to Open-Air Burning
4. Public Outreach and Education
5. Performance Management – Planning for and Measuring Success

Related policy and/or management options are provided for each tool. Management efforts should consider all of the approaches described below. However, some may not be as applicable as others in all areas (e.g., rural areas or where incorporated municipalities may not exist). Flexibility may be required on the part of governments and their partners to implement the tools identified in this Guidance Document.

4.1 Regulating Open-Air Burning

To establish good governance to protect air quality from the impacts of smoke, jurisdictions should consider options for establishing by-laws or regulations for open-air burning.

Tool 1 Regulating Open-Air Burning

Management Options:

- 1.1 Municipal By-Laws:** Municipalities can address nuisance and health related smoke issues by adopting by-laws (where legal authority exists) to reduce smoke emissions. Such by-laws can include detailed requirements or general prohibitions on open-air burning, allowable camp and bonfires under safe conditions, outdoor recreational fireplaces, prescribed burning for agricultural and forest renewal, and enhancing fire permit standards and compliance. Appendix 1 has been prepared as guidance for municipalities wishing to pursue this option. (Note: Tool 4. - Public Outreach and Education should be undertaken prior to or concurrent with public announcement of by-laws or regulations).
- 1.2 Provincial and Territorial Regulations:** Some municipalities, or provinces and territories that contain unincorporated areas, may wish to establish regulations and/or revise resource management provisions to promote best practices for open-air burning. Although principally targeting a municipal audience, Appendix 1 may inform such provincial/territorial efforts.

4.2 Air Quality Advisories and Burn Restrictions

Open-air burning activities should be restricted or suspended during episodes of poor air quality. These episodes are linked with adverse effects on human health, the environment and public safety.

Methods of determining local air quality can include using information from an air monitoring station that reports an Air Quality Index (AQI) measurement for short-term fine particulate matter or ozone. Some jurisdictions may also refer to the Air Quality Health Index (AQHI) which provides qualitative health information to the public.

AQI values may trigger an air quality advisory if the concentrations of criteria air pollutants⁵ are exceeded or are predicted to be exceeded. Air quality advisories are dependent on meteorological conditions and forecasts such as air temperature, wind-speed, daytime wind direction, and other considerations relevant for managing potential impacts to air quality from open-air burning, such as during wet or fog conditions.

Burn restrictions can be a useful tool for community air zone management planning. Ambient air quality standards for PM_{2.5} and ground-level ozone concentrations are a useful reference point to determine and advise on burn restrictions.

Where there is no nearby air monitoring station there will be a need to rely on observations of visible haze or odour due to smoke, and available meteorological services in the area to forecast air quality conditions.

After determining that an episode of poor air quality is occurring (or will likely occur) jurisdictions could consider implementing voluntary or mandatory No-Burn Days or a fire ban. Many jurisdictions utilize fire bans, restrictions or advisories to notify the public of the need to curtail open-air burning during dry summer conditions for public safety reasons. Burn restrictions may be issued by various local governments in the U.S. and Canada during Air Quality Advisories. Notices by way of local radio, television, Internet or billboard outlets can publicize bans on burning wood and other materials.

Tool 2 Air Quality Advisories and Burn Restrictions

Jurisdictions should consider curtailing open-air burning activities during poor air quality episodes or where poor air quality is predicted.

Management Options:

2.1 Notification: Local municipalities, provinces, territories, and Aboriginal communities should make a reasonable effort to notify residents about any concerns for open-air burning during an Air Quality Advisory or widely observed haze event. Notices could be disseminated through local radio stations, Internet, billboards, newspapers or by distribution of leaflets. Initial notices may request voluntary wood burning curtailment in the community.

2.2 Burn Restrictions: Burn restrictions should be considered in the following context:

a) Voluntary No-Burn Days: Guidelines or programs requesting that the public voluntarily refrain from conducting burning during periods of poor air quality.

⁵ Criteria air pollutants are those pollutants involved in the formation of smog, and include particulate matter, ground-level ozone, carbon monoxide, sulphur oxides, and nitrogen oxides.

b) Mandatory No-Burn Days: Municipal by-laws or regulations to curtail wood burning during poor air quality could include mandatory restrictions on open fires. Appendix 1 identifies draft regulatory or by-law text for prohibiting open-air burning during these events. Appendix 4 illustrates a model fire permit and the conditions under which a permit may be suspended due to poor air quality.

c) Fire Bans and Restrictions: Provincial or municipal fire bans and restrictions are also effective tools for curtailing and managing burning for public safety reasons during periods of drought or fire hazard. Jurisdictions may need to decide how fire bans or restrictions would work with ‘No-Burn Days’ if using both tools or applying them in different seasons and conditions.

In addition, jurisdictions can consult the Canadian Ambient Air Quality Standards (CAAQS) for PM_{2.5} and ozone (www.ccme.ca) to assist them in determining when and to what extent burn restrictions such as mandatory or voluntary No-Burn Days should be implemented⁶. Those jurisdictions that exceed or are close to exceeding the 24-hour PM_{2.5} or 8-hour ozone CAAQS on a long-term basis, should consider eliminating or reducing certain open-air burning activities. This may be especially common during the summer “ozone season” (approximately May 1st to September 30th). One-hour ambient air quality criteria or standards for these pollutants may be a more sensitive measure of short-term variation in air quality if those measures are locally available.

4.3 Alternatives to Open-Air Burning

Jurisdictions may have opportunities to develop alternatives to open-air burning for their communities. Material source separation, recycling and reuse, including energy and biomass recovery facilities, may help offset open-air burning activities of wood waste for communities interested in cleaner waste management solutions.

⁶ It should be noted that the CAAQS is a measure of longer term trends in air quality (3-year averages) and therefore the local air quality index, where available, provides for a better daily air quality reference point.

Tool 3 Alternatives to Open-Air Burning

There are many alternatives to open-air burning that should be explored by jurisdictions as part of integrated air and waste management planning at the local level (see Section 6.5 - Waste Management Planning).

Options could include:

- 3.1 Composting and Chipping Sites:** Establish free drop-off sites for yard, garden and other area materials, year-round at waste recycling depots. This material can be locally recycled into wood chips and compost which can then be given back to the public for use in their gardens or used for municipal landscaping. Accepted materials include: grass, leaves, shrubs and branches no greater than 7.5 centimetres (3 inches) in diameter. Curb-side pick-up of wood waste and leaves may also provide feedstock for recycling operations.
- 3.2 Wood Energy Utilization:** Explore opportunities for encouraging wood waste energy development opportunities with stakeholders potentially interested in alternative energy operations including co-generation. Wood waste can be used as a fuel to generate heat or electricity at industrial or commercial facilities.
- 3.3 Biomass Utilization:** Consider partnerships with local wood product manufacturers that may be interested in wood waste as biomass. Woody biomass can be used for many purposes including: pulp for paper, methanol/ethanol production, wood pellets, garden bedding, furniture, specialty crafts, compost, mulch, fibre, or particle boards.

Additional Resources:

Cowichan Valley Regional District Alternatives to Open-Air Burning Brochure:
<http://www.cvrd.bc.ca/DocumentCenter/Home/View/2162>

New York State Department of Environmental Conservation - Regulations and Alternatives to Burning:
<http://www.dec.ny.gov/chemical/32064.html>

Southwest Clean Air Agency – Outdoor Burning and Alternatives: <http://www.swcleanair.org/outburn.html>

4.4 Public Outreach and Education

Public outreach and education programs help to raise awareness about the health, air quality and public safety impacts associated with open-air burning. They also provide a means to educate land owners with respect to safe and efficient open-air burning practices. Outreach campaigns are particularly important when building community acceptance and support for proposed by-laws or regulations, for disseminating information over a long period of time, and for promoting initiatives that encourage public participation in related programs such as alternatives to open-air burning.

Outreach programs can be conducted by public, private, and non-profit organizations, and benefit by involving a broad range of interested stakeholders such as volunteer groups and professional associations.

Tool 4 Public Outreach and Education

Jurisdictions should consider outreach and education programs as a means to raise awareness, promote voluntary reductions in open-air burning, and to facilitate acceptance of new rules and programs with respect to open-air burning. Subsequent sections of this Guidance Document provide additional practices that should be considered in support of public outreach and education.

Management Options:

4.1 Electronic Resources: Open-air burning best practices, health information, and information on alternatives to burning can be communicated through e-mail notification servers and on websites. Jurisdictions could develop a background document on open-air burning and provide a website link to the CCME Guidance Document for Canadian Jurisdictions on Outdoor Open-Air Burning (GDOAB).

4.2 Multimedia Public Notification: Local television, newspapers, posters, pamphlets, billboards and public Town Hall meetings can be used to inform the public about issues relating to open-air burning. Be aware of the need to communicate information at the appropriate time of year (e.g., early spring, summer, or fall). Appendix 2 and Appendix 3 of this Guidance Document provide examples for materials that can be adopted for this type of outreach.

4.3 Key Messages for Outreach and Education:

- ✓ Avoid open-air burning whenever possible – find alternative ways to mulch, compost or reuse wood waste
- ✓ Do not burn during Air Quality Advisories and Burn Restrictions
- ✓ A smoke nuisance must not be created
- ✓ Obtain a fire permit if open-air burning is necessary (if required)
- ✓ Burn in open areas away from overhead wires and branches
- ✓ Burn at least 15 metres (50 feet) away from any structure
- ✓ Scrape away burnable materials on the ground several feet around piles. The result should be bare soil
- ✓ Only burn clean dry, well aerated wood. Wet or dirt covered materials will smoulder and create more smoke
- ✓ Do not burn prohibited waste materials
- ✓ Never leave fires unattended
- ✓ Municipal contact name and Internet link to local by-laws, codes or regulations

4.4 Local Service and Equipment Providers: As part of public awareness campaigns jurisdictions should explore opportunities to engage local chipping, shredding and composting equipment sales, rentals and service companies in expanded marketing for their products.

4.5 Community-Based Social Marketing: Research and actions can be targeted to address specific barriers to behaviour within a community. A locally recognized individual can be an effective campaign leader for coordinating outreach components.

Additional Resources:

Tools for Reducing Residential Garbage Burning for Local Officials and ‘Bernie the Burn Barrel’ Western Lake Superior Sanitary District:

http://www.wlssd.com/documents/Burn_Barrel_Media_Kit_Intro.pdf

Fire Smart Canada:

<https://www.firesmartcanada.ca/>

<http://wildfire.alberta.ca/fire-smart/default.aspx>

<http://bcwildfire.ca/Prevention/firesmart.html>

4.5 Performance Management – Planning for and Measuring Success

Jurisdictions should consider measuring and assessing the outcomes of their smoke management efforts by establishing and tracking appropriate indicators. This approach requires that measurement be considered from the outset of an initiative, in the planning and evaluation phases of such work.

Tool 5 Performance Management – Planning for and Measuring Success

Jurisdictions should consider assessing the outcomes of their smoke management efforts by tracking appropriate indicators. Planning for performance measures for smoke management should include measures from the CCME Guidance Document on Outdoor Open-Air Burning and from the CCME Code of Practice for Residential Wood Burning Appliances. This approach helps jurisdictions ensure that their actions are effective and the cumulative benefits based on these tools are measurable.

Management Options:

5.1 Initial Smoke Evaluation: An initial smoke evaluation may include a community survey defining smoke problems, a review of the fire permitting and compliance process, available emissions inventories and air quality indicators for particulate matter, along with available alternatives to open-air burning, among other elements. This will establish a baseline from which program success can be measured.

5.2 Selection of Actions: Having completed an initial smoke evaluation, performance measures should be crafted to compare planned implementation of GDOAB elements with the potential community response. Measures should include:

- ✓ Number of fire permits and permit data supporting an open-air burning emissions inventory for particulate matter and carbon monoxide/dioxide emissions
- ✓ Public nuisance complaints
- ✓ Compliance and enforcement activities
- ✓ Public outreach and education campaigns
- ✓ Quantities of wood waste and yard waste diverted to reuse facilities
- ✓ Number of burn restriction days or other evidence based observations (e.g., haze or visible smoke caused by local open-air burning practices)
- ✓ Short-term and long-term emissions trends based on emissions inventory estimates
- ✓ Air Zone Management Level based on the Canadian Ambient Air Quality Standards (see ccme.ca).

5.3 Measure Project Success: Results from selected actions can be reported as either qualitative information or in terms of quantifiable data indicating project success. The collection of information can help to define project success rates in support of continuous improvement. This data can be used when reporting to the public, funding agencies and partners, and will inform future initiatives.

5.0 GENERAL DIRECTIONS FOR OPEN-AIR BURNING

Where there is a risk of air quality deterioration in a community due to open-air burning activities, any best practices in this Guidance Document may be needed to reduce smoke intensity and to protect public health. The intensity of the policy response by jurisdictions may include enhancing fire permit and other by-law requirements for a greater level of wood smoke control especially where smoke tends to stagnate due to geographic features causing poor air dispersion or where complaints by neighbouring residents are frequent.

5.1 Allowable and Prohibited Burn Materials

Many materials should not be burned at all due to the pollutants they can emit, including plastics, railroad ties, cardboard and pressure-treated, painted or varnished wood. The type of material being burned should be limited to clean dry wood waste. Clean wood waste refers to tree trunks, tree branches, brush, or wood products that do not contain painted or treated wood materials (e.g., chromated copper arsenate or ammoniacal copper zinc arsenate, pentachlorophenol, creosote, pesticides, or paint); are excluded upholstered articles; plywood or composite wood

products containing varnish or glue; articles to which a rigid surface treatment is affixed or adhered, unless the rigid surface treatment is predominantly wood or cellulose. The definition of clean wood waste also excludes and prohibits other materials from being open burned such as tires or other rubber products, plastics, heavy oils or asphalt-based or -impregnated materials, paper products, other mixed waste or any large piles of grass clippings or collected leaves.

A list of materials typically prohibited from open-air burning is illustrated in a poster in Appendix 2, which may be adapted for use in jurisdictions to help educate the public on what materials should not be burned.

In some areas, the burning of green or wet wood may be required for disease and insect control (e.g., pine beetles, and diseased or infested tree clippings in orchards). The burning of green wood in these situations may require tightened measures to minimize potential smoke impacts (e.g., burning setbacks further away from nearby residences, notification requirements for nearby residents, use of accelerant materials to speed ignition of the green debris, or use of forced air to speed combustion of the green debris).

5.2 Meteorological Conditions

Burn when meteorological conditions favour smoke dispersion, air mixing, safe combustion and minimal smouldering. Planning shorter burn periods will help better manage burning in the event of changing weather conditions. Many jurisdictions will also have access to fire weather and fire behaviour indices during the fire season. These incorporate all of the factors discussed below to synthesize fire danger, spread rate etc.

The following meteorological conditions should be considered before and during open-air burning activities. If conditions are not favorable, the burn should be postponed or terminated (if already started).

- **Ventilation** – persistent low-level atmospheric/temperature inversions (i.e., stagnant air conditions often found on calm cold days) can result in poor ventilation of the fire and trap smoke near the ground. Some jurisdictions have established venting indexes, a numerical value related to the potential of the atmosphere to disperse airborne pollutants (see British Columbia ventilation measures: www.env.gov.bc.ca/epd/epdpa/venting/venting.html). Consider needs for suitable ventilation requirements (wind speeds – sec. 5.2) in order to avoid creating an adverse effect on air quality, especially near residential areas or sensitive receptors (e.g., schools, hospitals, places of worship).⁷
- **Rain, fog or snow** – While burning with snow on the ground or after a rain event may be safer from a fire safety perspective, it has to be balanced with the concern that materials may be damp and burn inefficiently and could smoulder excessively, creating a potential for

⁷ Limitations in current weather models may lead to overly conservative forecasts of the ventilation. Reliance on these as an absolute condition for burning may unintentionally prohibit any burning for extended periods during the fall and winter.

nuisance smoke. The presence of fog is also an indicator of poor venting conditions, and burning under these conditions may lead to nuisance smoke.

- **Wind speed** – Winds increase atmospheric mixing, thus contributing to better dispersion of the smoke from pile burns and lower risk of compromised air quality. However high wind speeds also increase the risk of fires spreading or burning out of control. The ideal wind speed for open-air burning will depend on the type of burn and the prevailing fire hazard. In general, light winds below approximately 10 kilometres per hour (km/hr) could be safer for a particular prescribed burn. For pile burns with surrounding snow cover, winds above 10 km/hr could be the favourable wind speed for proper ventilation, with a low fire hazard. Wind speed and direction may change rapidly and should be monitored closely with any burning:
- **High winds** – can blow live sparks several hundred metres downwind and are a fire hazard. Some jurisdictions ask that fires be extinguished when wind speeds exceed set limits (e.g., 25 kilometres per hour or higher).
- **Low winds** – can affect ventilation and some jurisdictions do not allow some types of open-air burning when wind speeds are too low and do not allow for adequate ventilation.
- **Wind Direction** – the prevailing wind during the burn should be away, to the extent possible, from any receptors (e.g., residences, schools, hospitals, places of worship etc.) likely to be affected by the smoke. Planning the burn around predicted wind direction is also essential to ensuring that fire containment and safety is maintained and should be a primary consideration.
- **Drought or dry weather conditions** – increase the risk of a burn escaping containment and becoming a wildfire.
- **Temperature and relative humidity** – these can rapidly affect the drying rates on vegetative fuels, especially grasses. For example, depending on type of burning and local area conditions, open-air burning should not be conducted by untrained individuals when the relative humidity falls below 25 percent or when temperatures rises over 25°C. The ‘cross-over’ rule is when relative humidity percentage is equal to or dips below the temperature and is an indicator of the highest fire risk period during the diurnal temperature cycle.

Those planning open-air burns should know the current fire conditions or restrictions such as fire bans in their area by checking with local forest and fire management agencies including any roadside signage.

5.3 Time of Day

- Jurisdictions should consider ‘time of day’ requirements for burning in consideration of the potential impact on both air quality and fire safety. Meteorological conditions can change during the day or night and can potentially result in two problems; fire escape or

adverse air quality conditions. Establishing time of day requirements should consider the type of burn, potential air quality impacts and fire hazards. The following should be considered:

Night-Time Burning

- The peak burning time usually follows the diurnal cycle; in terms of safety it is better to light some types of fires in the evening (e.g., prescribed agricultural fires), not in the morning, as the chance of a fire escaping increases after the morning hours and throughout the day as the temperature rises and the relative humidity drops.
- During periods of drought or dry weather conditions the only option may be to burn after certain time periods (e.g., ignite the fire no sooner than 2 hours before sunset and extinguish it no later than 2 hours after sunrise).
- Night-time burn practices should consider needs for safety, smoke dispersion and air quality protection when occurring in or near highly populated areas or roadways.

Day-Time Burning

- In terms of air quality management, day-time burning can be better for smoke dispersion under rising wind conditions, thereby minimizing air quality deterioration.
 - These conditions however may result in a higher risk of fires escaping with negative consequences (especially when burning occurs in the early-mid part of the day). Day-time open-air burning may therefore be discouraged or prohibited by jurisdictions unless this type of burning can be conducted safely, under low fire hazard conditions and with good ventilation.
 - Multi-day burns in smaller amounts should be considered if burning cannot be safely completed due to changing meteorological conditions or due to air quality considerations. Note, during summer drying periods, fire hazard conditions will become cumulative so multi-day burns may not be an option with a rising hazard.
- Time of day considerations may all be affected by seasonal conditions, especially in northern territories where longer sunny days in the summer can drastically affect the local weather and fire environments.

5.4 Time of Year

Seasonal changes can affect the moisture content of vegetation and hence the smoke and fire conditions during open-air burning. In general, the spring poses the most fire danger risk, as the surrounding ground cover vegetation is cured, dead and dried from the winter. As temperatures rise, before grass green-up and tree leaves flush, the vegetation is lowest in moisture content and is more volatile and unpredictable in fire behaviour. Extended periods of drying or drought in the summer or fall can also mimic the spring wildfire risk conditions.

New York State, for example, has implemented a state-wide ban on open-air burning between March 15 and May 15 of each year. Numerous wildfires have been shown to be caused by open-air burning of debris during that period (see: <http://www.dec.ny.gov/chemical/58519.html>).

In addition, restrictions on prescribed burning should also be considered within or near sensitive wildlife habitats, especially during the spring breeding season (see Section 5.12- Sensitive Receptors).

5.5 Current or Forecast Episodes of Poor Air Quality

Open-air burning activities should not be undertaken during periods when a local or regional air quality advisory has been issued. In addition, burning should not take place during a fog event since smog (smoke plus fog) tends to form and stagnate below the heavier layer of water vapour preventing it from dispersing. Local governments are advised to designate a burn restriction such as a No-Burn Day in the event of an air quality advisory, if a fire ban (see below) has not been designated. No-Burn Days may take two approaches:

- **Voluntary No-Burn Days** – guidelines or programs requesting that the public voluntarily refrain from conducting open-air burning during periods of poor air quality.
- **Mandatory No-Burn Days** – model by-law or regulation elements that prohibit open-air burning during periods of poor air quality are illustrated in Appendix 1. Appendix 4 illustrates a model fire permit and the conditions under which a permit may be suspended due to poor air quality.

Fire Bans and Restrictions – Provincial or municipal fire bans and restrictions are also effective tools for curtailing and managing burning for public safety reasons during periods of drought or fire hazard. Jurisdictions may need to decide how fire bans or restrictions would work with No-Burn Days if using both tools or applying them in different seasons and conditions

5.6 Preparation and Transportation of Materials to be Burned

Wet or dirt-covered materials will smoulder and create more smoke. Fuel preparation methods should be used to minimize dirt and other non-combustibles being placed in the fire, and to control the moisture content of the material as much as it is practical. Fuel moisture has the biggest influence on combustion efficiency and the amount of smoke generated. If the purpose of the burning is to prevent the spread of pests or disease, the fuel materials may be required to remain on the site or property where the burning will take place. Burn materials should not be transported to or from another site unless necessary. Occasionally it may be desirable to move the debris a short distance to ensure adequate setbacks from the burning to adjoining residences or businesses. Wood needed as fuel for cooking or warmth at a campsite may be moved but only if transportation restrictions are not in place.

Prior to the burn, selected vegetative debris should be:

- free of excessive dirt, soil and moisture
- arranged or loosely stacked in such a manner as to promote drying

- covered (when practicable) to protect the material from moisture in any form, including precipitation or dew.

Some jurisdictions have indicated that green or freshly cut debris should be thoroughly dried for at least 10 days prior to the burn. Other jurisdictions have indicated that prunings and small branches should be allowed to dry for three weeks while large branches/stumps should be dried for six weeks or longer, depending on moisture content and the type of wood. A small test fire can determine the dryness of a material, how well the material burns and where the smoke is going. In general, setting a specific drying period across all dead and live vegetation types is not effective or an easy metric to administer as materials can be in drought conditions already or there may be other reasons such as insect and disease control.

5.7 Choice and Preparation of Site

A properly chosen and prepared site will help create a safe environment for an open-air burn and will reduce the risk of fire escape or creating secondary fires.

An ideal site:

- has been located away from overhead branches and wires
- is located away from or downwind from sensitive receptors (e.g., schools, hospitals, places of worship)
- has been inspected to ensure there are no petroleum or gas pipelines on or near the burn site in order to avoid explosion hazards
- has a fire break. Some jurisdictions regulate breaks depending on the type or size of burn. For even small piles of yard debris, many jurisdictions advocate scraping away burnable materials on the ground (down to the mineral level) several feet around the pile of debris to be burned. This ensures a sufficient area to prevent spreading of the fire when materials are blown or roll off the burning pile. The diameter of this fire break will vary depending upon the size of the pile of debris to be burned (e.g., small fires usually need a break of at least 2 metres in diameter, depending on area conditions)
- has “wet” areas outside the firebreak, prepared by soaking with water.

5.8 Fire Suppression Equipment and Recommendations

Fire suppression equipment and personnel requirements as specified in provincial fire regulations and local fire protection bylaws must be present at all times during any type of urban or residential open open-air burning setting. Basic equipment could include:

- garden hose
- buckets of water
- bucket of dirt or sand
- shovel and rake.

Depending on the amount or area of material being burned, additional fire suppression tools and recommendations may be required, for instance:

- small confined fires for wood waste - one adult, one garden hose or bucket of water present at all times
- confined grass fires⁸ - at least two adults, buckets of water as well as garden hose or portable high capacity fire hose and pump, hand tools such as a shovel and rake
- confined brush fires⁸ - at least two adults, garden hose or portable high capacity fire hose and pump, buckets of water and a few hand tools such as shovel and rake
- Large scale brush, grass or debris pile burning⁸ - multiple adults, heavy equipment such as bulldozers or backhoes, large scale portable water sources such as water tenders (trucks), and multiple high volume water pumps and hose
- small confined fires for wood waste - one adult, one garden hose or bucket of water present at all times
- large confined grass fires⁸ - at least two adults, brooms or other appropriate items to suffocate a fire, buckets of water as well as garden hose or portable high capacity fire hose and pump
- large confined brush fires⁸ - at least two adults, garden hose or portable high capacity fire hose and pump, buckets of water and a few hand tools such as shovel and rake.

Before vacating the site, the fire should be completely extinguished to ensure smouldering of material does not occur. A buried fire is not considered extinguished. Soaking the material with water is the best method. Ashes should be cold prior to leaving the site. Large scale burn programs should also consider infrared scanning post burn.

5.9 Supervision of Open-Air Burns

All open-air burns must be supervised by a responsible adult and be controlled at all times.

5.10 Size of Debris Piles

The size of debris piles can be regulated by jurisdictions, but often can be difficult to administer effectively and consistently. Setting debris pile limits are more important in highly populated areas. The size of pile(s) may be less relevant than the ability to manage the fire (e.g., a private resident in an urban municipality is much different than a large scale industrial agricultural or forestry operation).

The size of the debris pile will affect the time required to achieve complete reduction of the debris, and also affects safety issues associated with managing an open-air burn.

⁸ Fire supervisors should check with their local provincial or municipal authority to ensure that up-to-date safety and technical information including regulations and by-laws are reviewed when planning to conduct a grass or brush burn. In general, the magnitude of fire protection equipment and the number of support workers may need to increase in proportional to the size of the burn area.

Open-air burns should be completed and extinguished within the requirements specified by the jurisdiction. If the size of the debris pile was managed properly all of the materials will have been fully combusted.

When burning vegetative matter at a private residence, if allowed, the size of the debris pile is typically restricted. Some common size restrictions include:

- 3 metres by 3 metres by 3 metres
- less than 3 metres in diameter and less than 2 metres in height, or
- 0.7 cubic metres of material, unless otherwise specified by the jurisdiction.

When burning vegetative matter or woody debris at a larger scale, e.g., for industrial agriculture or forestry operations, the size of the debris pile is typically not regulated, and is less important than maintaining or building appropriate firebreaks and fire suppression equipment and manpower on site.

Burn piles should be formed with proper land clearing techniques so that soil is not mixed in with burn material.

5.11 Smouldering

Smouldering (i.e., combustion with no flame) should be minimized or not be allowed for most burning in residential areas due to the smoke it typically creates. For larger scale industrial burns, prescribed agricultural or ecological fires, smouldering is often unavoidable but can be minimized with effective planning and actively managing the burning.

5.12 Sensitive Receptors

A sensitive receptor is a specific site where a local human population or wildlife habitat may have a greater susceptibility to health effects or environmental impacts due to exposure to an air contaminant.

Land uses (sensitive sites) where sensitive receptors are typically located may include: a health care facility, senior citizens' residence or long-term care facility, child care facility, educational facility, designated environmentally sensitive areas especially where species at risk may be negatively affected and any other site specified by the jurisdiction as a site where discharges of smoke may cause a risk to human health.

Sensitive receptors in proximity to open-air burning sites are of particular concern to the public. Communities should therefore have regard for the need to evaluate and designate potential sensitive receptors prior to selecting an open burn site and operating times of day and year.

Appendix 1, Part 2, Section 10 provides a sample of by-law or regulatory elements that considers additional protection for these receptors by requiring increased setback distances from large open-air burning operations.

Additional Resources:

Canadian Wildland Fire Information System (CWFIS): creates daily fire weather and fire behaviour maps year-round and hot spot maps throughout the forest fire season, generally between May and September, see: <http://cwfis.cfs.nrcan.gc.ca/home>
<http://cwfis.cfs.nrcan.gc.ca/background/summary/fdr>

South Coast Air Quality Management District –Air Quality Issues Regarding Land Use, Orange County, California: <http://www.aqmd.gov/docs/default-source/planning/air-quality-guidance/chapter-2---air-quality-issues-regarding-land-use.pdf?sfvrsn=2>

Alberta Wildfire Prevention and Enforcement:
<http://wildfire.alberta.ca/wildfire-prevention-enforcement/default.aspx>

6.0 DIRECTIONS FOR SPECIFIC TYPES OF OPEN-AIR BURNING

The information provided in this section helps inform best practices that are unique to specific types of sites including residential and other urban areas, Aboriginal communities, agricultural and forested lands, and landfill sites. These practices should be considered and implemented in conjunction with the General Directions for Open-Air Burning (Section 5) and in context to Appendix 1.

Burning practices including setback distances between open-air burning and occupied building or combustibles cited in this Guidance Document are based on the Review of Municipal, Provincial, Territorial and Federal Policies for Open-Air Burning in Selected Canadian and International Jurisdictions, 2016 (www.ccme.ca).

6.1 Residential and Recreational Outdoor Fireplaces

Residential and recreational fireplaces in this Guidance Document are described as either small confined fires (campfires and ornamental fireplaces such as chimeneas) or large confined fires (bonfires and burn barrels) depending on their application (see Appendix 1 - Part 2, Sections 5 and 6). In both cases community population density can be a deciding factor in determining where these types of fireplaces may be operated or how many fire permits are allocated.

Small confined fires (restricted to less than one metre in diameter requiring setbacks of 15 metres or more from nearby neighbours) for cooking, warmth or burning of small amounts of brush or wood waste outside of urban areas, if allowed, must not cause any nuisance. Local air quality problems or complaints in urban areas wherever heavy recreational burning occurs, including ornamental fireplaces, has suggested that jurisdictions may need to consider restricting their operations in order to reduce potential health risks and prevent fire from spreading (see Appendix 1 - Part 4). Large confined fires (bonfire or burn piles restricted to less than two metres in height) would be applicable only in rural areas where the risk of population exposure is low, and where setbacks from nearby neighbours would need to be at least 30 metres or more.

6.2 Aboriginal Communities

Communities considering enacting programs based on the information in this Guidance Document may find it helpful to contact their provincial or territorial government and adjacent local municipalities for a discussion of local open-air burning issues and the potential to take collaborative actions. Strong provincial, territorial or municipal relations with communities can assist in meeting a range of objectives, including collaboration on service delivery to achieve open-air burning best practices.

In addition, notification of an air quality advisory, fire bans, or other requests for open-air burning curtailment are some actions that jurisdictions may want to consider as part of any outreach program for all communities, including Aboriginal ones. One of the issues for northern Aboriginal communities is poor air quality from forest fires in the summer. Often there are voluntary or mandatory evacuations for residents who are at high risk to health issues due to air quality. Communities and governments can continue to work together to pre-plan for emergencies and pre-identify high risk individuals and work with local health, public safety and community agencies to better co-ordinate ways to mitigate risk and respond to community needs in a timely manner.

Open-air burning, air quality and waste management concerns are not unique to urban communities; rural and northern communities can also be impacted by these issues and can require evacuation or additional supports during periods of poor air quality. Many communities, municipalities, and provincial and territorial governments are working together to provide better education and outreach to improve open-burning practices and mitigate health risks.

Additional resources:

Aboriginal Affairs and Northern Development Canada – emergency management resources:
<https://www.aadnc-aandc.gc.ca/eng/1309369889599/1309369935837>

Aboriginal Affairs and Northern Development Canada – environmental management resources:
<https://www.aadnc-aandc.gc.ca/eng/1100100034649/1100100034653>

First Nations Wildfire Evacuation Partnership – exploring the impact of evacuations due to wildfires (and related smoke and health issues):
<http://www.eas.ualberta.ca/awe>

First Nations Emergency Services Society of British Columbia:
<http://www.fnss.bc.ca/>

Aboriginal Firefighters Association of Canada:
<http://www.afac-acpi.ca/>

6.3 Landfill

All materials to be received at a landfill site where open-air burning of wood waste is allowed should be separated into waste stream types (e.g., clean wood, other wood products, metals, drywall, glass, hazardous materials, brush and limbs). This practice will enable jurisdictions to

assess quantities of materials for reuse and help to avoid accidental combustion of prohibited materials (i.e., waste other than wood waste). The following are landfill burn permit requirements found in some North American jurisdictions:

6.3.1 General Requirements

Materials generally prohibited from burning at a landfill include:

- waste (other than clean wood) from residential, commercial, construction/demolition, agricultural or industrial establishments listed in Appendix 2
- waste materials having practical use for recycling operations including energy recovery facilities
- leaves and grass clippings.

Materials generally permitted for burning at a landfill include:

- wood waste such as brush, tree trunks, tree limbs and untreated waste lumber.

6.3.2 Frequency and quantity of materials burned in landfills

- Consider limiting landfill burning of wood waste to a few instances per year (e.g., brush burning days). Landfill operators may be encouraged to set caps on quantities burned thereby encouraging alternatives to burning.
- Consider setting up a mulching system or program that allows residents to bring clean woody debris or waste to the land fill or consider a portable system as a part of municipal services or spring clean-up programs.

6.3.3 Preparation of burn area

- Consider requiring landfills to use air curtain incinerators to conduct their open landfill burning of wood waste.
- Ensure landfills that are permitted to burn have appropriate firebreaks and setbacks with vegetation cleared away down to mineral soil.

6.3.4 Fire control and security

- Landfill operators or municipal officers should maintain a landfill area watch during periods of drought or high forest fire hazards if the landfill is subject to fire. Owners and operators of private landfills should do the same.
- Remove combustible materials in the vicinity of the landfill to minimize the likelihood of unintended fires. Some jurisdictions have required that all grass, weeds, brush and debris and other inflammable material be removed for a distance of 30 metres in all directions. In some instances, depending on the site landscape, a strip 3 metres wide has to be cleared to mineral soil on all sides of the landfill. Live trees need not be removed, except that green branches of conifers and dead branches of all trees should be pruned to a height of 3 metres above the ground. Dead trees should be removed.
- Land where open-air burning is to take place should not be filled or covered so as to present underground fire hazards due to the presence of methane gas.

- Landfills that are conducting open-air burns of wood waste should also ensure that the landfill site is fenced and access is controlled and supervised at all times.

Additional Resources:

Landfill Standards: A Guideline on the Regulatory and Approval Requirements for New or Expanding Landfilling Sites (February, 2014) -published by the Ontario Ministry of the Environment and Climate Change: <http://www.ontario.ca/environment-and-energy/landfill-standards-guideline-regulatory-and-approval-requirements-new-or>

6.4 Air Curtain Incinerators

Air Curtain Incinerators (ACI) should only be operated for the combustion of clean wood waste in some agricultural or forest debris management operations.

ACI operations improve open-air burning combustion efficiency and reduce emissions by introducing high velocity air into a combustion container. As the air continuously flows in and over the fire, a “curtain” is created around the fire thus trapping and recirculating smoke and particulate matter. Constant airflow into and over the combustion environment allows temperatures to remain high, resulting in relatively complete combustion of all emission products.

Municipalities and operators of ACIs should consult provincial or territorial governments to determine if ACIs are permitted for use, and the applicable design and operating conditions or permits that may be required.

6.4.1 ACI Direction

Important policy requirements for the safe operation of an ACI unit are referenced in Appendix 1 - Part 2, Section 9. The following guidelines may also apply:

- Air curtain incinerators should meet manufacturer’s specifications for operation and upkeep to ensure high burning efficiency. Manufacturers’ specifications should be kept on site.
- Approval for use of an air curtain incinerator at one site may be granted for a specified period (e.g., 3 months), but may be extended for additional limited periods upon further approval by the relevant government agency. Written approval should be received before re-locating the enhanced burner either within the approved burn site or to a different burn site.
- It is recommended material should be burned in the incinerator during daylight hours for better venting and air quality reasons. Additional material should not be added to the incinerator if that material could continue to burn after daylight hours. The fan or incinerator may be operated beyond these hours, but only while the facility is attended and if proper venting conditions exist.

- Opacity testing for visible emissions or smoke density has been used in some jurisdictions as a measure to ensure that open-air burning is conducted efficiently thereby minimizing particulate matter levels. For example, visible emissions should not exceed an opacity measurement of 20 percent during operations or 35 percent during start-up (for 30 minutes). Jurisdictions interested in implementing an opacity requirement for open-air burning sources may find additional resources at the U.S. Environmental Protection Agency's website <http://www.epa.gov/ttnemc01/methods/method9.html>.
- Ash should not be allowed to build up in the pit to a depth higher than one-third of the depth of the pit or to the point where the ash begins to impede combustion, whichever occurs first. Water should be applied to the ash prior to its removal to prevent the ash from becoming airborne.
- Ash resulting from ACI operations should be managed in accordance with the local or provincial government legislation or guidelines. Ash resulting from the burning of wood waste or vegetative debris that has been tested and demonstrated to be leachate toxic must be disposed of at facilities approved to receive hazardous waste materials.

Additional Resources:

U.S. Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Commercial and Industrial Solid Waste Incineration Units: <https://www.federalregister.gov/articles/2000/12/01/00-29875/standards-of-performance-for-new-stationary-sources-and-emission-guidelines-for-existing-sources#>

Guide to the Code of Practice for Small Incinerators (Alberta): <http://environment.gov.ab.ca/info/library/8782.pdf>

Air Curtain Incinerator – General Operating Permit (Texas):
http://www.tceq.texas.gov/assets/public/permitting/air/Title_V/General/518terms.pdf

Principles and operation of air curtain incinerators can be found at: www.airburners.com/principle.html

Texas Commission of Environmental Quality Air Permits By Rule (PBR) Checklist Title 30 Texas Administrative Code 106.496 Air Curtain Incinerators: <http://www.tceq.texas.gov/assets/public/permitting/air/Forms/PermitsByRule/Checklists/10536.pdf>

North Carolina Division of Air Quality Regulation 15A NCAC 02D.1904 Air Curtain Burners: <http://daq.state.nc.us/rules/rules/D1904.pdf>

6.5 Waste Management Planning

Some northern and/or remote communities may have limited options for cost-effective and environmentally sound waste management. Waste management activities in these regions should also help to avoid potentially dangerous interactions between humans and wildlife. In all cases, reduction and diversion should be the primary waste management objectives, prior to considering any disposal option. In some cases, incineration may be an appropriate option for waste other than wood waste. For guidance on incineration of waste other than wood waste,

readers should consult Environment Canada's 2010 publication entitled *Technical Document for Batch Waste Incineration*⁹

Some communities in these situations have developed innovative waste management solutions thereby preventing or reducing emissions of hazardous air pollutants and greenhouse gases into the atmosphere. Solutions include adoption of practices that integrate waste management with opportunities for waste energy recovery.

Additional Resources:

Sharing the Story - Aboriginal and Northern Energy Experiences - Energy Efficiency and Renewable

Energy: <http://www.aadnc-aandc.gc.ca/eng/1100100034302/1100100034418#chp18>

Community Energy Planning: A Resource Guide for Remote Communities in

Canada: <http://www.thesolarvillage.com/energyplan/CEP%20Remote.pdf>

Confederation of European Waste-to-Energy Plants (CEWEP): <http://www.cewep.eu>

Assessment of Solid Waste Practices for BC First Nations Remote Coastal

Communities: http://www.swananorthernlights.org/banff2010/proceedings/Assessment_of_solid_waste_practices.pdf

7.0 PRESCRIBED BURNING

Terms presented in section 7.0 are for scoping purposes only as prescribed burning can carry significant risk and impacts, can be technically complex and should only be completed by highly trained professionals. Jurisdictions and practitioners of prescribed burning operations should be familiar with appropriate legislation, regulations, policies, and standard operating procedures.

Additional Resources:

National Fire Protection Association: NFPA 295: Standard for Wildfire Control - example of one standard used by some agencies in the US:

<http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=295>

British Columbia

<http://bcwildfire.ca/prevention/PrescribedFire/>

7.1 Burn Permits, Burn Plans and Notifications

Agricultural, forestry and habitat open-air burning may be subject to local fire bans during times of high fire hazard or poor air quality. Farm and forestry operators should consider air quality advisories, local air conditions and potential nuisances when deciding whether or not to conduct a burn to enhance soils and forests.

⁹ Environment Canada. 2010. Technical Document for Batch Waste Incineration. Available at: <http://www.ec.gc.ca/gdd-mw/default.asp?lang=En&n=F53EDE13-1>. 2013-10-28.

Prescribed burning should be implemented in conjunction with Part 3 of Appendix 1. The following are prescribed burn requirements found in some North American jurisdictions:

- Agricultural and forestry open-air burning may require a permit and/or a burn plan (though this has not been the case for all jurisdictions).
- Individuals conducting a prescribed burn are encouraged to contact the relevant local authorities prior to the burn. These authorities could include the local agency in charge of forest management, local fire officials, the local air quality authority, those in charge of local traffic control (if the burn may cause smoke to pass over a roadway) or local airport authorities (if the burn may cause smoke to pass over an airfield).
- For larger open-air burns or burns located close to populated areas permit holders are encouraged to provide prior notice of the date and location of the burn to all households up to 25 kilometres (depending on burn size and duration) of the burn. Effective notification will prevent an unnecessary emergency response to smoke plumes.
- Non-agricultural matter should be removed from open-air burns of ditch banks and levees prior to the burn.
- The permit application may include, where feasible, maps of the areas to be burned, direction of prevailing winds, location of residential, institutional, commercial and public establishments or other sensitive receptors.
- Permits and/or plans should specify, where feasible, safety and contingency plans including:
 - (a) contact information for:
 - area emergency responders
 - the property owner
 - the agency/contractor conducting the burn
 - (b) actions planned to minimize emissions during and after the fire.
- The permit application could require a rationale as to why alternatives to open-air burning cannot be implemented.
- For larger scale open-air burns of vegetative material, some jurisdictions have required the fire operator to have reviewed fire safety and smoke management educational material or completed a smoke management training program prior to initiating a planned burn project.
- Some jurisdictions allow only one open-air burn per premise per calendar year for land clearing or right-of-way maintenance.

7.2 Allowable Burn Area

Some jurisdictions may limit the burn area based on size of land, while others focus more on the ability of the applicant to manage the burn safely, such as having appropriate amount of fire equipment and manpower on site. It is important to plan a project considering how quickly and safely it can be completed so as to minimize safety risks and environmental impacts.

Some examples of burn area or pile restrictions include:

- 18 metres by 18 metres in size within a 3 hectare area at one time.
- no more than two piles that are 9 metres by 9 metres in size may be burned within a 2.5 hectare area at one time.
- 28 cubic metres of pile volume per day.

For smaller scale residential burning - In determining daily burn area and daily burn pile volume, areas or piles within 90 metres of each other could be considered a single burn if the burning occurs on the same day and on property owned by the same person.

For larger scale industrial, agricultural or forestry based burning – allowable burn area is not as much of a factor as the ability to control and safely manage the burn in an effective manner.

7.3 Preparation of Area

- Fuel-moisture and effective fuel-air mixing influence combustion efficiency and the amount of smoke generated. Dry fuel should be used when possible. Otherwise, material moisture must be boiled off before the fire is hot enough to burn efficiently. Because of its high moisture content, green vegetation smokes more and burns cooler. Loosely stacked material smokes less because the flame is exposed to more air. Conversely, dirt holds additional moisture and keeps air away from the fuel causing it to smoulder, thereby generating additional smoke and making it difficult to extinguish.
- Test fires can determine how well the material burns and where the smoke is going. If the test burn indicates that the fuel is too damp, the smoke is not lifting or is blowing towards a sensitive area such a school, hospital, nursing home, airport, or recreational area, then the burn should be delayed.
- A buffer zone of at least 800 metres from any airport, hospital, nursing home, school, major highway, national park, wildlife area, or other sensitive receptors may be needed.
- Salvageable materials and any non-wood waste should be removed from open-air burn sites prior to the burn.
- Combustible materials should be removed from along fence lines to prevent accidental burning.

- Farm operators should not burn refuse plastics (e.g., bale twine or mesh) that could contribute to air, soil and crop contamination. Dioxin contaminants from the burning of agricultural plastics entering crops and animal feed can bio-accumulate in the fat of farm animals and be subsequently consumed by people.

7.4 Fire Breaks

- A fire break around proposed crop burning can be constructed by mowing, tilling and turning over soil around the entire proposed burn area. Wetting the fire break area with water or pre-burning a guard under safer conditions should also be considered where there is a risk of fire spreading.
- Other considerations for fuel breaks include keeping these breaks well away from steep slopes, ravines and coulees. Keep the fuel break as straight as possible and avoid sharp corners or right angle turns. Placement of fuel breaks in this manner will allow good access around the entire perimeter of the fire for control purposes, as well as avoid any heavy fuel pockets which could cause spot fires or a high intensity section of the fire from breaching the fuel break.

7.5 Ignition Techniques

Ignition techniques are highly complex and technical in nature and adjust based on specific burn objectives and site conditions. In general ignition techniques can influence the amount of smoke produced. For example if burning a field, lighting the fire at the downwind edge, also known as backfiring, while may be safer, it may take longer to burn and produce more smoke for a longer period of time. Often backfires force the fire to creep into the wind allowing greater fire control and more complete combustion, which should be safer and take longer, but it may be difficult to quantify if it produces more or less smoke.

Additional information/resources:

Ontario Ministry of Natural Resources Prescribed Burn Toolbox: <https://www.ontario.ca/environment-and-energy/controlled-burn>

Saskatchewan (SK) pamphlet regarding open-air burning of plastic bags. SK is planning to set up a recycling program to ensure proper disposal of all these bags: <http://www.saskwastereduction.ca/recycle/resources/agricultural-plastics/>

BC Ministry of Agriculture air quality factsheets and publications: http://www.agf.gov.bc.ca/resmgmt/AirQuality/AirQuality_Publications.htm

State of Washington, Department of Ecology, Agricultural Burning Permit Applications: <http://www.ecy.wa.gov/programs/air/aginfo/agburnpermitpage.htm>

Connecticut Online Open-Air Burning Training Program: http://www.ct.gov/deep/cwp/view.asp?a=2684&q=528010&deepNav_GID=1619

7.6 Prescribed Burning in Woodlands – Additional Provisions

Prescribed burning of woodlands is used for a variety of reasons:

- to reduce forest fuels and minimize the effect of wildfires
- to control undesirable growth of specific tree species (e.g., hardwoods)
- to control disease (e.g., mountain and pine beetle infestations, among other tree diseases).
- to prepare forest land for planting or seeding
- to create a favourable habitat for certain species
- to remove dead vegetation for the maintenance of railroad, highway and public utility right-of-way
- to improve forest health
- to restore fire-dependent forest ecosystems and
- to integrate with other control methods for use in eradication of non-native invasive plants.

7.6.1 *Time of Day*

- Prescribed burns in woodlands are often highly complex because of the complexity of the fire and weather environments, the site and even the burn objectives. It is generally suggested to begin later in the day after the wind has subsided and the diurnal temperatures are on the downward part of the curve to reduce the risk of escape. Some jurisdictions have indicated that prescribed burns can only be conducted in certain time periods e.g., after 5:00 p.m. and before 9:00 a.m., with the only exceptions being if there is a steady rain or the ground is completely covered in snow.
- Burning in the evening is often safer as a generality, but weather is just as important in that a warm front or wind event can still occur in the evening. Time of year and latitude may also affect the burn as longer days may mean fire behaviour is the highest in the later evenings. Smoke dispersion considerations may also be poorer in the evenings, so an earlier ignition may at times be more prudent.
- Burning is often prohibited and permits are often cancelled if the fire index is in the extreme category or if a burning ban has been declared by provincial/territorial or local officials.

7.6.2 *Supervision*

All burns should be supervised. Depending on the complexity, there needs to be trained and capable supervision. Most prescribed burning is highly complex; as such residents and even industrial users and government agencies should seek out external mentorship from other organizations or agencies if expertise does not exist within.

7.6.3 Emission Reduction Techniques

7.6.3.1 Increase moisture content

When significant amounts of fuel (different types of vegetation and wood litter) are high in moisture they may not burn even when other fuels in the burn area are undergoing combustion. Consider:

- Ensuring only targeted fuels are ‘dry’ enough to burn and that non-target fuels (types of vegetation in a target area that you do not want to burn) have high moisture content. This will help prevent ignition and smouldering of non-target fuels.
- Mass ignition/shortened fire duration/aerial ignition. Efficient ignition practices are important. Mass ignition can occur through a combination of dry fine-fuels (which light/burn quickly and easily) and a rapid ignition strategy, such as using a helitorch or a combination of other tools and strategies to achieve a rapid/hot burn.
- Depending on objectives, a burn manager disposing of timber harvest debris may want to consider avoiding burning before large fuels cure. Living trees contain very high internal fuel moistures, which take a number of months to dry after harvest. If an area is burned within 3-4 drying months of timber harvest, many of the large fuels will still contain a significant amount of live fuel moisture.
- Burn before precipitation. Scheduling a prescribed fire before a precipitation event will improve the ability to extinguish the burn in a timely manner and is a risk management consideration in case of fire escaping containment. This practice will reduce the potential for a long smouldering period and reduce the average emission factor.

7.6.3.2 Create an efficient burn

- Burn–fuels in piles or windrows. Keeping piles dry and free of dirt and other debris generates greater heat thereby promoting an efficient burn. Piles or windrows can be made mechanically or by hand.
- Burn under dry conditions to increase efficiency. Be aware that dry conditions can have a higher risk of fire escape.
- Burn more frequently at low intensity. Can be easier to manage from a fire safety perspective and provide more flexibility to better manage air emissions concerns.
- Burn in early spring. In areas with ground cover such as grass and/or an herbaceous fuel bed, burns should be conducted before these combustibles have greened-up for the year. This will reduce the amount of emissions produced.
- Burn in autumn. Larger burn projects should be conducted in autumn when trees have dropped their leaves and pending snow or rain conditions can help reduce fire hazards and extinguish the burn.

- Extinguish fires rapidly. This can reduce emissions from smouldering.

Additional Resources:

National Fire Protection Association: NFPA 295: Standard for Wildfire Control: <http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=295>

Nebraska Forest Service, Forestry Best Management Practices for
Nebraska: <http://nfs.unl.edu/documents/ruralforestry/Forestry%20BMPs%20for%20Nebraska.pdf>

APPENDIX 1: MODEL BY-LAW OR REGULATION ELEMENTS FOR OPEN-AIR BURNING

Preamble

The following model by-law *[regulation]* was developed to provide a working template for jurisdictions who wish to establish regulations, by-laws or programs for managing open-air burning problems. Jurisdictions will need to modify the elements found in this air management tool to align with their existing policies and authorities to regulate open-air burning activities and related air management programs.

The model references some Alberta, British Columbia and Ontario policies to illustrate how the elements can be adapted to fit a jurisdictional air zone management plan. This model was also developed based on a review of open-air burning best practices implemented in all 13 Provinces/Territories in Canada, all 50 U.S. states and selected municipal jurisdictions in both countries (www.ccme.ca). A range of standards from jurisdictions is provided to help set benchmarks for governments looking to adopt these best practices.

Jurisdictions may want to seek public input in their regulatory and program development process in order to ensure that they address local open-air burning issues. Jurisdictions may want to also seek input or support from the appropriate provincial, territorial or federal bodies to address open-air burning issues and by doing so will help ensure policy or program development is aligned and does not conflict with any overlapping legislation or policies.

Disclaimer

Jurisdictions should obtain legal advice when drafting and developing their own regulations or by-laws. Nothing in this Guidance Document or model by-law/regulation should be construed as legal advice nor should any provisions contained herein be relied upon in lieu of obtaining legal advice. The regulatory elements provided in this model by-law are only provided as guidance and do not represent a comprehensive regulation or by-law. Jurisdictions are encouraged to review this entire Guidance Document in order to identify other potential restrictions (not present in the following model by-law) that could be added to their regulation or by-law. Jurisdictions with existing regulations or by-laws that are more stringent than those listed in the model by-law are encouraged to maintain those requirements.

Part 1: Definitions

1.1 Adverse Effect includes:

- (a) impairment of the quality of the natural environment for any use that can be made of it
- (b) injury or damage to property or to plant or animal life
- (c) harm or material discomfort to any person
- (d) an adverse effect on the health of any person
- (e) impairment of the safety of any person
- (f) rendering any property or plant or animal life unfit for human use
- (g) loss of enjoyment of normal use of property
- (h) interference with the normal conduct of business

- (i) nuisances including but not limited to excessive smoke, odour, dust, airborne sparks, embers or reduced visibility on roadways, railways or airfields.
- 1.2 Air Curtain Incinerator** means an open top box used to burn wood waste or similar debris that incorporates an air flow over the top of the box to increase burning efficiency and reduce the release of particulate matter and smoke.
- 1.3 Air Quality Advisory** is a public health warning issued through the media by jurisdictions during periods of deteriorated air quality due to smog. If standards for ozone or fine particulate matter are exceeded an Air Quality Advisory (Alberta and British Columbia), Smog Watch and Smog Advisory (Ontario), Air Quality and Health Advisory (Atlantic Canada) or Smog Warning (Quebec) is issued. See ‘Smog Advisory’ definition often used in-place of ‘Air Quality Advisory’ by some jurisdictions.
- 1.4 Burn Barrel or Solid Waste Barrel Burner** means a steel drum or barrel used for burning wood waste. Burn barrels are typically 45 gallon (205 litre) steel drums. Other terms for this practice are “backyard burning” or “open-air burning”. Burning waste, other than wood waste, in a burn barrel may potentially release hazardous contaminants. These fires are inefficient and smoke stays close to the ground, which limits dispersion. Recent studies have indicated that residential garbage burning, which is more prevalent in rural areas, is a significant source of dioxins and furans¹⁰.
- 1.5 Campfire** means a fire designed for cooking or warmth that meets the following conditions:
- (a) the site of the fire is bare rock or other non-combustible material
 - (b) the space above the one metre area around the fire is at least three metres from vegetation and
 - (c) the fire does not exceed one metre in height and one metre in diameter.
- 1.6 Chief Fire Official** means the local municipal Chief Fire Official as defined in the *[insert name of Fire Code, by-law or regulation]*.
- 1.7 Clean Dry Wood** means firewood and wood waste that has been allowed to dry. “Dry” means moisture content less than 20 per cent.
- 1.8 Fire Regions** are the areas of the province or territory described in the schedules to *[insert name of by-law or regulation]*.
- 1.9 Fire Season** means the period from *[insert dates e.g., 1st day of March through the 31st day of October]* as defined in the *[insert name of Fire Code, by-law or regulation e.g., Forest Fires Prevention Act]*.

¹⁰ Great Lakes Binational Toxics Strategy 2008 Strategy Report: Burn Barrel Sub-Group
http://www.epa.gov/greatlakes/bns/2008GLBTSUpdate_English.pdf

- 1.10 Local Authority** means the local municipality, municipal by-law enforcement officer, provincial or territorial authority, enforcement officer, or a person designated by the local authority to issue permits and authorizations for enforcement of Open-Air Burning or Outdoor Fireplace Units.
- 1.11 Open Burning or Open-Air Burning** means any fire or burning practice that is conducted outside a building including but not limited to bonfires, fires in burn barrels, outdoor recreational fireplaces, air curtain incinerators, but does not include the following:
- (a) the operation of welding or similar equipment
 - (b) the operation of a coal or wood-fired locomotive or boat
 - (c) a ‘prescribed burning’ operation that is part of a forestry or other land and resource management process (see Part 1, Section 1.14), if covered in local by-laws or regulations
 - (d) an appliance which is fueled by natural gas, propane, charcoal, briquettes, including but not limited to a manufactured or non-manufactured barbeque, fireplace or fire pit
 - (e) campfires for the purpose of essential cooking or warmth
 - (f) burning of materials for fire suppression training, testing of firefighting equipment or law enforcement purposes.
- 1.12 Outdoor Fireplace Unit or Recreational Fireplace Unit** means a: manufactured wood-burning appliance, site-built masonry fireplace, fire pit, chimenea, clay or metal fireplace, portable wood-burning devices used for outdoor recreation or heating, or other enclosed container used outdoors and not fuelled by natural gas or propane and designed to hold a small fire, not exceeding one metre (3.2 feet) in any direction; but does not include pellet fuelled barbeques or industrial ‘wood-waste’ combustors defined under *[insert name of by-law or regulation, if applicable]*.
- 1.13 Owner** means the person who owns the property on which an Outdoor Fireplace Unit is installed, or the person who owns the property on which Open-Air Burning is conducted or the person responsible for conducting the Open-Air Burning.
- 1.14 Prescribed Burning** is the deliberate, planned and knowledgeable application of fire by authorized personnel and only in accordance with *[insert name of regulation or guidelines]* to a specific land area to accomplish pre-determined forest management or other land and resource management objectives.
- 1.15 Restricted Fire Zones** are regions defined by *[insert name of by-law, regulation e.g., O. Reg. 207/96, where the Ontario Ministry of Natural Resources retains the right to restrict all fires]*.
- 1.16 Sensitive Receptor** may include a childcare facility, healthcare facility, a senior citizens' residence, long-term care facility, educational facility, environmentally sensitive area, or other place where smoke may have a greater risk to health or the environment.
- 1.17 Smog Advisory** is a public health warning issued through the media by some jurisdictions during periods of deteriorated air quality due to smog. In Ontario, for example, smog advisories are issued to the public in advance when Air Quality Index (AQI) values are expected to be greater than 49 due to elevated, widespread and persistent levels of ozone

and/or fine particulate matter (particles less than 2.5 microns in diameter or PM_{2.5}). See ‘Air Quality Advisory’ definition used in-place of ‘smog advisory’ by some jurisdiction.

1.18 Strike has the same meaning as in the *[insert name of regulation, e.g., Ontario Labour Relations Act, 1995]*.

1.19 Urban Area is an area with a population of at least 1,000 and no fewer than 400 persons per square kilometre, as defined by Statistics Canada.

1.20 Waste includes garbage or refuse materials from residential, commercial, agricultural, industrial or institutional establishment.

1.21 Wood waste means, tree trunks, tree branches, brush, or wood products that do not contain:

- (a) chromated copper arsenate, ammoniacal copper arsenate, pentachlorophenol, creosote, pesticides, or paint
- (b) easily removable hardware, fittings and attachments, unless they are predominantly wood or cellulose
- (c) plywood or composite wood products containing varnish or glue
- (d) an upholstered article
- (e) an article to which a rigid surface treatment is affixed or adhered, unless the rigid surface treatment is predominantly wood or cellulose.

Note: This definition enables burning of clean wood waste while treated and/or contaminated wood waste would not be suitable for burning under this Guidance Document.

Part 2: Open-Air Burning Requirements

Municipalities or provinces may choose to enact elements of this example for the development of their by-laws or regulations.

Section 1: Purpose

This By-Law *[regulation]* is intended to promote public health, safety and protect the welfare of the inhabitants of the municipality from air pollution, nuisances and fire hazards associated with outdoor open-air burning.

Section 2: Applicability

This By-law *[regulation]* applies to all outdoor open-air burning within the municipality *[province/territory]* except:

2.1 Grilling or cooking using charcoal, wood, wood pellets, propane or natural gas in cooking or grilling appliances, including barbeques.

- 2.2 Use of propane, acetylene, natural gas, gasoline or kerosene in a device intended for heating, construction or maintenance activities.
- 2.3 Emergency safety/signaling flares or industrial flares used for the combustion of flammable gases.
- 2.4 Structures that may be burned exclusively for fire suppression training, or testing of firefighting equipment, provided that all asbestos materials have been removed from the structure and the structure has been inspected by a licensed asbestos inspector.
- 2.5 Burning of materials for law enforcement activities as authorized by the local authority or other law enforcement authority.
- 2.6 Forest or resource management operations on public, Crown or protected lands which are regulated under provincial acts, regulations or other instruments including land management agreements or prescribed burn manuals published by the jurisdiction.
- 2.7 Campfires in private campgrounds or provincial parks covered under provincial Acts and regulations (e.g., *Forest Fires Prevention Act*).
- 2.8 Burning of explosive or dangerous material by police or other public safety organization for which there is no other safe means of disposal.
- 2.9 Burning clean wood at solid waste disposal sites, if carried out in accordance with a permit issued under provincial Acts and Regulations (e.g., *Environmental Protection Act*).

Section 3: General Prohibition of Open-Air Burning

- 3.1 Open-air burning is prohibited in *[jurisdiction name]* unless the burning is specifically exempted in this by-law/regulation. Open-air burning shall be conducted in conformance with the *[by-law or legislation name - e.g., Forest Fires Prevention Act]*, where applicable.
- 3.2 No person conducting open-air burning shall create an adverse effect.
- 3.3 No combustible material shall be set fire to or burned out of doors without permission in writing first being obtained from the Chief Fire Official or Local Authority in the *[insert name of municipality, province or territory]*, and then only subject to such terms and conditions as are stated in the permission.
- 3.4 Notwithstanding any of the provisions of this by-law *[regulation]*, if at any time in the opinion of the Chief Fire Official or other Local Authority, it is necessary for the prevention of fire spreading or nuisance, that any fire should be extinguished, the person responsible for, or in charge of, or on whose property the fire is located, shall forthwith extinguish the fire on notice of the Chief Fire Official or Local Authority to do so, or the Chief Fire Official or Local Authority may take such steps as he/she deems necessary to cause any such fire to be extinguished forthwith.

- 3.5** No open-air burning shall be undertaken during periods when the *[insert name of Local Authority]* has issued an Air Quality Advisory applicable to the area, and no burning shall take place if it is foggy. *[Note: municipalities are advised to designate a burn restriction in the event of an air quality advisory. Add link here to any local Air Quality Advisory notification systems that the jurisdiction may subscribe to for public notices]*
- 3.6** No open-air burning shall be undertaken during periods of dry conditions, pursuant to Section 3.5, or when a local fire ban has been declared. Those open-air burning activities that have already been permitted to occur on a designated No-Burn Day or fire ban, shall be delayed until the No-Burn Day warning or ban has been lifted.
- 3.7** The Chief Fire Official or *[insert name of Local Authority]* may declare a burn restriction such as a Fire Ban or No-Burn Day against outdoor burning when atmospheric conditions or local circumstances make such fires hazardous, including the discharge of fireworks. The public shall be notified that a burn restriction is in effect on local radio, television stations and the *[jurisdiction]* website. Signs advertising the ban will be posted at the *[jurisdiction]* offices, shopping centres and roadways within the *[jurisdiction]*.
- 3.8** Open-air burning must not be started earlier than two hours before sunset, and extinguished no later than two hours after sunrise the following day, or earlier, during the fire season. *[Note: Some municipalities with volunteer fire departments may want to require burning during times of the day when firefighters are more likely to be available. Other municipalities may limit burning to only daylight hours especially where needed for landfill, agricultural or other prescribed burning operations (see Part 3). The municipality may also limit the times of year when open-air burning is acceptable, such as months with low fire hazard or times when snow cover is present. Any changes to fire times should not conflict with provincial legislation.]*
- 3.9** No materials may be burned upon any street, curb, gutter or sidewalk or on the ice of a lake, pond, stream or body of water.
- 3.10** Open-air burning shall be constantly attended and supervised by a competent person of at least eighteen (18) years of age to ensure that the fire is kept under control. The person shall have readily available for use such fire extinguishing equipment as may be necessary for the total control of the fire.
- 3.11** Prior to leaving the site, the open-air burn shall be completely extinguished by soaking the material with water. Ashes from the open-air burn shall be cold prior to the site being vacated.
- 3.12** No person shall allow or permit a fire to spread beyond the fire pit.

Section 4: Open-air Burning of Waste

Municipalities developing by-laws based on the CCME Guidance Document for Canadian Jurisdictions on Outdoor Open-Air Burning (GDOAB) must refer to and comply with all provincial laws or requirements with respect to burning waste/materials. Municipalities with

existing by-laws which are more stringent than those listed in the GDOAB should maintain those requirements.

4.1 Open-air burning of waste from residential, commercial, agricultural or industrial establishment is prohibited, unless otherwise permitted by *[jurisdiction name]*.

4.2 Open-air burning of the following materials is prohibited:

- (a) Construction and demolition waste or materials including roofing tiles or shingles
- (b) Hazardous substances including but not limited to batteries, household chemicals, pesticides, asbestos, used oil, gasoline, paints, varnishes, and solvents
- (c) Furniture and appliances
- (d) Tires and rubber materials
- (e) Any plastic materials including but not limited to nylon, PVC or ABS plastics, polystyrene or urethane foam, and synthetic fabrics, plastic films and plastic containers.
- (f) Newspaper, cardboard, office paper
- (g) Treated or painted wood including but not limited to plywood, composite wood products or other wood products that are painted, varnished or treated with preservatives.

4.3 Open-air burning of leaves and grass clippings is prohibited except leaves attached to tree limbs.

Section 5: Residential Open-Air Burning – Small Confined Fires

Outdoor recreational fires and fires for cooking, or burning of small brush piles outside of urban areas are allowed provided they do not cause a nuisance. Open-air fires, unless permitted under Part 4 – Outdoor Fireplace Units, are prohibited in urban areas. *[Note: Jurisdictions will need to decide if fire permits will be required for small confined fires in rural areas –see Part 5 and Appendix 4 –Fire Permits]*

5.1 A person may set or cause to be set a small, confined campfire for cooking or heating *without a permit* only in accordance with *[insert name of by-law or regulation, if applicable. If no regulation exists then end this statement after “without a permit.”]*

5.2 The fire shall not exceed one metre (3.3 feet) in diameter, or one metre (3.3 feet) in height.

5.3 No burning shall be undertaken within *[insert distance - 7.5 metres (25 feet) or other appropriate distance]* from any combustible building material, or partition, exterior window opening, overhead wire, exit access or exit unless authorized by the Fire Chief or Local Authority. *[Note: for practical reasons this section does not apply to campfires where a 3 metre (10 feet) radius from nearby woodlands is required, or other radius as stated in the local by-law, provincial, or territorial regulation.]*

Section 6: Burning Brush and Tree Limbs – Large Confined Fires

- 6.1** Notwithstanding Part 2, Section 3, large open-air burning (e.g., some bonfires) of tree limbs, logs, brush, and stumps is allowed, in accordance with all of the following provisions:
- 6.1.1 A fire permit issued in accordance with Part 5 (Brush & Logs –Appendix 4) of this by-law must be obtained prior to open-air burning under this Section between April 1st and October 31st *or when the ground is not snow covered*.
 - 6.1.2 The burning of limbs, logs, brush, and stumps must be in a single burn pile that is confined to less than three metres (10 feet) in diameter and less than two metres (6.0 feet) high, or burning must be confined inside of a 45 gallon (205 litre) burn barrel *[Note: municipalities may decide if they would rather prohibit burning in barrels altogether]*.
 - 6.1.3 Open-air burning under this section shall only be conducted at a location at least *[insert a distance e.g., 33 metres (100 feet), 75 metres (250 feet) or other greater distance]* from the nearest building which is not on the same property.
 - 6.1.4 No burning shall be undertaken within *[insert distance - e.g., 15-45 metres (50-150 feet) or other appropriate distance]* between the fire and any forested area, tree or shrub, highway, property line, overhead wire, building or other built structure.
 - 6.1.5 A perimeter around the fire of at least *[insert distance - e.g., 4.5 metres (15 feet) or other appropriate distance]* must be clear of combustible material such as ground cover.

Section 7: Landfill Open-Air Burning

Section 7 applies to the operation of landfills where open-air burning of wood waste is permitted by the municipality, province or territory. If open-air burning of wood waste at landfills is practiced, jurisdictions are encouraged to use Air Curtain Incinerators (see Part 2, Section 9).

Jurisdictions responsible for environmental management at landfill sites are encouraged to consider alternatives to wood waste burning, such as producing woodchips to be used for dust control or compost, drainage, erosion control and alternative daily cover at the site. Alternatively, clean dry wood waste may be accepted at thermal recovery sites and facilities.

The following restrictions on open-air burning apply to the open-air burning of wood waste at municipal and private landfills and shall be implemented in conjunction with Part 2, Section 3.

- 7.1** No burning of any kind should take place at a landfill site, unless specifically allowed by *[Insert name of provincial, territorial regulations or municipal by-laws, or guidelines]*.
- 7.2** Open-air burning at municipal or private landfills is restricted to wood waste.
- 7.3** Open-air burning of wood waste can only occur at individual landfills a maximum of *[insert value]* days per year.
- 7.4** A strip down to the mineral soil that is *[insert value]* metres wide shall be established around the entire landfill area where the open-air burning shall be conducted.

- 7.5** Private or municipal landfills that conduct open-air burning shall implement the following safety precautions:
- 7.5.1 The landfill site shall be fenced and access shall be controlled and supervised at all times.
 - 7.5.2 Open-air burning shall not be conducted on land that has been filled and covered, or on soil substrates known to contain methane.
- 7.6** Landfill operators or municipal officers should maintain a landfill area watch during periods of drought or high forest fire hazards if the landfill is subject to fire.

Section 8: Labour Strike

Open-air burning during a strike shall only be conducted in accordance with a permit issued under Part 5 of this by-law; the permit for strike locations also includes the following requirements:

- 8.1** Only one burning device shall be used at each location. Fires must be confined to containers no larger than a 45 gallon (205 litre) drum or barrel.
- 8.2** Only clean dry wood may be burned and must be kept a minimum of one metre away from the burn barrel.
- 8.3** No burning shall be undertaken within three metres (10 feet) of any vehicle.
- 8.4** The permit is only valid for the duration of the strike.
- 8.5** The fire is to be extinguished if it is not supervised as per Section 3.10.

Section 9: Air Curtain Incinerators

The following restrictions on open-air burning apply to municipal and private air curtain incinerator (ACI) operations and shall be implemented in accordance with Part 2, Section 3 of this *[regulation]* or by-law: *[Note – exceptions may be needed for Forestry or Right of Way operations where these restrictions may be impractical].*

- 9.1** Open-air burning under this Section shall only be conducted at a location at least *[insert a distance - e.g., 100 metres (300 feet) or other greater distance]* from the nearest forested area, tree or shrub, highway, or property line.
- 9.2** Open-air burning shall only be conducted at a location at least *[insert a distance e.g., 30 metres (100 feet) or other greater distance]* from the nearest building or other built structure.
- 9.3** A perimeter around the fire of at least *[insert distance - e.g., 4.5 metres (15 feet) or other appropriate distance]* must be clear of combustible material such as ground cover.

- 9.4** The air curtain incinerator must be surrounded by a fence with a locked gate. An attendant must be on duty when the blower unit is in operation. All fires should be extinguished when the blower unit is shut off.
- 9.5** A sign shall be posted at the entrance of the operation which indicates the name, contact phone number, acceptable and prohibited wastes, permit number, hours of operation, penalty for non-authorized use, necessary safety precautions and any other pertinent information. Warning signs should be posted at intervals around the entire air curtain incinerator installation notifying people to keep out of the area.
- 9.6** The stockpile of waste material shall be kept a minimum of 30 metres (100 feet) from the burner. The total amount of stockpiled waste shall be limited to the amount that can be burned in 5 days.
- 9.7** Except during start-up, visible emissions should not exceed a specified opacity level of [*insert value - e.g., 20 percent (see commentary Section 6.4.1 – Air Curtain Incinerators)*]. During start-up, the visible emissions should not exceed 35 percent opacity [*or some other opacity level determined appropriate by the relevant government agency*] when averaged over a six-minute period. Start-up should not last for more than 30 minutes, and there should be no more than one start-up per day.
- 9.8** An operator familiar with the proper operation of the unit must be on-site at all times during operation.
- 9.9** Ash resulting from the operation must be disposed of at a facility approved by the relevant government agency to receive such material.
- 9.10** Surface water must be prevented from standing in the ACI operating, waste storage and access areas.
- 9.11** ACI area surface water runoff must be prevented from entering nearby rivers, streams and lakes.

Section 10: Sensitive Receptors

- 10.1** Notwithstanding Parts 2 and 3 (below), open-air burning shall not be undertaken within [*insert distance - e.g., 45-100 metres (150-300 feet) or greater distance*] from a sensitive receptor. Sensitive receptors include:
- (a) A health care facility
 - (b) A senior citizens' residence or long-term care facility
 - (c) A child care facility
 - (d) An educational facility
 - (e) An environmentally sensitive area [*list municipal, provincial or territorial designated sensitive areas, e.g., grasslands, forested or wetland areas where 'species at risk' may be negatively affected. Close attention must be made with regard to the timing of proposed burns especially during spring breeding seasons*].
 - (f) A [*place*] specified by the [*municipality*] as a place where discharges of smoke may cause a risk to human health.

Part 3: Prescribed Burning

Open-air burning for the purpose of agriculture, forest or habitat renewal shall be conducted in accordance with Part 2, Section 3 - General Prohibition of Open-Air Burning, and is subject to the following requirements:

- 1.1 The person responsible for open-air burns of agricultural, forestry or habitat matter larger than *[insert acreage value]* in size, shall ensure that a burn plan (prescription) is prepared and submitted to *[insert name of local authority e.g., Ministry of Natural Resources]*. The burn plan must be approved by the *[authority]* prior to commencing the burn.
- 1.2 The burn plan shall contain the following information:
 - (a) the specific location and description of the area to be burned
 - (b) subject vegetation types
 - (c) an emergency telephone number
 - (d) the property owner
 - (e) the agency/contractor conducting the burn
 - (f) the burn prescription
 - (g) the number of hectares to be burned, the type of fuel, fuel loading estimates and the ignition technique to be used
 - (h) a list of agencies and private parties involved
 - (i) a map depicting prevailing winds and the potential impact of the smoke on occupied buildings and areas for up to *[insert distance kilometres]* from the burn site
 - (j) a discussion of the public notification procedures and
 - (k) an evaluation of alternative methods to open-air burning.
- 1.3 The person(s) responsible for conducting an open-air burn shall ensure the burn does not occur within 100 metres of any dwelling, group of dwellings, commercial, institutional or industrial establishments or other occupied structure located outside of the property where the open-air burn is being conducted, unless permission has been received from all occupants.
- 1.4 The person(s) responsible for conducting an open-air burn shall ensure that the burn is conducted in accordance with Section 10 - Sensitive Receptors.
- 1.5 The person responsible for conducting an open-air burn shall ensure that burning occurs when the prevailing wind direction does not cause visibility restrictions on nearby roadways or airfields.
- 1.6 The size of wood waste piles to be the subject of an open-air burn should be limited in size as described in Part 2, Section 6 - Large Confined Fires. The size of the prescribed open-air burn areas shall not exceed *[insert area -hectares]* at any one time unless otherwise approved by a prescribed burn plan submitted to the *[insert relevant authority]*.
- 1.7 A fire break around proposed crop or forested areas shall be a minimum 10-metre width around the entire proposed burn area. A fire break shall be clear of branches, groundcover, and steep slopes.

Part 4: Outdoor Fireplace Units

Use of outdoor recreational fireplace units such as chimeneas and other similar solid fuel flame-producing products contravene the *[insert by-law or regulation if applicable, e.g., Fire Code]* if they are operated within the *[municipality]* and their use is prohibited.

Section 1: Outdoor Recreational Units

Note 1: Omit this section entirely if your municipality chooses not to regulate this activity.

Note 2: Chimeneas, patio warmers, and other portable outdoor fireplace units used for recreational purposes, all of which are defined as "outdoor recreational fireplace units" in this Guidance Document, can be a cause of complaints. Sparsely populated rural townships will likely not need to regulate outdoor recreational units. However, if your municipality contains an urban area or has had complaints about recreational units, you should consider the following provisions for those areas. Your municipality will need to decide whether to entirely prohibit the use of recreational fireplace units, whether to allow the use of recreational units under specified conditions such as substantial minimum distances, or whether not to regulate them at all.

1.1 (Alternative 1) No person shall install, use, or maintain a recreational fireplace unit in *[jurisdiction name]*.

or

1.1 (Alternative 2) A recreational fireplace unit shall be installed and used in *[jurisdiction name]* in accordance with all of the following provisions:

1.1.1 The recreational fireplace unit shall not be used to burn waste

1.1.2 The recreational fireplace unit shall burn only clean dry wood

1.1.3 The recreational fireplace unit shall be located at least *[insert a distance appropriate for the jurisdiction]* from any nearby structure *[Choose a minimum distance such as 7.5 metres (25 feet), 15metres (50 feet) or other greater distance as appropriate for your jurisdiction. For the reasons cited in the introductory note to this section, a substantial minimum distance is recommended].*

1.1.4 The fire is not placed on wood decks, used on or in enclosed patio decks, or under overhangs.

1.1.5 The owner of the outdoor recreational fireplace shall obtain an annual fire permit from the Chief Fire Official or other Municipal Authority in accordance with Part 5 of this *by-law* if the fireplace is located *[insert a specified distance]* from the nearest structure which is not on the same property as the recreational fireplace unit. *[Note: If a permit will not be required for recreational fireplaces, omit this paragraph entirely. If a permit will be required for all outdoor recreational fireplaces, end the sentence after the word by-law. If a permit will be required only if there are nearby neighbors, insert an appropriate distance such as 15 metres (50 feet) or 30 metres (100 feet).]*

1.1.6 No open-air burning shall be undertaken during periods when the *[insert name of jurisdiction, e.g., Ministry of the Environment]* has issued an Air Quality Advisory applicable to the area, and no burning shall take place if it is rainy or foggy *[Note:*

jurisdictions are advised to call a burning ban in the event of an air quality advisory].

- 1.1.7 A spark arrestor screen is used to control sparks and embers when provided with the unit.
- 1.1.8 The fire is out at the end of the activity.
- 1.1.9 The outdoor recreational fireplace unit shall not cause an adverse effect.

Section 2: Fire Extinguishing

- 2.1** Outdoor Fireplaces Units shall forthwith be extinguished when atmospheric conditions cause any or all of the following:
 - (a) The possible spread of the fire beyond the fireplace unit
 - (b) Any odour to such an extent or degree so as to cause discomfort to the persons in the immediate areas
 - (c) Excessive smoke
 - (d) A decrease in the visibility on any highway, roadway or airfield
 - (e) Any other adverse effect.

Part 5: Fire Permits, Complaints and Enforcement

Section 1: Fire Permits

Fire permits are an important part of open-air burning administration. They provide opportunities for public education on fire safety, smoke and environmental issues, while enabling governments to compile inventories on burning activities. *[and avoiding responses to false alarms].*

No person shall start or maintain any open-air burning or outdoor fireplace unit *[insert where applicable]* except under and in accordance with a fire permit issued by the *[insert "Fire Chief", or name of other office, or title(s) of other person(s) authorized to issue burning permits]*.

The fee for each fire permit shall be *[insert cost of permit]*. *[Note: Your jurisdiction will have to decide whether or not to require a fee and how to collect it. Your jurisdiction will also have to decide if a one time or seasonal fire permit would be required. It is suggested that if permits are free compliance will be higher with improved opportunities for education and outreach while reducing the amount of false calls for first responders.]*

1.1 A burning permit issued under this section shall require compliance with all applicable provisions of this *by-law* and any additional special restrictions deemed necessary to protect public health and safety. *[Note: See Appendix 4 - other specific permit requirements based on sections of the Guidance Document could be added to the permit appendix-reverse side.]*

1.2 An outdoor campfire does not require a permit provided that the fire complies with all other applicable provisions of this *by-law*.

The following sub-sections 1.3 - 1.5 should be clearly identified in all open-air burning and outdoor fireplace fire permits:

- 1.3 Atmospheric Conditions:** Burning should not be carried out under any of the following conditions:
- (a) Rain, fog or smog appears to be present; smoke cannot disperse properly and may be concentrated in one particular area under these conditions.
 - (b) Wind speeds are high or wind directions are changing frequently enough to cause fire to spread rapidly.
 - (c) The area or nearby areas have poor air quality according to the Air Quality Index (AQI): value indicates poor air quality (AQI>49) or a high risk Air Quality Health Index (AQHI>6).
- 1.4** When weather conditions warrant, the Fire Chief or other Local Authority may temporarily suspend issuing burning permits and may temporarily suspend previously issued burning permits for open-air burning.
- 1.5** Any violation of the conditions of a burning permit shall be deemed a violation of the *[applicable by-law name]*. Any violation of this by-law or the burning permit shall void the permit.

Section 2: Response to Complaints

- 2.1** The person responsible for an open-air burn shall make a reasonable effort to respond to local resident complaints received about smoke issues.
- 2.2** The person conducting an open-air burn shall extinguish the fire if it creates an adverse effect at any time.
- 2.3** If the *[insert name of relevant authority]* receives complaints about an open-air burn, a Municipal By-law Enforcement Officer or other Authority may enter the land to inspect and extinguish the fire.

Section 3: Inspections and Enforcement

- 3.1** A By-law Enforcement Officer, or other Local Authority, may enter on land at any reasonable time for the purpose of carrying out an inspection to determine whether this by-law or an Order to Discontinue Activity is being complied with.
- 3.2** The By-law Enforcement Officer or other Local Authority may order the owner to extinguish any open-air burn at any time and the owner shall extinguish the fire; or the Local Authority or his designate may take the necessary steps to do so.
- 3.3** An Officer or other Local Authority may enter the premises at a reasonable time, with prior notice and the consent of the occupier, for the purpose of inspecting an open-air burn.

Note 1: Municipalities may specify penalties for persons who initiate an open-air burn in breach of municipal by-laws.

Note 2: Municipalities should obtain legal advice to determine whether it has authority to authorize any inspection or compliance actions.

Note 3: In general, every person is responsible for complying with the provisions of the [insert provincial/territorial environmental legislation name]. No person shall discharge a contaminant or cause or permit a discharge of a contaminant that causes or may cause an adverse health effect. Any contravention of [insert provincial/territorial environmental legislation name – e.g., Environmental Protection Act] such as burning prohibited materials may result in an investigation and prosecution under the Act.

Section 4: Liability

Municipalities, provinces or territories may specify penalties for persons who conduct open-air burning in breach of laws. This enforcement section will need to include specific jurisdictional penalties.

- 4.1** Any person who contravenes any of the provisions of this by-law [regulation] is guilty of an offense and upon conviction is liable to a fine.
- 4.2** If any person fails to pay the fine set out above, within thirty (30) days, the amount of the fine may be recovered by the municipality in like manner as municipal taxes in accordance with the [insert municipal, provincial/territorial legislation name].

APPENDIX 2: PUBLIC EDUCATION POSTER

Materials Prohibited from Open-Air Burning

Applies to all Residential Properties, Farmlands, Commercial, Institutional, Industrial Properties, Municipal and Private Landfills

A

- Agricultural Plastic
- Animal Bedding
- Animal Remains or Feces
- Appliances

B

- Batteries
- Biological and Pathogenic Wastes
- Buildings, Mobile Homes and Other Structures

C

- Carpet
- Chemical Containers
- Clothing or Diapers
- Coated or Laminated Papers
- Commercial/Institutional/Industrial Waste
- Copper or Coated Wire

E

- Electronics including computers
- Explosive Materials

F

- Fertilizer
- Furniture
- Furniture Fabrics and Insulation

G

- Gaseous Wastes
- Grass clippings
- Green Plants

H

- Hay or Straw
- Household Trash
- Halogenated and Cyanic Compounds
- Household and Agricultural Chemicals

L

- Leaves

M

- Motor Vehicle or Aircraft Bodies and Interiors

P

- Packaging Wastes
- Paint Products and Solvents
- Paper Products and Cardboard Boxes
- Pesticides and Pesticide Containers
- Petroleum-Based Products: Used Oil, Tar, Tar Paper, Oily Wastes, Contaminated Hydrocarbon Spill Cleanup Materials, Asphalt, Used Oil Filters
- Pharmaceutical or other Medicines
- Plastic Products including Nylon, PVC or ABS Plastics, Polystyrene or Urethane Foam, and Synthetic Fabrics, Plastic Films and Plastic Containers
- Poultry Litter

R

- Railway Ties
- Recyclable Cans, Plastics, or Glass

T

- Tires or other Rubber Material

W

- Wood Pallets, Sawdust, Wood Chips, Wood Mulch
- Wood and Wood By-products that have been coated, painted, stained, treated, or contaminated by a foreign material

APPENDIX 3: PAMPHLETS ON OPEN-AIR BURNING BEST PRACTICES FOR PUBLIC EDUCATION AND TO ACCOMPANY FIRE PERMITS

Burning garbage releases toxic chemicals into our air, water and soil. These toxins get into the foods we eat and remain in our bodies, where they can cause serious health concerns like cancer. Burning garbage in rural areas where food is produced increases this danger.

Burning can affect everyone who eats, not just those who burn!



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Bernie the Burn Barrel and this brochure developed by the Western Lake Superior Sanitary District with support from the EPA's Great Lakes National Program Office.

If you're burning garbage, you're making poison.

Believe me, you don't want this garbage inside you!

Bernie the Burn Barrel, reformed burner



Burning garbage puts toxins in the food we eat!

Even burning paper can release hazardous pollutants like heavy metals and deadly dioxin. Each burn barrel can release up to 11 times more dioxin than a full-scale municipal incinerator. Burn barrels smolder at lower temperatures and don't contain pollution control devices. Reports show that backyard garbage burning is now the **LARGEST** source of dioxins in the United States. Industry has cleaned up their act—now it's time to clean up ours!

Burning is dangerous to property, too. Debris burning can cause destructive wildfires and even house fires. Help keep the environment and your family safe and healthy- don't burn garbage!



Backyard burning is preventable pollution!

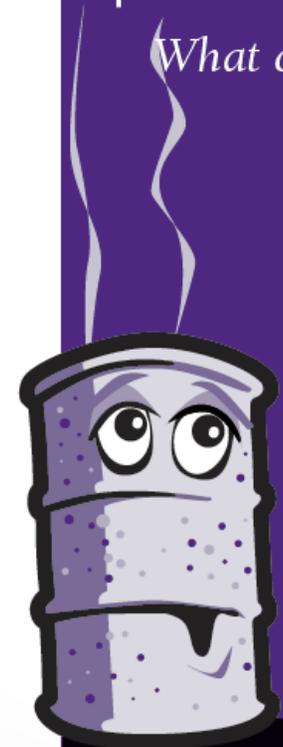
What can you do?

Don't burn garbage!
Not even at the cabin or in the campfire!

Use recycling facilities and garbage services.
Encourage your neighbors to do the same.

Educate your family and neighbors about the hazards of burning.
Remember Bernie!

Know the laws. Burning garbage is illegal in many states, cities or towns. Contact local conservation or law enforcement officers for more information.



Alternatives to Burning:

- Reduce waste
- Compost
- Use garbage services!
- Recycle
- Shred paper

Burning may seem to reduce garbage volume, but it really just moves the toxins from the garbage into your body through the air or in food. Even ashes can be toxic. It's better not to burn!

Safer Alternatives

Following the 3Rs (Reduce, Reuse, Recycle) principle and disposing of your garbage in a safer way will help you protect your health and the environment.

Reduce: Avoid disposable items. Buy products in bulk instead of individually wrapped or single-serving sizes. Buy durable products and products that can be recharged, repaired, or refilled.

Reuse: Donate items you no longer need such as clothing, furniture, books, magazines, and toys to relatives, friends, or charities. Mend and repair rather than discard or replace.

Recycle: Separate the recyclable items from your garbage and prepare them for collection or for drop-off at a local recycling depot.

Compost: Install a backyard compost bin for composting your kitchen and yard waste or, if available, participate in your community's organics collection program.

Dispose: Put your garbage out for collection or bring it to your local landfill.



To find out more about reuse, recycling, composting, and disposal opportunities in your area, please contact your local waste management department.

For more information on the effects of open burning of garbage, please contact

Environment Canada at
1-800-668-6767
or visit us on our website at
www.ec.gc.ca

Further Reading

*Canadian Centre for Pollution Prevention:
Great Lakes Trash and Open Burning Website*
www.openburning.org

*Canadian Lung Association:
How Open Burning Hurts Human Health*
[www.lung.ca/protect-protegez/
pollution-pollution/outdoor-exterior/
heating-chauffage_e.php](http://www.lung.ca/protect-protegez/pollution-pollution/outdoor-exterior/heating-chauffage_e.php)

*Health Canada: The Health Effects
of Dioxins and Furans*
[www.hc-sc.gc.ca/hl-vs/iyh-vsv/enviro/
dioxin-eng.php](http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/enviro/dioxin-eng.php)

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represented by the Minister of the Environment, 2010

ISBN 978-1-100-15701-6
Cat. No. En14-18/2010E-PDF

Aussi disponible en français.

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 Environment Canada / Environnement Canada



What Goes  Up
Must Come
Down 

**Open Burning of Garbage
Is Harmful to Your Health
and the Environment**





What Is Open Burning?

Open burning refers to burning garbage in barrels, open pits, outdoor furnaces, woodstoves, or fireplaces. Open burning of garbage is much more harmful to your health and the environment than you may think.

Some people may say, "We've been burning garbage for ages, so what's the big deal now?"

We now understand that open burning of garbage—even seemingly harmless materials like paper, cardboard, yard waste, and construction debris—releases a hazardous mixture of cancer-causing compounds and other toxic substances when open-burned.

Open Burning Bylaws

Many Canadian communities have developed bylaws prohibiting open burning or restricting the types of materials that can be open-burned. To complement these bylaws, some communities are issuing burn permits and promoting safer alternatives. For example, when it comes to managing fallen leaves, communities are encouraging residents to either mulch them into the lawn with a mower or compost them in their backyards or through an organics collection program.



Up in Smoke

Open burning of garbage poses health risks to those exposed directly to the smoke. It especially affects people with sensitive respiratory systems, as well as children and the elderly.

In the short term, exposure to smoke can cause headaches, nausea, and rashes. Over time, it can increase the risk of developing heart disease. Some of the pollutants contained in the smoke from open burning of garbage can include:

- Dioxins
- Furans
- Arsenic
- Mercury
- PCBs
- Lead
- Carbon monoxide
- Nitrogen oxides
- Sulphur oxides
- Hydrochloric acid



Some of these pollutants can also end up in the ash that is left behind from open burning of garbage.

Dioxins, Furans, and Your Health

One of the greatest concerns with open burning of garbage is the health risks posed by the release of dioxins and furans into the environment. Exposure to dioxins and furans has been linked to:

- Certain types of cancers
- Liver problems
- Impairment of the immune system, the endocrine system, and reproductive functions
- Effects on the developing nervous system and other developmental events

In Canada, the open burning of garbage produces more dioxins and furans than all industrial activities combined.

Dioxins, Furans, and Your Environment

Since open burning of garbage is more common in rural and agricultural areas, there is particular concern for high levels of dioxins and furans settling on crops, in our streams, and in our lakes. Dioxins and furans produced by the open burning of garbage are deposited on plants, which are eaten by animals. The dioxins and furans are absorbed by these animals and stay in the food chain until they ultimately end up in our meat and dairy products. In fact, over 90 percent of our intake of dioxins and furans is from our diet.

What is open burning?

Open burning is any burning conducted outdoors that does not pass through a stack, duct, or chimney. Open burning includes burning of residential solid waste, prescribed burns, crop residue burning, and fires for recreation and warming, weed control, and training. Fires in burn barrels are considered a form of open burning as well.

Open burning in Idaho is regulated by state law and rules, tribal code, and local ordinances. Sections 600-623 of the *Rules for the Control of Air Pollution in Idaho* describe the state's regulatory authority over open burning, under the jurisdiction of the Idaho Department of Environmental Quality (DEQ). The state rules apply to all lands other than the five Indian Reservations.

Regulation of open burning is needed to minimize the impact of smoke on public health.

Smoke generated by open burning is comprised primarily of small particles and gases. Smoke can irritate the eyes and airways, causing coughing, a scratchy throat, irritated sinuses, headaches, stinging eyes, or a runny nose. Inhaling smoke may worsen the symptoms of those with heart or respiratory conditions.

This brochure provides information on open burning of residential solid waste. Specifically, it covers:

- conditions under which residential open burning may occur
- materials that can and cannot be legally burned
- proper burning basics
- alternatives to burning
- protection against smoke impacts

A brief overview of other types of allowable open burning in Idaho is also provided.

For more information

Idaho Department of Environmental Quality

State Office
Air Quality Division
1410 N. Hilton
Boise, ID 83706
(208) 373-0502

Regional Offices

Boise
1445 N. Orchard
Boise, ID 83706
(208) 373-0550
toll-free: (888) 800-3480

Coeur d'Alene
2110 Ironwood Parkway
Coeur d'Alene, ID 83814
(208) 769-1422
toll-free: (877) 370-0017

Idaho Falls
900 N. Skyline, Suite B
Idaho Falls, ID 83402
(208) 528-2650
toll-free: (800) 232-4635

Lewiston
1118 F Street
Lewiston, ID 83501
(208) 799-4370
toll-free: (877) 541-3304

Pocatello
444 Hospital Way #300
Pocatello, ID 83201
(208) 236-6160
toll-free: (888) 655-6160

Twin Falls
1363 Fillmore Street
Twin Falls, ID 83301
(208) 736-2190
toll-free: (800) 270-1663

Web Resources

Open "Outdoor" Burning Guidelines
www.deq.idaho.gov/open-burning

Residential "Backyard" Burning
www.deq.idaho.gov/residential-open-burning

Rules for the Control of Air Pollution in Idaho
<http://adminrules.idaho.gov/rules/current/58/0101.pdf>



Printed on recycled paper, DEQ May 2012. PID 0205, CA 30060. Costs associated with this publication are available from the State of Idaho Department of Environmental Quality in accordance with Section 60-202, Idaho Code.

A vertical matchstick with a lit tip, showing a bright orange and yellow flame. The background is dark, making the flame stand out.

Light it Right!

Idaho's Guidelines for Open "Outdoor" Burning of Residential Solid Waste

Idaho Department of Environmental Quality
www.deq.idaho.gov



What residents can burn

Unless a burn ban is in effect...

...residents who have house-to-house garbage collection may burn tree leaves, garden waste, and yard trimmings if allowed by local government ordinances during certain periods of the year.

...residents who do not have house-to-house garbage collection may burn rubbish (such as paper and cardboard), tree leaves, garden waste, and yard trimmings if burning is conducted on the property where the waste was generated.

What cannot be burned

Burning of most processed or manufactured materials is prohibited (exemptions may apply). These include:

- garbage from food preparation
- dead animals or animal waste
- junk motor vehicles or parts
- tires or other rubber materials
- plastics
- asphalt
- tar and petroleum materials
- paints
- preservative-treated wood
- trade waste (commercial, industrial, or construction)
- insulated wire
- pathogenic (disease-causing) waste
- hazardous waste

Local ordinances may further restrict or prohibit residential open burning. In addition, burners may be required to obtain permits in some jurisdictions.

Burn Bans

DEQ may issue burn bans as a result of weather and air quality conditions. When a burn ban has been issued, outdoor burning and the use of wood stoves and fireplaces are prohibited. Check DEQ's Daily Air Quality Reports and Forecasts webpage at www.deq.idaho.gov/daily-air-quality-reports-forecasts to find out about burn restrictions.

Alternatives to burning

Burning can waste valuable resources. It may be possible to avoid open burning by better planning, reuse, or recycling.

- Recycle paper products whenever possible.
- Compost yard debris and kitchen scraps.
- Reuse old lumber whenever possible.
- Buy or rent a chipper and use chips for mulch and compost.
- Work with neighbors to organize a neighborhood cleanup day.
- Dispose of waste at your local landfill rather than burn it.
- Take hazardous materials, including oil-based paints, solvents, garden chemicals, and car fluids to a hazardous waste collection site. Burning these materials is illegal and extremely dangerous.

Proper burning basics

If no alternative to burning is available:

- **Get the proper permit if required.** DEQ does not issue residential burn permits. Contact your local government or fire protection service.
- **Burn during the middle of the day** when ventilation is generally good and smoke dissipates more easily.
- **Burn when fuels are dry and well aerated** so the fire is hot, yet manageable. Wet or dirt-covered materials will smolder and create more smoke.
- **Burn in open areas** away from overhead branches and wires.
- **Scrape away burnable materials** on the ground several feet around the piles. The result should be bare soil.
- **Never leave fires unattended**, and have fire suppression equipment and water available. You can be held responsible for any damage caused by a fire that gets out of control.
- **Burn at least 50 feet away** from any structure.
- **Test burn a small area** prior to burning.

Protect your health

To protect against smoke impacts while burning:

- **Pay attention to local air quality reports** and stay alert to news coverage or health warnings related to smoke.
- **Minimize burning time** to minimize smoke exposure.
- **Be aware of signs of overexposure** to smoke such as fatigue and illness.
- **Delay burning for another day** if it looks smoky outside.

Other types of burning

The state's air pollution control rules also regulate the following types of open burning:

- **Recreational and warming fires.** Fires for preparation of food, campfires, and barbecues are allowable, as are small fires for hand warming.
- **Weed control fires.** Fires for weed abatement along such areas as fence lines, ditch banks, and canal banks are allowable.
- **Training fires.** Fires to train firefighters are allowed. Contact your local DEQ regional office prior to burning.
- **Prescribed burning.** Open burning of forest and rangeland to accomplish land management objectives is allowed. To find out more, visit www.deq.idaho.gov/wildland-fires.
- **Crop residue burning.** Growers may burn crop residue when approved by DEQ. Training, permits, and fees are required. Learn more at www.deq.idaho.gov/crop-residue-burning.

Questions?

Contact the
DEQ Regional Office
nearest you (see reverse).

Open Burning

Your guide to safe and legal open burning



Serving Butler, Clermont, Hamilton and Warren counties in Ohio

250 William Howard Taft Road
Cincinnati, Ohio 45219

🔥 What Is Open Burning?

Open burning is any outdoor fire that does not vent to a chimney or stack.



LEGAL OPEN BURN

🔥 Why Is Open Burning Prohibited?

- Open burning pollutes the air we breathe. Even small campfires burning clean wood can emit harmful chemicals.
- The pollutants released by open burning make it more difficult to attain health-based air quality standards, especially in or near the major metropolitan centers.
- Open burning releases various harmful pollutants, including volatile organic compounds (VOCs), particulate matter (PM) and carbon monoxide, all of which contribute to air pollution.
- These pollutants can lead to breathing difficulties and increased asthma attacks. Additional health risks include heart damage and neurological symptoms such as headache, nausea, fatigue and vomiting.

🔥 How Do I Apply for a Permit?

Contact Mike Fair (513-946-7711) at the Southwest Ohio Air Quality Agency, two to three weeks in advance of your scheduled open burn date to discuss the purpose of the fire. You can then receive the permit application by mail, or you may download it at: SouthwestOhioAir.org/open-burning.

🔥 What Are the Consequences of Illegal Open Burning?

Ohio EPA has the legal authority to enforce the open burning law. Violations can result in penalties. If you have any questions, or would like to report a suspected open burning incident, contact the Southwest Ohio Air Quality Agency at 513-946-7777 (serving Butler, Clermont, Hamilton, Warren counties).



ILLEGAL OPEN BURN

What Are the Alternatives to Open Burning?

You can reduce waste by participating in these environmentally-friendly activities:

- **Compost:** start a compost pile in your backyard.
- **Recycle:** most communities in our area provide curb-side or drop-off recycling.
- **Properly dispose of yard trimmings:** take advantage of your county's yard trimmings drop-off sites.
- **Properly dispose of household hazardous waste:** check with your county's solid waste district to learn how to safely dispose of hazardous materials.



COMPOST



RECYCLABLE ITEMS



YARD TRIMMINGS



HOUSEHOLD HAZARDOUS WASTE

🔥 What Can I Burn?

Visit SouthwestOhioAir.org/open-burning to search the burning requirements for your community.

The chart to the right lists open burns that are allowed in Ohio.

🔥 What Open Burning is Never Permitted?

- Garbage: any wastes created in the process of handling, preparing, cooking or consumption of food.
- Dead animals.
- Materials containing rubber, grease, and asphalt or made from petroleum, such as tires, cars and auto parts, plastics or plastic-coated wire.

The following open fires are allowed in Ohio:

Type of Fire	Inside a village or city* (if generated on property)	Outside a village or city* (if generated on property)
Campfires and Portable Fire Pits	Wood stack no larger than 3 feet wide by 2 feet high. Use clean, seasoned firewood.	Wood stack no larger than 3 feet wide by 2 feet high. Use clean, seasoned firewood.
Agricultural Waste	Agricultural wastes and plant matter such as tree trimmings, stumps, brush, weeds, leaves, grass, shrubbery and material from crop or livestock production. This includes fence posts and scrap lumber, but not buildings. Fire must be more than 1,000 feet from neighbor's inhabited building. Must notify Southwest Ohio Air Quality Agency in advance.	Agricultural wastes and plant matter such as tree trimmings, stumps, brush, weeds, leaves, grass, shrubbery and material from crop or livestock production. This includes fence posts and scrap lumber, but not buildings. Fire must be more than 1,000 feet from neighbor's inhabited building.
Land-clearing Waste	Not permitted in city limits.	Plant matter such as tree trimmings, stumps, brush, weeds, leaves, grass, shrubbery and crop residues, with prior written permission from the Southwest Ohio Air Quality Agency; allow two weeks.
Residential Waste	Not permitted in city limits.	Plant matter such as tree trimmings, stumps, brush, weeds, leaves, grass, shrubbery and crop residues. Also wastes such as wood or paper products that are generated by one-, two- or three-family residences. Fire must be more than 1,000 feet from neighbor's inhabited building.
Ceremonial Fires	Wood stack no larger than 5 feet wide by 5 feet high. Duration no longer than three hours. Use clean, seasoned firewood or equivalent. Must notify Southwest Ohio Air Quality Agency in advance.	Wood stack no larger than 5 feet wide by 5 feet high. Duration no longer than three hours. No notification required.
Occupational Fires (welding torches, heating tar, heating for warmth of outdoor workers and strikers)	Use clean, seasoned firewood.	Use clean, seasoned firewood.
Explosive Materials Disposal; Firefighter Training	Must have prior permission from the Southwest Ohio Air Quality Agency; allow two weeks.	Must have prior permission from the Southwest Ohio Air Quality Agency; allow two weeks.
Horticultural, Silvicultural, Range or Wildlife Management Practices	Must have prior permission from the Southwest Ohio Air Quality Agency; allow two weeks.	Must have prior permission from the Southwest Ohio Air Quality Agency; allow two weeks.
Disease or Pest Control	Local health department, the Ohio Department of Agriculture or the U.S. Department of Agriculture verifies to the Southwest Ohio Air Quality Agency that open burning is the only appropriate control method and must notify the Air Quality Agency in advance.	Local health department, the Ohio Department of Agriculture or the U.S. Department of Agriculture verifies to the Southwest Ohio Air Quality Agency that open burning is the only appropriate control method.

* Call your local municipality for corporation boundaries. Restricted areas are defined as follows: 1. Within the boundaries of any village or city. 2. For any city or village with a population of 1,000 to 10,000, the restricted area extends to include a 1,000-foot zone beyond the city or village's boundaries. For any city or village with a population of more than 10,000, the restricted area extends to include a one-mile zone beyond the city or village's boundaries. 3. Township residents: if you live in a township, please contact Mike Fair at 513-946-7711 to determine whether or not your residence falls within your neighboring city or village's restricted area.

APPENDIX 4: MODEL FIRE PERMIT APPLICATION

Permit No. [redacted]

Permit Holder: [redacted] New Renewal

Permit Holder Representative: [redacted]
(only required where Permit Holder is not an individual)

Telephone: Home [redacted] Cell [redacted] E-mail [redacted]

Address of Permit Holder: [redacted]

Burn Site Address: [redacted]

Rural Address Number Posted; specify [redacted] Temporary Site Poster Provided

Date(s) of Burn: [redacted] Time of Burn Start: [redacted] Finish: [redacted]

Fire and Emergency Services Contact (other than 911): [redacted]

Type of Permit

- Recreational (free): single season event for a small confined fire (maximum three days-consecutive)
- Brush & Logs (\$30): single season event (maximum three days-consecutive)
- Brush & Logs (\$95): annual (greater than three days per year)
- Outdoor Recreational Fireplace (free): annual
- Agricultural - permit recommended for farm operations (no fee)
- Other (e.g., Outdoor Boilers and Air Curtain Incinerators)

Note: Seasonal (*depending on the jurisdiction*) applies [*insert dates e.g., May 1st to October 31st*]; burning of any waste materials is prohibited; fire permits are not generally issued for land clearing for commercial purposes and construction site materials when other alternatives are available for disposal. Chipping, composting and wood reuse is recommended.

Total Fee Paid \$ [redacted] Received by: [redacted]

Burn Materials:

- Hardwood
- Softwood
- Mixed (Hardwood and Softwood)

Burn Procedure: Open Pile or Burn Barrel or Both

Open Pile or Burn Barrel Maximum Dimensions are 1m x 1m x 1m unless approved below:

Length [redacted] m Width [redacted] m Height [redacted] m

Carbon Output: Total Number of Burn Piles and/or Barrels Burned [redacted] Total Burn Hours [redacted]
Carbon output estimates mass of carbon released for duration of permit (e.g., eight piles burned for 16 hours)

Outdoor Boilers: Full Cords of wood per year = [redacted] Hours / day (October – May) = [redacted] (e.g., 24 hours)

Required Provisions for Extinguishment: Garden hose Extinguisher Other [redacted]
Other Site Specific Requirements/Conditions: [redacted]

Revocation of Permit: Are you aware that the [*municipality name*] may temporarily or permanently suspend this permit in the following circumstances? (check each box to confirm applicant's awareness):

- an Air Quality Advisory, Fire Restriction or Fire Ban is issued for your area
 - when high winds are forecasted which might contribute to the threat of fire spreading
 - during periods of drought
 - any complaint received while burning or any other condition deemed to create an extra risk
- All permits issued expire on December 31 of the year they are issued (except agricultural permits renewed every two years)**

Permit Holder's Signature

Date

Witness