

Sierra Club Great Lakes Program
An Agenda for Public Health and Environmental Protection

**Michigan Should Significantly Strengthen
its Toxic Air Pollution Regulations**

Sierra Club Great Lakes Program
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Forward

This document is one in a series produced for the Sierra Club Great Lakes Program in order to facilitate and increase public understanding of toxic substance issues and the connection between toxic air pollution, Great Lakes water pollution and effects on human health and the environment.

In this document, we offer a critique of current state-initiated airborne toxicant rules in Michigan that go beyond requirements of the Federal Clean Air Act. We make a series of specific recommendations for improvements in Michigan's toxic air pollution rules found at the Part 2, Air Use Approval section of the Michigan Department of Environmental Quality air pollution rules.. Our proposed changes address the need to control persistent bioaccumulative toxics in the Great Lakes, to reduce emissions of all toxic air pollutants by imposing technology-based controls, and to provide more specific standards to evaluate and limit residual risks to health and environment from toxic air pollutants. The Sierra Club Great Lakes Program seeks adoption of new rules in Michigan to accomplish these objectives.

This document is one of a series of advocacy and educational materials written to help citizens in the Great Lakes region understand state and federal toxic air pollution regulations and to stimulate discussion about potential changes in state regulatory policy to more fully protect public health and the environment.

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1. Introduction

The Sierra Club Great Lakes Program (SCGLP) has reviewed Michigan's current rules to control toxic air pollution, found in the Part 2 -- Air Use Approval section of the Michigan Department of Environmental Quality -- Air Quality Division (MDEQ-AQD) rules.

Michigan's rules provide a system of technology-based emission control requirements and provisions to evaluate and limit environmental risk from new and modified sources of toxic air pollution; we provide specific recommendations to improve these protections later in this document.

In general, Michigan has failed to promulgate regulations that address existing sources of toxic air pollution. If an existing toxic pollution source did not go through a toxics-based control technology review and evaluation/limitation of residual risks when a source was first permitted, such an existing source escapes all state toxic air pollution control requirements that are more stringent than minimum federal requirements. Under current Michigan rules, the only time existing sources come under more stringent state requirements is when such sources are modified in ways that increase emissions or cause the emission of new toxic air pollutants.

As a result of these deficiencies, Michigan -- as the pre-eminent Great Lakes State -- does not have adequate regulatory authority to control persistent and/or bioaccumulative toxic air pollutants, which are a threat to both the Great Lakes and inland waters.

Michigan citizens should demand that policymakers in the Engler Administration and the Michigan Department of Environmental Quality promulgate significantly more stringent rules to control toxic air pollution.

2. Summary of Major Criticisms of the Michigan's Rules on Toxic Air Pollution

The following points summarize our major criticisms of Michigan's toxic air pollution rules.

- S** For persistent and/or bioaccumulative toxic air pollutants, Michigan's present rules fail to adequately protect the Great Lakes and Michigan's inland waters from damage caused by airborne deposition of these pollutants.
- S** Michigan's rules fail to control toxic air pollution from existing sources unless such sources are modified to increase toxic emissions or to emit toxic pollutants that were not previously emitted.

- S** Michigan’s definition of “toxic air contaminant” includes substances that are inappropriately excluded from this definition, even as these same exempted materials are fully capable of exerting a toxic effect. Inappropriately exempted materials include calcium hydroxide, coal dust, portland cement dust and silica.
- S** Technology-based emission controls under Michigan’s rules do not approach sufficient stringency reflecting a “virtual elimination” policy for emissions of persistent and/or bioaccumulative toxic air pollutants, such as mercury, chlorinated dibenzo-dioxins and other Binational Toxic Strategy pollutants. Under the current Best Available Control Technology for Toxics (T-BACT) rules, new/modified sources of persistent bioaccumulative substances do **not** have to install control technology that is equivalent to lowest achievable emission rate (LAER), the most stringent control technology standard.
- S** Recent changes in the rules sought by Dow Chemical Company and others to allow 10 times the ambient impact for environmental carcinogens in industrial areas or on public roadways (compared to residential areas) will still lead to greater ambient impacts of such toxic pollutants in residential areas adjacent to industrial areas. Before this relaxation, affected sources would have had to submit to more stringent emission limitations that would be in effect continuously even when highest ground level impacts were predicted for industrial land or roadways. Those more stringent limitations would also have reduced exposures in adjacent residential areas.
- S** Michigan’s rules exempt certain sources covered by a federal National Emission Standard for Hazardous Air Pollutant (NESHAP) emission standard from health-based screening reviews, even though residual risks for some NESHAP facilities could still be either significant or poorly characterized.
- S** Health-based reviews of residual risks from toxic air pollution in Michigan are solely for the air-inhalation route of exposure. Michigan does not require multi-pathway exposure and risk assessment/limitation for persistent and/or bioaccumulative toxic air pollution. Michigan does not require ecological risk assessment of any kind for toxic emissions. As a result of these deficiencies, Michigan’s rules do not adequately protect surface waters from damage caused by deposition of persistent and/or bioaccumulative toxic air pollution.
- S** Michigan’s proposed medical waste incinerator rules adopt, except for mercury, very lenient federal standards which were recently remanded to EPA by the District of Columbia Federal Circuit Court after a challenge to the leniency of these standards by environmental groups.

- S** For environmental carcinogens, Michigan’s risk assessment procedures assume lifetime exposures to a 70 kilogram adult. As a result, the Michigan rules fail to provide assessment of special risks to children in determining carcinogenic risks from toxic air pollution.

- S** Similarly, Michigan’s rules for calculating acceptable inhalation exposures for toxic pollutants with EPA oral reference doses or other toxicological data where an oral to inhalation exposure conversion is made also assume a typical 70 kilogram adult. As a result, these methodologies do not account for potentially larger comparative inhalation exposures for children arising from higher respiratory volume rates in comparison to body size and weight.

- S** Michigan’s health-based screening process for toxic pollutants that are not carcinogens relies, in part, on threshold limit values (TLVs) published by the American Conference of Governmental Industrial Hygienists. Reliance on TLVs raises the following issues:
 - S** ACGIH explicitly disavows such uses in their TLV documents, notwithstanding the wide use by air quality officials nationwide of TLVs, for purposes of risk assessment and community air pollution assessment..

 - S** Some ACGIH TLVs are based on unpublished, non-disclosed industry data

 - S** TLVs were only meant to protect healthy workers and not human populations sensitive toxic air pollution, such as children and people with pre-existing respiratory disease

 - S** TLVs are sometimes based on non-inhalation criteria

- S** For toxic pollutants that are serious pulmonary irritants and sensitizers with a “ceiling value” threshold limit value (short term exposure standard), the Michigan rules may provide insufficient protection because of the use of a 1 hour exposure averaging time when instantaneous or ten minute averaging times on exposures might be more appropriate.

1. The Sierra Club Great Lakes Program Recommendations for Public Health and Environmental Protection — Changes Needed to Significantly Increase the Stringency of Michigan’s Rules to Control Toxic Air Pollution

1.1 State Policy on Emissions of Airborne Toxicants Should Emphasize the Precautionary Principle, Virtual Elimination of Persistent Bioaccumulative Toxicants, Toxics Use Reduction, Pollution Prevention Practices and Chemical Testing Programs

The Sierra Club embraces the precautionary principle in setting policy to control toxic air pollution. We should not wait for definitive scientific proof of environmental and public health damages before implementing prudent preventive measures to limit emissions and to evaluate and limit subsequent public health and environmental impacts from toxic air pollution.

The Sierra Club strongly opposes the use of quantitative risk assessment as a justification to allow uncontrolled, poorly controlled or poorly characterized emissions of toxic air pollutants to the environment. Quantitative risk assessment used in this manner will inevitably lead to excessive human and environmental exposures, failure to account for exposure to multiple and synergistic environmental contaminants and unreliable characterization of potential real-world health and environmental threats. Moreover, existing risk assessment procedures often fail to consider all pathways of exposure and potential future hazards from bioaccumulation of persistent toxicants.

In the case of persistent bioaccumulative toxicants, the Sierra Club supports virtual elimination of emissions and zero discharge as the goal for point and area sources. For chemicals that exhibit persistence, bioaccumulation, or both, virtual elimination and zero discharge should be the required policy in the Great Lakes states and provinces to achieve Great Lakes restoration.

For all other toxic air pollutants, the Sierra Club strongly embraces toxics use reduction and pollution prevention to dramatically reduce public health threats and environmental impacts. Zero discharge through changes in industrial processes and the elimination of toxic materials should still be the goal in dealing with toxic air pollution.

In all cases, industries seeking to emit air toxics should be under a “reverse onus” to prove that such emissions do not pose a threat to our Great Lakes environment and public health *prior to* their widespread use and/or release. This burden of proof should never rest on the public.

The Sierra Club recommends that environmental agencies require industries wishing to use and/or emit toxic chemicals to submit detailed toxicological data on such chemicals. State and federal environmental regulators should insist on detailed toxicological testing of high production-volume chemicals to determine the potential of these materials to cause cancer, neurological damage, endocrine disruption and/or other harmful effects. Such testing must take place before emissions are permitted.

1.2 Michigan Should Adopt Comprehensive Technology-Based Emission Control Requirements for New, Modified and Existing Sources of Toxic Air Pollution

With comprehensive technology-based emission control requirements, sources must install emission control equipment or make changes to processes and process equipment to reduce emissions. Any residual threats to public health and environmental protection must then be evaluated.

The SCGLP recommends that Michigan adopt the following technology-based emissions control technology requirements:

Pollutant or Source Category	Emission Control Requirement
Persistent bioaccumulative toxics from either new, modified or existing sources	Lowest Achievable Emission Rate (LAER) technically achievable, consistent with “virtual elimination” goals of the Binational Toxics Strategy
Known or suspected human carcinogens as indicated by credible evidence; chemical compounds having serious chronic endocrine disruption, teratogenic and/or neurological effects in human systems	Lowest Achievable Emission Rate (LAER) technically achievable
New, modified or existing municipal solid waste or medical waste incinerators	Lowest Achievable Emission Rate (LAER) technically achievable, consistent with “virtual elimination” goals of the Binational Toxics Strategy
New or modified sources of all airborne toxicants other than those indicated above	Best Available Control Technology (BACT) determined by a top-down methodology similar to BACT for Prevention of Significant Deterioration Sources

New, modified and/or existing sources of airborne toxicants which are serious pulmonary irritants and/or sensitizers with serious acute and chronic effects on respiratory function (i.e. hydrogen sulfide, sulfuric or nitric acid aerosol, isocyanates, chlorine and chlorine dioxide, hydrogen fluoride, etc.)	Best Available Control Technology (BACT) determined by a top-down methodology similar to BACT for Prevention of Significant Deterioration Sources
Existing sources of airborne toxicants other than those noted above which are listed by rule and which are not otherwise subject to requirements for new/modified sources	Reasonably Available Control Technology similar to a level of stringency associated with CAA Maximum Achievable Control Technology requirements for existing sources

1.3 Michigan Should Amend its Regulations to Extend Programmatic Requirements to Existing Toxic Air Pollution Sources

According to the National Institute for Environmental Health Sciences:

“There are 50,000 chemicals in commercial production. It is estimated that about 10,000 are in significant commercial production and perhaps 2,000 present significant exposure levels. We do not know what fraction of those have been adequately tested, but certainly it is not much more than 10 to 30 percent.”¹

Many existing sources of toxic air pollution in Michigan have never gone through either a toxics control technology assessment or toxics-related residual risk evaluation. Given the types of toxic substances presently in commercial use and the failure of pollution controls for common pollutants (like volatile organic compounds and particulate matter) to account for the substance-specific toxicity of emissions, it is reasonable to assume that some existing Michigan toxic pollutant sources pose unreasonable public health and environmental risks.

1.4 Michigan Should Retain its Present Process-Based Risk Assessment Procedures with Certain Amendments

Under a process based rule for risk assessment, explicit procedures are set forth in the rule on precisely how risk assessments should be conducted and what data is to be used. Such a process-based rule would require the use of the best possible toxicology

¹ See <http://www.niehs.nih.gov/oc/factsheets/ead/text.htm>

data available for risk assessment purposes. If no toxicology data is available, then a stringent ambient limitation of 0.1 micrograms/cubic meter for an annual average should be imposed for inhalation risk limitation. The entire structure of the process should always encourage the development of the best, most reflective toxicology data available, rather than merely relying on threshold limit values as the present rule requires.

Michigan's present toxic air pollution rules embody such a process-based approach, but only for inhalation related effects for new sources. Michigan should extend its exposure and risk assessment procedures to non-inhalation exposure path routes and to evaluation of the health and environmental effects of existing sources.

For each type of toxicology data available, the process set forth in the rule would show the appropriate risk assessment procedure for the determination of what exposure is associated with a one in a million risk for environmental carcinogens. The linearized multi-stage model of carcinogenicity should be used for a conservative prediction of one in a million risk levels for airborne concentrations assuming a 70 year lifetime exposure. The assumption of this model is that there is no threshold for increases in risk from exposure to proven or suspected human cancer causing materials; and that elevations in cancer risk can be caused by chemical agents that either initiate or promote carcinogenic processes.

For non-carcinogens, the procedure would specify the appropriate species difference, route difference and dose conversions and other uncertainty factors to be used.

Risk assessment for environmental carcinogens should rely on all available credible and up-to-date scientific evidence of carcinogenicity and dose response relationships.

Individual permitted emissions for new and modified sources of environmental carcinogens should not cause lifetime cancer risks from inhalation exposure at the company property line to exceed one in a million. For non-carcinogens, modeled air concentrations of toxic air pollutants should not exceed screening levels predicted by the applicable rule-described process based on the use of the best toxicology information available.

Here is the hierarchy of available toxicology data in order of increasing quality for community air pollution inhalation risk evaluation procedures as one goes down the table:

Toxicology Data for Risk Assessment for Non-Carcinogens
No data available; use 0.1 ug/M3 for annual average screening level
Only LD-50 available
An LC-50 is available
An oral route, 7 day No Observable Effects Level is available
An inhalation route, 7 day No Observable Effects Level is available
An ACGIH TLV is available; use 1% of the TLV as screening level
A NIOSH recommended occupational health exposure guideline is available; use 1% of the guideline as the screening level
An EPA Reference Dose is available
An EPA Reference Concentration is available

For each of the above types of toxicology data, appropriate and conservative dose route conversion factors, species difference factors and other uncertainty factors should be used to ensure public health protection.

For toxic air pollutants with acute toxicity, dose conversion factors and other uncertainty factors should use respiration rates, body sizes and whole body dose calculations appropriate to protect children who spend a great deal of their time outdoors.

For pulmonary irritants and sensitizers, such as toluene diisocyanate and chlorine dioxide, short term averaging times as brief as ten minutes should be considered for maximum health protection.

1.5 Michigan Should Impose Comprehensive Multi-Pathway Exposure Assessment and Risk Characterization Procedures and Residual Risk-Base Emission Standards for Emissions of Persistent Bioaccumulative Toxic Air Pollutants from New, Modified and Existing Sources

All new, modified and existing sources should be required to perform residual risk assessments after applying the recommended technology-based emission control requirements shown in Section 3.2 for persistent bioaccumulative toxicants, known or suspected carcinogens and other toxic pollutants.

Michigan should ensure that its toxic air pollutant regulations are, at a minimum, properly coordinated with designated Tier 1 and 2 pollutants under the Binational Toxics

Strategy. Additional chemical compounds that display persistent and/or bioaccumulative behaviors should potentially be added to Michigan's toxic air pollution control requirements and strategy.

Risk assessment for persistent bioaccumulative toxicants should incorporate multi-pathway exposure assessment and should identify sensitive demographic population subgroups (i.e. subsistence and urban fishers, local consumers and farmers who may be more at risk from exposure on farmland adjacent to airborne toxicant sources, etc.).

An individual source, together with other multiple sources and background, should not be permitted to cause excess cancer risks calculated for all pathways to exceed one in 100,000.

1.6 For Classes of Particular Compounds Posing Unique Risks, Michigan Should Require Ecological Risk Assessment

Certain materials, such as tri-butyl tin, pose unique ecological risks that will not be reflected in multi-pathway human health risk assessments. Michigan should develop a rule-based process to identify these materials and to require ecological risk assessment during permitting. In cases where ecological risk assessment is warranted because of an individual toxic air pollutant, permitting of emission sources should not allow exclusive use of natural resources, decisions that would allow irretrievable commitment of natural resources or that would otherwise cause local or regional biodiversity to be damaged.

1.7 Michigan's Toxic Air Pollution Regulations Should be Coordinated with Emerging Regulation for Non-Point Source Atmospheric Inputs to Impaired Water Bodies Under the Federal Clean Water Act's Total Maximum Daily Load Program

Non-point source atmospheric pollution of the Great Lakes and inland lakes of this region has emerged as a serious public health and environmental problem. Under the Clean Water Act's program to develop Total Maximum Daily Load budgets for water bodies impaired by airborne deposition of chemical contaminants, measures must be taken to roll back emissions from existing sources and to prevent new sources from making problems worse.

Michigan's toxic air pollution regulations should be amended to authorize TMDL-based toxicant budget limitations during permitting of new, modified and existing sources.

1.8 Michigan Should Promulgate Rules to Restrict and/or Ban Certain Commercial, Societal and Manufacturing Uses of Mercury

Michigan should promulgate rules to restrict and/or ban the sale, use, and disposal of certain mercury-containing items and work practices involving mercury. These restrictions are intended to reduce or eliminate mercury pollution in the environment or to achieve mercury use reductions where feasible and prudent alternatives exist. The restrictions would also reduce mercury use patterns when frivolous (such as use in clothing) or when such patterns are otherwise expected to cause unnecessary mercury emissions to the environment. Finally, some of these restrictions can be expected to reduce the potential for serious indoor mercury contamination problems.

Proposed Restrictions, Bans and Work Practices Concerning Mercury Products
Ban on sale of mercury-containing games, apparel, decorations and novelties
Requirement for recyclers to remove mercury switches for mercury recovery from vehicle processing and white goods
Requirement for health care facilities to collect mercury-containing medical batteries and recycle for mercury recovery
Requirement for building demolition companies to collect mercury containing thermostats and electrical switches for mercury recovery and/or proper disposal
Ban the sale and use of mercury fever thermometers
Restrict use of mercury meteorological instruments by government, industry and scientific users
Ban on the sale of household mercury thermostats and electrical switches
Requirement for mortuaries to recover dental amalgams before cremation
Prohibit bulk mercury sale to general public and restrict sale only to government, scientific, educational and industrial users; mercury sales for ritualistic uses to be banned
Restrict sale of batteries to minimal mercury content achievable with current battery manufacturing techniques
Require proper disposal techniques for mercury-containing fluorescent lights for large commercial, government, educational, industrial and institutional users
Require fugitive control measures for preparation of dental amalgams, collection measures for water recovered from dental drilling for amalgam removal and restrictions on disposal of removed amalgams

Prohibition on incineration of phenol mercuric acetate wastes in cement kilns
Restrictions and performance standards on mercury recovery operations to limit fugitive emissions and environmental impacts
Provide money and staff for the mercury “Clean Sweep” programs

1.9 Michigan Should More Stringently Restrict Open Burning

Michigan’s current open burning regulation is too permissive. Open burning of trash and leaves can emit a wide variety of toxic air contaminants. These emissions not only cause local nuisances and property damage through soiling and odors, such emissions will likely cause severe difficulty for people with respiratory ailments.

Open burning of trash and leaves can be a significant regional source of toxic metals, poly-chlorinated dibenzo-dioxins/furans and polycyclic aromatic hydrocarbons, all of concern for Great Lakes water quality. As a result, these sources should come under more stringent state rule prohibitions.