February 2017

GUIDE TO REQUESTING A SITE-SPECIFIC STANDARD

Guidance for Request for Site-Specific Standard Approvals under Section 32

Under Ontario Regulation 419/05

Air Pollution – Local Air Quality

made under the Environmental Protection Act

Version 2.0

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CONTENTS OF THIS DOCUMENT ARE SUBJECT TO CHANGE WITHOUT NOTICE

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FOREWORD

This document, the "Guide to Requesting a Site-Specific Standard", is intended for facilities preparing to submit a request for a site-specific air standard under section 32 of Ontario Regulation 419/05: Air Pollution – Local Air Quality (O. Reg. 419/05 or the Regulation). In 2005, the Ministry of the Environment and Climate Change (the ministry) introduced a regulatory process for site-specific air standards to deal with implementation issues such as time, technical and/or economic factors. The Regulation works within the province's air management framework by regulating air contaminants released into communities by various sources, including local industrial and commercial facilities. The Regulation includes three compliance approaches for industry to demonstrate environmental performance, and make improvements when required. Industry can meet an air standard, request and meet a site-specific standard or register and meet the requirements under a technical standard (if available). All three approaches are allowable under the Regulation.

Under the Regulation, new, updated or more stringent air standards typically have a phase-in period. The purpose of the phase-in period is to allow facilities time to assess and if necessary take action to come into compliance with the Regulation. A facility should proceed to implement any necessary changes during the phase-in period, subject to the necessary Environmental Compliance Approval (ECA) requirements. A facility that is not able to meet an air standard within the phase-in period may be eligible to request a site-specific air standard under section 32 of O. Reg. 419/05. A site-specific standard is a standard for a contaminant established for an individual facility that is challenged in meeting a provincial air standard due to technical or economic issues. This compliance approach focuses on actions to reduce emissions to air as much as possible considering the technology that is available and best operational practices. The process for determining a site-specific air standard is set out in the Regulation and the "Guideline for the Implementation of Air Standards in Ontario". Additional information is provided in this Guide. An approval for a site-specific air standard is not the same as an Environmental Compliance Approval (under section 20.3 of Part II.1 of the Environmental Protection Act). For information on the ECA process, please refer to the "Guide to Applying for an Environmental Compliance Approval" which is also available on the ministry's website.

A site-specific air standard for a particular contaminant is facility-specific and becomes the standard for that facility for the purposes of compliance assessments and the ECA process. The Regulation provides that a site-specific air standard may be approved for a period of 5 years or up to 10 years. In addition, the Regulation provides that a facility may also make a subsequent request for a site-specific standard. The goal of the site-specific standard regime set out in sections 32 to 37.1 of O. Reg. 419/05 is continuous improvement of emissions that will occur as new technologies become available or economic circumstances change.

This "Guide to Requesting a Site-Specific Standard" is not meant to be a stand-alone document. Other related documents that facilities requesting a site-specific air standard should refer to are available on the ministry website (follow the links to Rules on Air

Quality and Pollution). This guide will set out minimum expected requirements that the Director may apply when exercising his or her discretion while considering applications on a case-by-case basis. To the extent that this document sets out that something is "required" or "shall" be done or sets out a "requirement" or "limit", it does so only to identify minimum expected requirements, the application of which remain subject to the discretion of the Director.

The Regulation will take precedence where a conflict or ambiguity exists between this Guide to Requesting a Site-Specific Standard and the requirements of O. Reg. 419/05. All web site addresses referred to in this document were current at the time of release. For any addenda or revisions to this Guide to Requesting a Site-Specific Standard please visit the ministry website or contact:

Ministry of the Environment and Climate Change
Standards Development Branch
40 St. Clair Avenue West, 7th Floor
Toronto, Ontario M4V 1M2
Telephone: (416) 327-5519

While every effort has been made to ensure the accuracy of the information contained within this Guide to Requesting a Site-Specific Standard, it should not be construed as legal advice.

Note: For those interested in information on the technical standards compliance approach, please refer to the ministry document: Guide to Applying for Registration to the Technical Standards Registry – Air Pollution (dated September 2010) (as amended) available on the ministry website.

1.0 INTRODUCTION

1.1 Purpose

The Ministry of the Environment and Climate Change (the ministry), Standards Development Branch (SDB) is responsible for administering requests for site-specific air standards made under Ontario Regulation 419/05: Air Pollution – Local Air Quality (O. Reg. 419/05 or the Regulation) under the Ontario *Environmental Protection Act*, R.S.O. 1990 (the Act). Section 35 of O. Reg. 419/05 sets out the criteria that must be met for the Director to approve a site-specific air standard. General information on O. Reg. 419/05 is also available on the ministry website (follow the links to Rules on Air Quality and Pollution).

The purpose of this document, the "Guide to Requesting a Site-Specific Standard" (GRSSS) (hereafter referred to as GRSSS or the Guide), is to highlight the information required to be submitted to the ministry to support a request under section 32 of O. Reg. 419/05. While section 32 requests apply only to O. Reg. 419/05 standards, elements described in this Guide could be requested by the ministry in abatement situations related to standards, guidelines or other contaminants. The Guide is not intended to be a stand-alone document and must be read in conjunction with O. Reg. 419/05 and other related documents (as amended) which include:

- Guideline for the Implementation of Air Standards in Ontario (GIASO);
- Procedure for Preparing an Emission Summary and Dispersion Modelling Report (ESDM Procedure Document); and
- Air Dispersion Modelling Guideline for Ontario (ADMGO).

This Guide provides specific details on when, what and to whom to submit information. O. Reg. 419/05 will always take precedence where there is a conflict or ambiguity with any other ministry document.

The GIASO document is the primary ministry guideline that describes the framework for managing risk which includes setting a site-specific air standard. A site-specific air standard approval is a legal instrument that is different than an ECA (approved under s.20.3 of Part II.1 of the Environmental Protection Act). A site-specific air standard for a particular contaminant is a site-specific standard that replaces the standard for that contaminant in the schedules of the Regulation for that facility. The site-specific air standard is used to assess compliance for a facility and in the ECA process or any other Emission Summary and Dispersion Modelling (ESDM) report. However, if an approval of a site-specific air standard is granted, there will also likely be a requirement to obtain an ECA to implement the preferred technically feasible *pollution control combination* for the facility. For more information on ECA applications and amendments, please refer to the "Guide to Applying for an Environmental Compliance Approval" which is also available on the ministry website. O. Reg. 419/05 provides that an application for an

ECA may be made in conjunction with a request under section 32 of O. Reg. 419/05. It may also be made subsequent to an approval granted under section 35.

1.2 Where to send Requests

Standards Development Branch (SDB) is the lead branch for processing section 32 requests for site-specific air standards. The original copy of the submission is to be sent to SDB. A copy of the request must also be sent to the Environmental Approvals Branch (EAB) for logging and tracking purposes. A copy of all material pertaining to a request for a site-specific air standard must also be sent to the local ministry district office for their files. Ministry office locations and addresses can be found on the ministry website.

Standards Development Branch
Ministry of the Environment and Climate Change
Attention: Director, Site-specific Air Standards
Local Air Quality Section
40 St. Clair Avenue West, Floor 7th
Toronto, Ontario
M4V 1P5
Telephone: (416) 332-5519
Fax: (416) 327-2936
(original copy, electronic files and public version)

Environmental Approvals Branch
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5
Telephone: (416) 314-8001 or: 1-800-440-6389
Fax: (416) 314-8452

(one copy of request)

The Regulation requires that copies of all reports, as well as the input and output dispersion modelling files must be submitted electronically with the request. The Regulation also requires a facility to have a copy of the request available for review by the public. Any facility who is concerned about proprietary information should also submit a version of the request that can be shared with the public. The ministry expects that public versions will include all information with the exception of personal information and trade business secrets. For facilities with questions regarding the confidentiality of the submission, please see GIASO Chapter 2.10.1 Submission of Confidential Information for more information. Public versions of the request will be made available at SDB, the local ministry office as well as at the office of the facility making the request subject to the obligations under the Freedom of Information and Personal Privacy Act (FIPPA).

1.3 Background

Under the Regulation, newer requirements such as more advanced air dispersion models or any new, updated or more stringent air standard(s) are generally phased-in. The purpose of the phase-in period is to allow facilities time to assess and, if necessary,

take action to select the most appropriate compliance approach. The Regulation includes three compliance approaches for industry to demonstrate environmental performance, and make improvements when required. Industry can meet the air standard, request and meet a site-specific standard or register under a technical standard (if available for the sector). All three approaches are allowable under the Regulation.

Ontario's Local Air Quality Regulation recognizes that sometimes significant investments may be needed to keep pace with new or updated requirements. The site-specific standard compliance approach allows a facility the time needed to assess and implement where possible technical or operational adjustments to improve their environmental performance over time. A facility that meets a site-specific standard is in compliance with the Regulation.

It is expected that most facilities will be able to achieve compliance with the standards during the phase-in period. Subject to the necessary ECA requirements, a facility should proceed to implement the necessary changes to achieve compliance before the end of the phase-in period. A facility that is not able to meet the provincial standards within the phase-in period may be eligible to request a site-specific air standard under section 32 of O. Reg. 419/05 or to register for a Technical Standard (if available).

A site-specific standard is a standard for a contaminant established for an individual facility that is challenged in meeting a provincial air standard due to technical or economic reasons. This compliance approach focuses on actions to reduce emissions to air as much as possible considering the technology that is available and best operational practices. Information that is required to be submitted and considered by the Director before a decision can be made is set out in sections 33 to 34.1 of O. Reg. 419/05. This Guide is intended to assist facilities with the requirements of section 32 to 34.1.

An approval for a site-specific air standard under section 35 of O. Reg. 419/05 is a legal instrument that may be issued to a facility. There may be conditions of approval associated with a site-specific air standard that must be complied with, or the approval ceases to exist and the facility will be required to meet the applicable Schedule 3 standard for that contaminant. In some cases, the ministry may consider issuing an order under subsection 35 (14) of O. Reg. 419/05 to bridge to the requirements of a site-specific standard. In other cases, site-specific standards may change as action items are implemented and progress is made.

O. Reg. 419/05 provides that a site-specific air standard can be approved for a period of 5 years and up to 10 years. A facility can also make a request to renew a site-specific standard. Facilities that have already received an approval for a site-specific standard and are making a subsequent request may not be required to host a public meeting if there are no significant changes to the original request. However, public notification and comments will still be required through the Environmental Registry posting. The ministry will consider, on a case-by-case basis, whether to host or require the company

to host a public meeting. GIASO provides more information on the overall framework for managing risks.

Facilities eligible to request a site-specific standard are summarized in Part 2 Regulatory Framework of this Guide, see Table 2-2 Eligibility to Make a Request for a Site-Specific Air Standard. The Director responsible for issuing an approval for a site-specific air standard, under section 35 of O. Reg. 419/05, must consider site-specific factors related to the facility and its surrounding environment. Site-specific factors may include a number of items such as site geometry, nearby receptors, location, terrain, and frequency of exceedences.

Section 37 of O. Reg. 419/05 provides the Director the authority to revoke the site-specific air standard approval under certain conditions. Subsection 35 (7) O. Reg. 419/05 states that if conditions are imposed in a section 35 approval, the approval applies only if the conditions are complied with.

The granting of a section 32 request, however, is not a guarantee that the equipment or facility will operate in compliance with the Act or other applicable ministry legislation, regulations or guidelines. If, at any time, air emissions from a facility contravene any part of the Act, O. Reg. 419/05, or any conditions included in any authorizing document or other legal instrument, then such contravention may become the subject of abatement or enforcement in accordance with section 186 of the Act.

1.4 How to Use this Guide

This Guide lists the minimum information that a facility requesting a site-specific air standard must include in their submission. The Guide, however, is not intended to provide a detailed explanation of all of the information that is required to be submitted. The ministry guidelines listed in Part 1.1 Purpose of this Guide provide further details and instructions on the technical and other information that must support the request for a site-specific air standard. This Guide summarizes the key pieces of information that need to be provided as well as whom the information should be submitted to in the ministry for approval. The final decision on a request for a site-specific standard will be made by a signing director appointed under section 5 of the EPA for the purposes of section 35 of the Regulation. This currently includes the Environmental Sciences and Standards Division (ESSD) which includes SDB.

A glossary of terms is included at the end of Appendix A. When a term is used in the Guide, which is in the glossary, it shall appear in italics to alert the reader to definition used for the purposes of this Guide only.

For reference purposes Table 1-1 Outline of Guide outlines the information contained in the various parts of this Guide.

Table 1-1: Outline of Guide

Part	Contents
1 Introduction	An introductory section to provide background and context to the Guide.
2 Regulatory Framework	Provides an overview of the requirements that are considered by the Director under sections 32-34.1, O. Reg. 419/05 prior to assessing a request for a site-specific air standard. It also describes who is eligible to make a request for a site-specific air standard.
3 Information Required For Site-Specific Air Standard Requests	Provides an overview of the technical supporting information and other information to be submitted as part of the request.
4 Processing Site-Specific Air Standard Requests	Outlines the information that must be included in the request in order to be considered complete.
Appendix A: Technical Guidance for Preparing a Technology Benchmarking Report that is submitted as part of a request for a site-specific air standard	Provides supplemental information to ensure transparent decisions are made when choosing technically feasible control strategies and combinations for the contaminant that is the subject of the section 32 request for a site-specific air standard.
Appendix B: Consequence Category Assignments	This Resource Table is provided to assist in applying the scoring methodology which may be considered in the ranking of economically feasible pollution control options.

2.0 REGULATORY FRAMEWORK

Facilities that submit a request under section 32 of O. Reg. 419/05 must have technical reasons to support the selection of this compliance approach. Economic factors may also be considered. This part of the Guide describes who is eligible to make a request under section 32 and what information must be submitted, to whom and when. It also provides highlights of the Regulation to provide some context as to when a facility may be eligible to submit a request for a site-specific air standard.

2.1 Highlights of the Regulation

In 2005, Regulation 346 was revoked and replaced with O. Reg. 419/05. The Regulation came into effect on November 30, 2005. The Regulation works within the province's air management framework by regulating air contaminants released into communities by various sources, including local industrial and commercial facilities. The ministry regulates contaminants in air because we want to be protective of communities who live close these sources. It aims to limit substances released into air that can affect human health and the environment and requires industry to operate responsibly under a set of rules that are publicly transparent.

The Regulation includes three compliance approaches for industry to demonstrate environmental performance, and make improvements when required. Industry can meet an air standard, request and meet a site-specific standard or register and meet the requirements under a technical standard (if available). All three approaches are allowable under the Regulation.

This Guide focuses on the site-specific standard compliance approach (formerly referred to as alternative, altered, or alteration of standards process). It includes guidance on development of technology benchmarking reports. A technology benchmarking report is required for a site-specific standard request and can also be used to support the development of sector-based technical standards or required as part of a notice issued under section 27.1 of the Regulation.

In broad terms, O. Reg. 419/05 includes:

- Air standards for a number of contaminants contained in Schedules 2 and 3. New or updated air standards that have been introduced into O. Reg. 419/05 are listed in Schedule 7. Phase-in dates for new or more stringent standards are as specified in the Regulation.
- A phase-out (between 2010 and 2020) of the models in the Appendix to Regulation 346, according to a schedule that varies by industrial sector (using the North American Industry Classification System (NAICS) code).

- A set of defined dispersion models referred to in O. Reg. 419/05 as “approved dispersion models” that are required to be used when assessing compliance with the standards in Schedules 2 and 3. O. Reg. 419/05 also stipulates how the models must be used with the various inputs (as applicable), including:
    - operating conditions (section 10);
    - source of contaminant emission rates (section 11);
    - meteorological data (section 13);
    - area of modeling coverage (section 14); and
    - terrain data (section 16).
- O. Reg. 419/05 specifies the content of an Emission Summary and Dispersion Modelling (ESDM) Report (section 26). These reports are required to be submitted for ECA applications. There is also a phased introduction of a requirement for sectors listed in Schedules 4 and 5 to update an ESDM report annually; keep the report on-site; and make it available to the ministry upon request.
- O. Reg. 419/05 allows requests for site-specific air standards. Requests for site-specific air standards submissions include, among other things, the requirement to host a public meeting; a comparison of technology requirements and methods that are available for use; and economic feasibility (optional). For more information on site-specific air standards, see GIASO.

The US EPA air dispersion models and air standards will eventually affect all industries in Ontario. A phase-in period for new or updated standards and the US EPA air dispersion models has been established to allow facilities time to address potential implementation issues before the new requirements (new or updated standards or newer US EPA models) in the Regulation begin to apply to them. New or more stringent standards will apply to all emitters of those contaminants by the phase-in period specified in the O. Reg. 419/05. The new model requirements will be phased-in by sector: Schedule 4 sectors by February 1, 2010, Schedule 5 by February 1, 2013 and all others by February 1, 2020. A list of sectors in Schedules 4 and 5 is provided in Table 2-1 Schedule 4 and 5 Sectors below. For more information on phase-in dates, please see the O. Reg. 419/05 and the ministry website.

Table 2-1: Schedule 4 and 5 Sectors

Schedule #	NAICS Code	North American Industry Classification System Description
Schedule 4	2122	Metal Ore Mining
	221112	Fossil-Fuel Electric Power Generation
	324110	Petroleum Refineries
	3251	Basic Chemical Manufacturing
	3252	Resin, Synthetic Rubber, Artificial and Synthetic Fibres and Filaments Mfg
	3311	Iron and Steel Mills and Ferro-Alloy Manufacturing
	331410	Non-Ferrous Metal (except Aluminum) Smelting and Refining
Schedule 5	3221	Pulp, Paper and Paperboard Mills
	324190	Other Petroleum and Coal Products Manufacturing
	325	Chemical Manufacturing
	326150	Urethane and Other Foam Product (except Polystyrene) Manufacturing
	3279	Other Non-Metallic Mineral Product Manufacturing
	331	Primary Metal Manufacturing
	332810	Coating, Engraving, Heat Treating and Allied Activities
	332999	All Other Miscellaneous Fabricated Metal Product Manufacturing
	336	Transportation Equipment Manufacturing
	5622	Waste Treatment and Disposal

2.2 Who is Eligible to Make a Request?

A facility is eligible to request a site-specific standard if it is affected by a new or updated air standard, the requirement to use a more advanced air dispersion model or if it is issued an order or a Notice as summarized in Table 2-2 Eligibility to Make a Request for a Site-Specific Air Standard. A phase-in period for new or updated standards and the more advanced air dispersion models has been established to allow facilities time to address potential compliance issues before Schedule 2 standards (sections 19) or Schedule 3 standards (standards with variable averaging periods are assessed using a more advanced model) (section 20) of the O. Reg. 419/05 begins to apply to them. Those facilities that cannot achieve the air standard within the phase-in period may consider a request for a site-specific air standard if they are eligible.

Section 32 of O. Reg. 419/05 specifies which facilities are eligible to make a request for a site-specific air standard and the specific timeframes within which the request must be made. Table 2-2 Eligibility to Make a Request for a Site-Specific Air Standard shows the eligibility of facilities to make a request for a site-specific air standard. The window of opportunity to make a request (shown in the right hand column) varies depending on the request scenario (shown in the left hand column).

Table 2-2: Eligibility to Make a Request for a Site-Specific Air Standard

	Request Scenario	Opportunity to Make a Submission for a Request for a Site-Specific Air Standard
1	An existing facility† within a sector identified in Schedule 4 is affected by a newer model listed in s. 6. [s.32(1)1 - revoked]*	February 1, 2007 – October 31, 2008 [s.32(5) revoked]*
2	An existing facility† within a sector identified in Schedule 5 is affected by a newer model listed in s. 6. [s. 32(1)2]*	February 1, 2010 – October 31, 2011 [s.32 (6)]*
3	A facility† that is not in Schedule 4 or 5 is affected by a requirement to use a newer model (i.e. section 20 applies). [s.32(1)3]	February 1, 2013 – October 31, 2017 [s.32(7)]
4	A new facility† that is affected by a standard for a contaminant listed in Schedule 7. [s. 32(1)4]	Concurrent with initial ECA application or, if the standard has not yet come into force, 15 months before the new standard comes into effect or 12 months after the new standard is introduced, whichever is later. [s.32 (8) and (9)]
5	An existing facility† that is affected by a standard for a contaminant listed in Schedule 7. [s. 32(1)5]	15 months before the new standard comes into effect or 12 months after the new standard is introduced, whichever is later. [s.32(9)] Note: For example, a request with respect to a standard that takes effect July 1, 2016 must have been made by April 1, 2015.
6	A facility† is given a notice under s.7 by the Director before February 1, 2020 specifying that there is only one model that is able to be used. [s.32(1)6]	Within 3 years of the Director giving the notice [s.32(10)]
7	A facility† is given a notice under s.7 by the Director on or after February 1, 2020 specifying that there is only one model that is able to be used and the model is not listed in s.6. [s.32(1)7]	Within 3 years of the Director giving the notice [s.32(10)]
8	A facility† is given a notice under s. 20(4) or an order under s.20 (5) by the Director for the early application ("speeding up" before February 1, 2020) of the Schedule 3 standards and the newer models listed in s. 6. [s.32(1)8]	Within 3 years of the Director giving the notice or making the order [s.32(11)]
9	A person making a subsequent request (i.e. requesting a renewal of) with respect to a site-specific standard. [s.32(1)8.1]	The subsequent request must be made at least 15 months before the expiry date of the site-specific standard approval. [s.32(12)]
10	A facility is required to make a request under this subsection as part of a plan developed or amended pursuant to an order under section 7 or 17 of the Act or paragraph 7 or 8 of subsection 18 (1) of the Act.	As specified in the order.

Note: * Dates for these items have passed but remain in the table for reference since some decisions are still current.

† Although the Regulation does not define the term 'new facilities', it does refer to facilities where construction of the facility began after November 30, 2005 and no application for an ECA (air) was made on or before that date.

Section 35 of O. Reg. 419/05 provides authority for the Director to grant an approval for a site-specific air standard for a contaminant that is different than the Schedule 3 standard in O. Reg. 419/05 provided certain criteria are met. A facility governed by section 19 of O. Reg. 419/05 (i.e. that must meet Schedule 2 standards) is also eligible to request a site-specific air standard if it cannot meet a Schedule 2 air standard[1] (see footnote 1). However, since all requests for a site-specific air standard require the use of US EPA models referenced in O. Reg. 419/05 for the contaminant that is the subject of the request, the request is for a site-specific standard to replace the standard in Schedule 3. New[2] facilities in Schedules 4 or 5 emitting a contaminant in Schedule 7 are also eligible.

These windows of opportunity are very important. The standards are phased in so that industry has time to react to a change in a standard and/or a newer model. It is the responsibility of the industry to determine if a request for a site-specific air standard is required and submit all of the required information within the applicable window of opportunity available. The ministry will use its time to adequately review the requests and to seek input from external expertise, as necessary. If a facility misses a window they may lose their opportunity to make a request for a site-specific air standard.

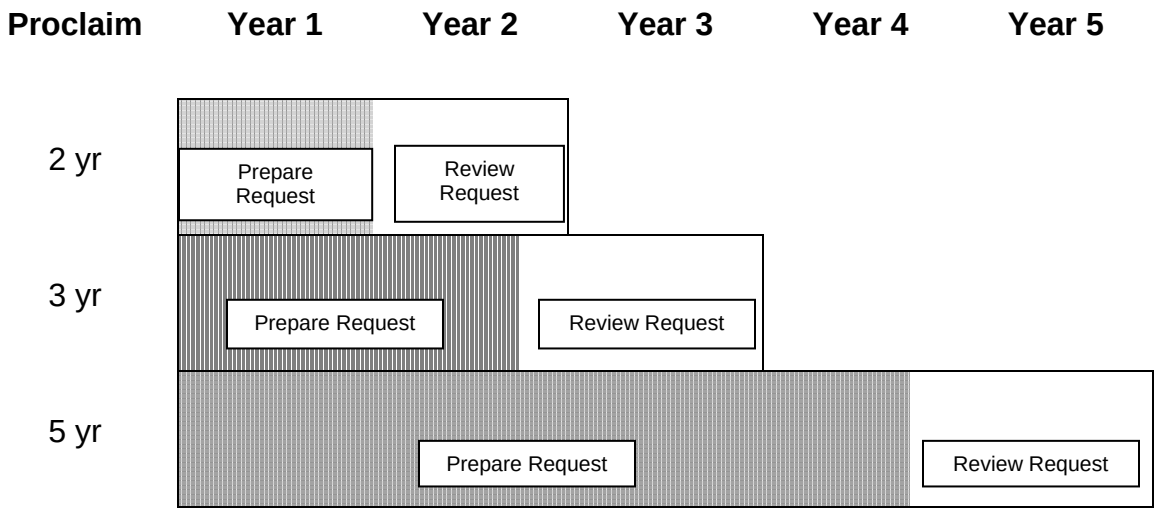
As more standards are added to the O. Reg. 419/05, the window to request a site-specific standard will shift for those contaminants. Figure 2-1 Windows of Opportunity as New Standard Added to Schedule 7 graphically illustrates how the windows of opportunity to request a site-specific standard open when a new standard is added to Schedule 7. The first line shows that for a new contaminant listed in Schedule 7 with a 2 year phase-in period, eligible facilities will have 12 months to prepare and submit a request under section 32 (and the standards would not take effect until 12 months later). The second line shows that for a new contaminant listed in Schedule 7 with a 3 year phase-in period, eligible facilities will have 21 months to prepare and submit a request (and the standards would not take effect until 15 months later). The final example in the figure is for a 5 year phase-in period in which eligible facilities will have 3 years and 9

[1] Please note that a facility governed by section 19 (i.e. Schedule 2) after 2010 can request a site-specific standard. However any facility requesting a site-specific standard is required to use the more advanced US EPA models (such as AERMOD) as part of their request. The more advanced models are required because they allow for the assessment of frequency of exceedences at receptors, and an assessment of the standard with variable averaging times in Schedule 3 which is the future standard for all facilities. A facility that is or would be required to meet the standards in Schedule 2 can also request a site-specific standard. These situations are summarized in Table 2-2 Eligibility to Make a Request for a Site-Specific Air Standard. Please also refer to s. 32(1).

[2] Although the Regulation does not define the term ‘new facilities’, it does refer to facilities where construction of the facility began after November 30, 2005 and no application for an ECA (air) was made on or before that date.

months years to prepare and submit a request (and the standards would not take effect until 15 months later) [see subsection 32 (9) of the Regulation].

Figure 2-1: Windows of Opportunity as New Standard Added to Schedule 7



3.0 Information Required for a Request for a Site-Specific Air Standard

This part of the Guide summarizes section 33 of the Regulation which sets out the information that is required to be submitted to support a request for a site-specific air standard. The ministry guidelines GIASO, ADMGO and the ESDM Procedure Document provide more detail on the contents of the reports as well as other regulatory requirements and as such must also be consulted when preparing a request for a site-specific standard. Facilities with questions regarding the legal issues associated with a request for a site-specific air standard, or the technical aspects of completing an assessment of the emissions and point of impingement (POI) concentrations from a facility, should seek the services of qualified professionals.

For facilities with questions regarding the confidentiality of the submission, please see GIASO Chapter 2.10.1 Submission of Confidential Information for more information.

3.1 Summary of Requirements

This part of the Guide outlines in more detail the information requirements for the reports that must be submitted to support a request for a site-specific air standard.

Requests for a site-specific air standard, under section 32 of O. Reg. 419/05 must include the information set out in sections 33, 34 and 34.1 (note that information on economics set out in subsection 33 (4) is optional).

The following is a summary of the information that is required to be submitted as part of a request for a site-specific air standard:

- an application form (which summarizes legal information including name and location of applicant, contaminant name, etc.);
- an Emission Summary and Dispersion Modelling (ESDM) Report (which must include the results from a modelling/monitoring study, and an assessment of the magnitude and frequency of exceedence of the standard(s), etc.);
- a Technology Benchmarking Report (which must assess and rank technical methods for reductions in contaminant concentrations and provide an assessment of feasible technologies);
- an Economic Feasibility Analysis (Optional);
- a Public Consultation Report that summarizes the results of the mandatory public meeting with the local community; and
- an Action Plan with schedule of dates/timelines.

Table 3-1 Items to be submitted with Request below provides a summary of the information required in each of these with a reference to the specific sections of the O. Reg. 419/05. For a full description of the contents of these reports and the material that is to be submitted with the request, as well as other requirements, please see GIASO, ADMGO and the ESDM Procedure Document. Appendix A of this Guide also provides guidance on the development of the Technology Benchmarking Report.

The information summarized in Table 3-1 Items to be submitted with Request must be included in the request in order for the request to be considered complete.

Table 3-1: Items to be submitted with Request

Information to be Submitted	O. Reg. 419	Ministry Contacts†	Forms/Reference Documents	Timing and Other Factors
Application Form	-	SDB	Application for Approval of a Site-Specific Air Standard	Form to be submitted with the section 32 request for a site-specific air standard.
Emission Summary and Dispersion Modelling (ESDM) Report	s. 33(1) paras 0.1, 1 and 2 prepared in accordance with s. 26. s. 10, 11, and 12 (refinement, higher data quality). s. 33 (3), (6), (7), (8), (9) and (10), (use more advanced US EPA models for contaminant that is the subject of the section 32 request for a site-specific air standard). s. 20 for contaminant that is the subject of the request.	SDB	ESDM Procedure Document ADMGO GIASO, chapter 2.2.2 CAMMs Pre-submission requirements as per of Table 3-2 Pre-submission Requirements this Guide	ESDM report to be submitted with the section 32 request for a site-specific air standard. Executive Summary of ESDM report must be made available to the public at the public meeting. [clause 34(3)(a)]. Must offer to provide a complete copy of the request. [clause 34(3)(b)]. ESDM report shall be prepared using both operating scenarios in s. 10(1). See subsections s. 33 (6), (7), (8) and (9).
Technology Benchmarking Report	s. 33 (1) paragraphs 3, 4, 5 and 6	SDB	GIASO, chapter 2.4 Technology Benchmarking Appendix A to this Guide	Technology Benchmarking Report must be submitted with submission of request. Must be made available to the public upon request. clause 34(3)(b).
Economic Feasibility Analysis (Optional)	s. 33(4)	SDB	GIASO, chapter 2.5 Economic Considerations Guideline F-14: Economic Analyses of Control Documents on Private Sector and Municipal Projects (PIBs# 1517)	Optional with submission of request. Must be made available to the public upon request. clause 34 (3)(b).

Information to be Submitted	O. Reg. 419	Ministry Contacts†	Forms/Reference Documents	Timing and Other Factors
Public Consultation Report: A summary of the pre-submission consultation meeting with local stakeholders	s. 33(1) para 8 s.34 s. 34.1	Notification of SDB and local ministry district.	GIASO, Chapter 2.6 Stakeholder Involvement	Meeting to be held prior to submission of request. Notification of the meeting must occur at least 15 days prior to meeting and in accordance with the requirements of O. Reg. 419/05. Submission includes a summary of comments made and responses provided. A person making a request under section 32 may make the request without holding a public meeting if the Director has ever set a site-specific standard under section 35 for the same contaminant in respect of the same facility.
Action Plan	s. 33(1) para 7 OR s. 33(4), para 4 s. 35(9) and 35(10).	SDB with input from local ministry District office	GIASO, Chapter 2.7 The Action Plan and 2.8 Continuous Improvement	With submission of request. Must be made available to the public upon request. s. 34(4) and s. 34.1(6)
Scoring Method (Optional)	The method is optional and is not referenced in O. Reg. 419.	SDB	Appendix B of this Guide describes the optional Scoring Method. This method is also part of the costing assessment.	With submission of request. May be included in Cost-Effectiveness report or Technology Benchmarking Report with supporting documentation in ESDM report.

Note: † SDB is the main contact for requests for site-specific air standards and all original copies should be sent there. One copy must also be submitted to EAB, and one copy to the local District Office (see Part 1.2 Where to send Requests). An electronic copy of the ESDM and Technology Benchmarking reports and the input and output dispersion modelling files must also be provided. If a facility is concerned about proprietary information, then a public version of the documents for viewing should also be provided to SDB and the local district office. The ministry expects that public versions will include all information with the exception of personal information and trade business secrets.

3.2 Pre-submission Requirements

Some requirements to support a request under section 32 require pre-approval or notification in advance of the submission of a formal request. These items are listed in Table 3-2 Pre-submission Requirements and include:

- Approval of Site-specific Meteorological Data;
- A Plan for Combined Assessment of Modelled and Monitored Results as an emission rate refinement tool (see Technical Bulletin – Combined Assessment

OF Modelled and Monitored Results (CAMM) as an Emission Rate Refinement Tool (as amended));

- Source Testing Pre-Test Plan (if required or desired) [Note: source testing across a range of operating conditions can be submitted in lieu of a CAMM. See s. 12(1.1) of the Regulation];
- Proposal for Negligible Sources (under Chapter 7.3 General Guidance to Identifying Insignificant or Significant Sources and Contaminants of ESDM Procedure Document); and
- Notification for pre-submission consultation meeting with local stakeholders.

Table 3-2 Pre-submission Requirements sets out when such pre-approval or notification must be completed and indicates which branch of the ministry should be contacted for each item. If there are any questions regarding these items, pre-submission consultation with the ministry is possible and may be advisable. This is strongly encouraged. Please contact the appropriate ministry office listed in Table 3 2. Please note that use of the term Director does not mean the director of a ministry branch. It is the position identified and appointed under s. 5 of the Environmental Protection Act designated in the ministry as a Director for the purposes of O. Reg. 419/05.

It should be noted that it takes time and effort both on behalf of the proponent to prepare the necessary documents for pre-approval or notification and on behalf of the ministry to review these submissions. It is important to use the phase-in period efficiently and allow enough time for the pre-submission requirements.

Table 3-2: Pre-submission Requirements

Information to be Submitted	When	O. Reg. 419/05	Ministry Contacts	Forms/Reference Documents
Site-specific Meteorological Data	Site-specific meteorological data must be approved prior to completing the ESDM report to support the section 32 request for a site-specific air standard.	s. 33(10) and s. 13(2)	Environmental Monitoring and Reporting Branch (EMRB)	ADMGO – Form† for "Request for Approval under s.13(1) of Regulation 419/05 for use of Site Specific Meteorological Data" PIBS#5350e:
A Plan for Combined Assessment of Modelled and Monitored Results (CAMM)	A combined assessment of modelled and monitored results is typically done for sources of fugitive air emissions (see Technical Bulletin available on the ministry website - "Combined Assessment of Modelled and Monitored Results (CAMM) as an Emission Rate Refinement Tool"). Assessment of emissions in accordance with an approved plan under section 11(1) paragraphs 2 or 3 must have been done prior to completing the ESDM report to support the section 32 request for a site-specific air standard. ESDM reports submitted for a section 32 request must have highest data quality as per s.12. Note: see GIASO for reference to new facilities	s. 33(8) Will require a plan to be approved under s. 11(1) para 3 s. 12 s. 33(9) In some cases, source testing alone may be sufficient.	Submit proposed modelling/ monitoring plan to SDB with a copy to local ministry district office. SDB will coordinate comments from the ministry's Regional Technical Support Section and EMRB. Note: It is recommended that the draft report be submitted to the ministry for comment. Site-specific meteorological data must also be included in a combined modelling/monitoring assessment.	The Technical Bulleting "Combined Assessment of Modelled and Monitored Results (CAMM) as an Emission Rate Refinement Tool "is available from the ministry web-site. Form† "Request for Approval of a Plan for Combined Analysis of Modelled and Monitoring Results" PIBS#6323e

Information to be Submitted	When	O. Reg. 419/05	Ministry Contacts	Forms/Reference Documents
Negligible Sources	If additional negligible sources are identified beyond current ministry guidelines, agreement must be achieved prior to completing the ESDM report to support the section 32 request for a site-specific air standard.	s. 33(1) para 1 s. 26(1) subpara 3.iii.	SDB	The development of specific criteria for assessment of negligible source under Chapter 7.3 General Guidance to Identifying Insignificant or Significant Sources and Contaminants of ESDM Procedure Document. The use of accepted methods such as those in Chapters 7.1 Screening-Out Contaminants that are Emitted in Negligible Amounts and 7.2 Screening-Out Sources that Emit Contaminants in Negligible Amounts do not require pre-approval.
Source Testing Pre-Test Plan (if applicable)	Source testing must have been done prior to submission of the ESDM report to support a section 32 request. The ministry must also be given 15 days notice prior to source testing to allow the opportunity to witness the test.	s. 33(9) s. 12(1.1) s. 11(1) para 2	SDB; approving Director for s. 11(1) para 2 SDB Manager of Technology Standards Section. Submission should be identified as being in support of a request for a site-specific air standard.	Ontario Source Testing Code Note: source testing may not be necessary if an approved modelling/monitoring plan has been conducted.
Organize Pre-submission consultation meeting with local stakeholders	Prior to submission of request. Provide notification to local stakeholders, local ministry district office and SDB 15 days prior to meeting.	s. 33(1) paragraph 8 s. 34 s. 34.1	Provide copy of the Notice for the meeting to local ministry district office and SDB.	GIASO, chapter 2.6 Stakeholder Involvement Note: All the material listed in Table 3-1 Items to be submitted with Request must be summarized and made available to the public upon request.

Note: † For more information on forms, please go to the ministry website.

The following is a discussion of each item in Table 3-2 Pre-submission Requirements.

3.2.1 Site-specific Meteorological Data

Meteorological data used in modelling must represent facility site conditions as accurately as possible. Site-specific data may include the most appropriate available ministry data set, data from an on-site meteorological station or data derived from computational methods. Subsection 33 (10) of O. Reg. 419/05 requires that the most site-specific meteorological data be used, as approved by the Director, to support a request for a site-specific air standard. This means meteorological data referenced in subsection 13 (1), paragraphs 3 or 4 of O. Reg. 419/05 must be used and approved by the Director. Where regional meteorological data is deemed to be the best data available, this will be considered but is subject to pre-approval. Site-specific meteorological data is important because a request for a site-specific air standard must consider the frequency of exceedence of the standard at specified locations (subsection 35 (2) and 35 (12) paragraph 2). Site-specific meteorological data is also important in assessing the pattern and geographic extent of exceedences. For more information on frequency, see Chapters 2.3.1 Identification of Receptors and 4 Factors to Consider When There Are Exceedences of GIASO.

It should be noted that Director approved meteorological data is also required for the days where monitored results are available for the combined modelling/monitoring assessment. This specific meteorological data would only be considered as part of that approval for a combined modelling/monitoring plan under subsection 11 (1), paragraph 3 of O. Reg. 419/05 (see Part 3.2.2 Combined Modelling/Monitoring Assessment of this Guide).

A form to request the use of site-specific meteorological data can be obtained from the ministry website. When this form is being submitted to support a section 32 ESDM report, copies are to be provided to the following ministry Branches: EMRB, SDB, EAAB and the local ministry district office.

3.2.2 Combined Modelling/Monitoring Assessment

The decision to grant a request for a site-specific air standard under section 32 will be based in part on the POI concentration ($\mu g/m^3$) that results from a “refined” ESDM report that has considered all *technically feasible pollution control combinations* to reduce the concentration of the contaminant that is the subject of the request as much as possible for every non-negligible source of that contaminant. Sections 10, 11 and 12 of O. Reg. 419/05 govern the concept of “refinement” of emission inputs to the model (see also subsection 33 (9)). The ESDM report must include an “as accurate as possible” assessment of existing emissions/concentrations for the contaminant that is the subject of the request. The emission rate used must be based on a director approved plan under subsection 11 (1) paragraphs 2 or 3. This section focuses on paragraph 3 of subsection 11 (1). Emission rates that rely on paragraph 2 of subsection 11 (1) is further discussed in Chapter 3.2.3 Source Testing Plan.

The modelling/monitoring assessment allows for the confirmation and refinement of emission rates. The general approach involves the use of iterative modelling to adjust the emission rate of each source being refined so that the model results best match the monitored data at all of the monitors for that day. For more information, please see the Technical Bulletin – Combined Assessment of Modelled and Monitored Results (CAMM) as an Emission Rate Refinement Tool (as amended). For additional information on monitoring, including proper siting considerations, please refer the Operations Manual for Source Emissions Monitoring (SEM) document (latest version).

All requests for a site-specific standard must include the submission of a plan as per s.11(1) paragraph 3 which must be pre-approved by SDB. A form to request approval of this plan can be obtained from the ministry website. When this form is being submitted to support a section 32 ESDM report, copies are to be provided to the following ministry Branches: EAAB, EMRB, SDB and the local ministry district office.

In general, these plans will include details on a modelling/monitoring approach. The plan typically includes the rationale for the placement of the monitors, the sampling frequency and the sampling methodology and analysis. It is very important to allow sufficient time for the ministry to review the plan. If there are neighbouring facilities that also emit the same contaminant, care will need to be taken to determine the contribution from the facility requesting the site-specific air standard.

See subsections 33 (6 thru 10) of the Regulation for more information on refining an ESDM report submitted under section 32.

3.2.3 Source Testing Plan

An ESDM report submitted in support of a request for a site-specific air standard must include refined emission rates for the contaminant that is the subject of the request (and others as necessary). Source testing that is conducted in accordance with ministry requirements may be one method to refine emissions rates if the Director is of the opinion that it will accurately determine emissions of that contaminant. Generally, source testing is used for point sources and modelling/monitoring is used for fugitive sources. Please see subsections 33 (7), 33 (8) and 33 (9) of O. Reg. 419/05 for more information on refining modelling in an ESDM report submitted in respect of a request made under section 32.

Any source testing that is to be used in support of a request for a site-specific air standard must be conducted according to a plan approved by the Director as likely to provide an accurate reflection of emissions. The plan should indicate that this data is intended to be used in a section 32 request. In addition, under subsection 11 (1) paragraph 2, the proponent is required to test using a range of operating conditions. The proponent must also provide the ministry 15 days' notice of the date of the source testing to allow the ministry the option to witness the test. The final report must also be submitted and approved by ministry staff.

Note: When estimating emission rates according to paragraph 2 of subsection 11(1) of the Regulation, source testing is required to be conducted comprehensively across a full range of operating conditions. The range of operating conditions must be approved by the ministry (SDB – Local Air Quality Section) before source testing is conducted. This plan is not the same as a pre-test plan for source testing. For more information, please contact SDB, Local Air Quality Section.

3.2.4 Pre-submission Consultation with Local Stakeholders

O. Reg. 419/05 requires the facility to hold a public meeting prior to submitting a proposed request for Director's approval of a site-specific air standard. Paragraph 8 of subsection 33 (1) of the Regulation requires that information pertaining to a public meeting be submitted with the request made under section 32. Details of the requirements for the public meeting and stakeholder notification are set out in section 34 and, if a meeting is required by the Director, section 34.1. The local community must be given an opportunity to be made aware of the nature of the request and to be provided with a full understanding of the options that are being considered including the technical challenges that a facility faces. Economic issues may also form part of the basis of the request for a site-specific air standard. It is recommended that stakeholder identification begin as soon as possible in the process and that risk communication focus on the key stakeholder(s) – the local community. For more information on public meetings and risk communication, please refer to Chapter 2.6 Stakeholder Involvement of GIASO. The ministry has also developed public fact sheets for use with public engagement activities.

The facility making the request for a site-specific air standard shall, at least 15 days before the public meeting, publish a notice in a newspaper having general circulation in the area where the source of contaminant is located, setting out the name, address and telephone number of the facility making the request and informing the public of the facility's intention to make the proposed request, the purpose of the request and the date, time and place of the meeting. The company is responsible for organizing the meeting and ensuring that appropriate local stakeholder groups have been notified at least 15 days prior to the meeting. Clause 34(4)(b) provides a list of the stakeholders that are required to be notified of the meeting. Notification to the ministry shall be both to the local ministry district office as well as to the Director of Standards Development Branch.

The notices for the public meeting must be in language that can be understood by persons without specialized scientific training. The format, style, title or content of the notice may vary from facility to facility to suit specific circumstances and local requirements. The following is recommended:

- name and address of the facility making a request for a site-specific air standard;
- a brief description of the basis of the request and the reasons why the site-specific air standard is needed;
- an indication that the facility is following a process required by O. Reg. 419/05;

- details of when and where the public meeting will take place and where further information can be obtained if a member of the public is unable to attend the meeting;
- name or title of a company contact person to whom comments or requests for information should be directed; and
- the final date for submission of stakeholder comments to the proponent.

3.3 The Emission Summary and Dispersion Modelling Report

The ESDM report submitted under section 33 of O. Reg. 419/05 must include all contaminants emitted from the facility, not just the contaminant that is the subject of the request for a site-specific air standard. Subsections 33(6) and 33(10) of O. Reg. 419/05 require that the contaminant(s) that is the subject of the request for a site-specific air standard be assessed using an approved dispersion model that uses the most representative hourly meteorology data (e.g. AERMOD) as if section 20 of O. Reg. 419/05 applied. The approved dispersion model will be used to assess compliance against the standards in Schedule 3 of O. Reg. 419/05. For all of the other contaminants, the facility may choose to use any one of the approved dispersion models. If the facility is not yet required to use the US EPA air dispersion models to assess all contaminants from their facility, then the Appendix to Regulation 346 can be used (only if applicable) to assess contaminants that are not the subject of the request.

For presentation purposes, it may be easier to separate the information on the non-section 32 contaminants from the section 32 contaminant(s). A separate source summary table for the section 32 contaminant(s) is necessary to assist in the review of the sources that are significant to the request being made. A table summarizing the POI contributions from each source must also be included in the ESDM report submitted under section 32. The ESDM report must contain the following information (in addition to all of the other required information) for the contaminant that is the subject of the request:

- An assessment of the POI concentrations at both of the operating conditions described in subsection 10 (1) of O. Reg. 419/05 paragraphs 1 and 2.
- An assessment of the POI concentrations at the currently approved operating condition if this is different than the above.
- The modelling runs to support the assessment of the POI concentrations that would result if the various technically feasible *pollution control strategies* identified as part of the Technology Benchmarking Report (see Appendix A of this Guide) were in place. It would be helpful to clearly identify each modelling run as linked to the various combinations detailed in the Technology Benchmarking Report.

- An assessment of the POI concentrations at both of the operating conditions described in subsection 10 (1) of O. Reg. 419/05 paragraphs 1 and 2 that would now include implementation of the *preferred technically feasible pollution control strategy* that was recommended in the Technology Benchmarking Report. This POI concentration will form the basis of the site-specific air standard.

For more information on ESDM reports, including requirements to assess the frequency of exceedences at specific points, please refer to the ESDM Procedure Document, ADMGO and GIASO.

Electronic Modelling Files

All of the necessary electronic modelling files to support a section 32 ESDM report must be included on a data disk. Examples of the types of files that must be supplied (assuming use of AERMOD model) include:

- meteorological-related files;
    - unprocessed and fully processed model ready meteorological files for modelling/monitoring comparisons;
    - the ministry approved 5 year meteorological set;
    - AERMET stage 1, 2 and 3 input files (.IN1, .IN2, .IN3);
- BPIP input, output and summary files;
- terrain-related files;
    - DEM files used;
    - AERMAP input file;
    - AERMAP output files (.ROU and .SOU);
- AERMOD-related files; and
    - electronic base map;
    - input and output files for every model run;
    - plot files of concentrations and exceedences;
- spreadsheets, database files;
    - emission input files;
    - model output manipulation (post-processing) files.

All of the above files should be organised into well labelled folders and/or may be archived using zip or another common compression file format.

Complete documentation of the modelling files is necessary for the ministry review staff to follow what modelling was undertaken. Documentation must be supplied that clearly describes each of the supplied model runs including the name of files supplied, the emission scenario being modelled and the purpose of the run. If the modelled source names do not match exactly the source names listed in the ESDM report, a correlation table must be supplied. All source groups need to be documented including source group name of emission sources included in the group and the purpose of the source group. Any post-processing of the modelling output files using a database program

such as *Microsoft Access* or a custom developed executable file or script needs to be well documented.

Overall sufficient documentation and electronic files must be supplied that will allow the reviewer to duplicate the results.

Most Refined ESDM Report

ESDM reports submitted under section 32 must be the most "refined" ESDM report possible for the contaminant that is the subject of the request for a site-specific air standard. The decision to grant a request for a site-specific air standard under section 32 will consider the POI concentration ($\mu g/m^3$) that results from a "refined" ESDM report as well as the technically feasible *pollution control strategies* identified in the Technology Benchmarking Report (see Appendix A of this Guide).

The information referred to in Parts 3.2.1 Site-specific Meteorological Data and 3.2.2 Combined Modelling/Monitoring Assessment of this Guide is needed before a proponent can complete an ESDM report for the purposes of a request for a site-specific air standard. ESDM reports submitted under section 32 must include the following information for the contaminant that is the subject of the request:

- a plan submitted as per paragraph 3 of subsection 11 (1) of the Regulation which typically includes a combined modelling/monitoring assessment (see Technical Bulletin: Combined Assessment of Modelled and Monitored Results (CAMM) as an Emission Rate Refinement Tool (as amended));
- source testing information (if applicable);
- an assessment of the frequency and magnitude of exceedences for the contaminant that is the subject of the request (see Part 3.5 Assessing Concentrations and Frequency at Receptors of this Guide); and
- site-specific meteorological data approved by the ministry (EMRB) prior to finalizing the ESDM report.

Examples of information contained in the ESDM report that can be "refined" include:

- emission inputs for air dispersion modelling, which can be refined to a higher data quality (sections 11 and 12 of O. Reg. 419/05);
- operating conditions of the facility (sections 10 and 12 of O. Reg. 419);
- selection of approved dispersion model can be refined to more accurately assess concentrations (sections 6 and 7 of O. Reg. 419/05); and
- meteorological data can be refined to be site-specific (section 13 of O. Reg. 419/05).

As previously discussed, the ESDM report submitted in support of a section 32 request must be refined in accordance with section 12 of O. Reg. 419/05.

For the contaminant that is the subject of the request, the ESDM report must contain a review of the contribution and significance of various sources to total emissions and maximum POI concentrations (see also GIASO Chapter 2.4.3 Step 3: Technically Feasible Options are Ranked/Benchmarked). A table summarizing the POI contributions from each source should be included in the ESDM report.

The ESDM report must also contain modelling results that allows for the ranking of technically feasible *pollution control options and strategies* based on minimizing the maximum POI concentration on a source-by-source basis. An ESDM report submitted under section 32 of O. Reg. 419/05 must include a modelling assessment for all technically feasible *pollution control strategies and combinations* identified in the Technology Benchmarking Report (see Appendix A of this Guide). It is recommended that this information be submitted as a separate Appendix to the ESDM report. This information on POI concentrations in the ESDM Report can then be used in the Technology Benchmarking Report to rank the technically feasible *pollution control strategies* and overall *pollution control combinations* in terms of effectiveness at minimizing the maximum POI concentrations for this contaminant. A separate section or appendix must be included in the ESDM report for each modelling scenario that is required in the Technology Benchmarking Report for the contaminant that is the subject of the request. Information on the frequency of exceedences at both the maximum POI as well as POIs at specified receptors (see subsection 30 (8) of O. Reg. 419/05) must also be included for each technically feasible *pollution control combination* being considered in the report(s). The significant sources that contribute to the POI concentrations at these other receptors should also be identified. For more information regarding frequency and receptors, please see Part 3.5 Assessing Concentrations and Frequency at Receptors of this Guide and Chapter 4 Factors To Consider When There Are Exceedences of GIASO.

It should be noted that if a request is being made to consider economic feasibility, the ESDM report must include a comparison of the POI concentrations for the existing emission/operating conditions at the facility; the POI concentrations that would result from the installation of the best technically feasible *pollution control combination* identified in the Technology Benchmarking Report; and the POI concentrations that would result from the *preferred technically feasible pollution control combination* based on economic feasibility arguments that are supported by an Economic Feasibility Report (see GIASO, Chapter 2.5 Economic Considerations).

Continuing Requirement to Update ESDM Reports

The submission of the ESDM report to support a request for a site-specific air standard engages the requirement to update and maintain an ESDM report annually as per sections 25 and 27 of O. Reg. 419/05. For the contaminant for which a site-specific standard was approved under section 35, the ESDM report update must include both operating conditions set out in subsection 10 (1) (e.g. actual emissions in the previous year as well as the maximum operating scenario).

3.3.1 Negligible Sources

Chapter 7 Assessment Of The Significance Of Contaminants And Sources of the ESDM Procedure Document discusses sources that need not to be considered in the air dispersion modelling component of an ESDM report – known as negligible sources. Sources may be considered negligible if it discharges an amount of the contaminant that is negligible in comparison to the plant-wide rate of emission giving consideration to the nature of the contaminant. Table B-3A of the ESDM Procedure Document lists specific examples of sources that emit contaminants in negligible amounts (items in Table B3-B may also be considered no significant but require additional information to be provided). Contaminants may also be considered negligible if they are emitted in negligible amounts compared to their applicable ministry POI limits[3].

It is important to note that the ESDM report must identify all sources that emit a contaminant that is the subject of the request whether or not they qualify as negligible sources. To streamline the process of assessing feasible technologies to reduce POI concentrations, negligible sources identified in the ESDM report may be eliminated from the technology benchmarking assessment. Guidance on negligible sources may be found in the ESDM Procedure Document, Chapter 7 Assessment Of The Significance Of Contaminants And Sources. It is also possible for facilities requesting a site-specific air standard to develop their own criteria for determining negligible sources under Chapter 7.3 General Guidance to Identifying Insignificant or Significant Sources and Contaminants of the ESDM Procedure Document. However, any approach that is different than those outlined in Chapters 7.1 Screening-Out Contaminants that are Emitted in Negligible Amounts and 7.2 Screening-Out Sources that Emit Contaminants in Negligible Amounts must be agreed to by the ministry (SDB) prior to finalizing the ESDM report that is to be submitted in support of a section 32 request.

3.4 Technology Benchmarking Reports

All submissions under section 32 of O. Reg. 419/05 must include a technology benchmarking assessment as set out in paragraphs 3 through 6 of subsection 33 (1). This “Technology Benchmarking Report” assesses the technical feasibility of implementing applicable *pollution control strategies* and *pollution control combinations*. For more information on the content of this report, please refer to Appendix A of this Guide.

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[3] The generic term "limits" in the context of this guideline means any numerical concentration limit set by the ministry including standards in the schedules to the Regulation, guidelines and recommended screening levels for chemicals with no standard or guideline. The ministry Air Contaminants Benchmarks List (ACB List) summarizes standards, guidelines and screening levels used for assessing point of impingement concentrations of air contaminants. For more information, see ESDM Procedure Document.

Methods to reduce or control air emissions can vary for different sectors as well as for facilities within the same sector. One of the purposes of a Technology Benchmarking Report is to ensure that the action plan proposed by the proponent represents the best practices available in limiting off-site impacts of a contaminant(s). A Technology Benchmarking Report must demonstrate that all applicable *pollution control options* have been identified and considered in determining that a site-specific standard is necessary. Organizing information as described in the GIASO five step "top-down" process (see Chapter 2.4 Technology Benchmarking (Risk Control) of GIASO and Appendix A Technology Benchmarking Reports of this Guide) should facilitate the identification of technically feasible *pollution control options and combinations* and the ministry review process.

To expedite the ministry's review, it is important to develop a Technology Benchmarking Report that transparently shows and comprehensively justifies the decisions made in recommending a technically feasible *pollution control combination* that minimizes the POI concentrations from all relevant sources of the contaminant that is the subject of the request. In order to achieve this goal, the following must be considered:

- Ensure that the selected list of technical methods to reduce POI concentrations and air emissions is comprehensive. This list of methods can generally be based upon a review of the technical literature listed in Part 2.3 Information Resources of Appendix A to this Guide as well as GIASO. The Technology Benchmarking Report must identify all technically feasible *pollution control options* for each non-negligible source. The *pollution control options* considered are to be categorized as either a material substitution, a process change, or an add-on control.
- The proponent must then identify the possibility of combining technically feasible *pollution control options* for each source to minimize POI concentrations or emissions from the facility. This combination of options for each source is referred to as a *pollution control strategy* for each source.
- The assessment of technical feasibility will eliminate approaches that are not feasible for the facility. There are at least two stages of assessing technical feasibility: 1) technical feasibility of available and applicable technologies; and 2) technical feasibility of the combination of *pollution control options and strategies* for individual as well as multiple sources. Factors that can be considered to assess feasibility can include: availability of technologies or methods; applicability for the facility; and other factors that consider site-specific issues such as: physical restrictions; resource availability; chemical restrictions; engineering principles; and/or significant safety concerns (that cannot be reasonably mitigated).
- The default technically feasible *pollution control strategy* for each source is a selection of the best material substitution *pollution control option* plus the best process modification *pollution control option* plus the best add-on *pollution control option* assessed for feasibility.
- The preferred technically feasible *pollution control combination* will assess the technical feasibility of combining the best of each individual technically feasible

pollution control strategies to achieve the best technically feasible *pollution control combination* for the entire facility for all their sources. This final assessment of the feasibility to combine *pollution control strategies* for multiple source combinations will lead to a list of technically feasible *pollution control combinations* for the overall site.

- The final ranking of technically feasible *pollution control combinations* must be based upon minimizing POI concentrations from all sources of the contaminant. O. Reg. 419/05 requires the ranking to be based on modelled POI concentrations. However, if it can be demonstrated that dispersion factors would not vary with the technically feasible *pollution control strategies* being considered, then an initial ranking of the *pollution control strategies* for each source based upon emission reduction metrics such as mass of contaminant reduced per unit production or per material throughput may be appropriate[4]. For more information, please see Appendix A of this Guide, Part 4.1.1 Emission Metrics.
- The final ranking of technically feasible *pollution control combinations* must be based upon the minimization of POI concentrations for the site. If the request for a site-specific air standard does not include an (optional) economic feasibility report, then the best technically feasible *pollution control combination* is to be selected as the preferred approach: this would be referred to as the *preferred technically feasible pollution control combination*.
- However, in most cases, if two or more technically feasible *pollution control combinations* are within 15% of each other in terms of overall maximum POI concentrations, then the proponent may choose between the technically feasible *pollution control combinations*. For example, if there are two options with POI concentrations within 15% of each other, the proponent may choose the option with the lower cost. The proponent's proposal must be well documented with a rationale and is subject to ministry discretion and approval. For more information, see also GIASO Chapter 2.4.3.1 Ranking Technically Feasible Options.

O. Reg. 419/05 allows the section 32 Director to approve a site-specific standard request if that a site-specific standard is as close to the standard in Schedule 3 as possible. Subclause 35(1)(b)(ii) of the Regulation refers to this as "the minimum difference necessary". The Technology Benchmarking Report must be able to support this assessment. In addition, the assessment of the frequency of exceedences at

[4] In the event that an option does involve changes in the dispersion modelling characteristics of the source, then dispersion modelling will be required to rank the options. It may be appropriate to limit this modelling to the sources that are affected by the possible change in dispersion modelling characteristics.

various receptors must also be evaluated for the following options: the existing situation or status quo option; the best overall technically feasible *pollution control combination* (default option); and the *preferred technically feasible pollution control combination* (if it differs from the default option). For more information on frequencies, please see Part 3.5 Assessing Concentrations and Frequency at Receptors of this Guide.

The process that leads to the recommended course of action needs to be well documented in the various reports that are required to be submitted in support of a section 32 request for a site-specific air standard. As set out in subsection 34 (3), the proponent must make available to everyone in attendance at the pre-submission consultation meeting, a written copy of the executive summary of the request and an explanation written in language that is understandable to persons without specialized scientific training, of the materials that are to be submitted as part of the request. The proponent must offer to provide a complete written copy of the proposed submission to every person in attendance who asks for a copy (a request for a copy of the material may also be made within 30 days of the public meeting). If a facility is concerned about proprietary information, then, in addition to the original request, a public version of the document without confidential information may be provided to SDB and the local district office for public viewing. The reason that public consultation is required is to give the public an opportunity to review and comment on the request. As such it is of the utmost importance that the material provided to the public is easily understandable and complete in order to achieve the purpose of this portion of the Regulation. For more information on the content, please see GIASO, Chapter 2.6 Stakeholder Involvement.

Sector based approaches

Subsection 33 (1) of the Regulation sets out the requirement for assessing feasible technical solutions. An analysis of all available technically feasible alternatives must be submitted by a facility to support a request for a site-specific air standard. Technology Benchmarking Reports may be developed for a sector (or part of a sector) if the facilities in the sector share common technical challenges in reducing contaminant concentrations. Individual facilities in that sector may then use this Technology Benchmarking Report to support their own individual requests for a site-specific standard with appropriate site-specific modifications (please see GIASO). The report can be used to determine their *preferred technically feasible pollution control combination* at the site in question. Each facility would also still need to complete the other requirements of a request for a site-specific air standard including an ESDM report. Since each facility will have different dispersion characteristics due to differences in source locations and exhaust parameters, configuration of on-site buildings and property size it will be necessary to prepare an ESDM report for each facility to determine what site-specific air standard will apply to that specific facility.

Pre-submission consultation with the ministry is required for sector approaches. In some cases, a sector may also request a technical standard. For more information on technical standards, please refer to GIASO.

3.5 Assessing Concentrations and Frequency at Receptors

In making a decision regarding a site-specific air standard, the Director will consider receptors and the frequency of exceeding the standard as per subclause (35) (1) (b) (iv) as well as subsection 35 (2) and paragraph 2 of subsection 35 (12) of O. Reg. 419/05. As a minimum, frequency must be evaluated at the maximum POI concentration location as well as at the receptors listed in subsection 30 (8) of O. Reg. 419/05 which include:

1. A health care facility.
2. A senior citizens' residence or long-term care facility.
3. A child care facility.
4. An educational facility.
5. A dwelling.
6. A place specified by the Director in a notice under subsection 30 (9) as a place where discharges of a contaminant may cause a risk to human health.

A facility requesting a site-specific air standard is required to identify potential receptors and determine the magnitude and the frequency of the exceedence of the standard (see Chapters 2.2.1 ESDM Reports to Support a Request for a Site-Specific Standard and 4 Factors To Consider When There Are Exceedences of GIASO). Only receptors within the modelling domain defined in section 14 of the O. Reg. 419/05 need to be considered.

Subsection 33 (1) paragraph 2 of O. Reg. 419/05 details the following requirements:

- a written statement or contour map that identifies the location and magnitude of the POI concentrations for the scenario that results in the maximum POI concentration for the contaminant(s) where compliance with the Schedule 3 standard cannot be achieved; and
- a written statement of the frequency of occurrence of the exceedences and the magnitude at all the locations set out in subsection 30 (8) of O. Reg. 419/05 as well as at the maximum POI concentration based upon the use of the most site-specific meteorological data in conjunction with an approved dispersion model (see ADMGO for more information on the appropriate use of an approved dispersion model).

For more information, please see subsections 33 (2) and 33 (3) of O. Reg. 419/05.

Generally, the ministry is interested in knowing the following:

- the frequency of exceedence at the maximum POI anywhere off property;
- the highest frequency of exceedence anywhere off property;

- the frequency of exceedence at the maximum POI on the site of a human receptor; and
- the highest frequency of exceedence on a site of a human receptor (or other identified receptor).

The assessment of magnitude and frequency shall be included for various ESDM report operational scenarios including: the existing base case; the default best technically feasible *pollution control combination*; and the *preferred technically feasible pollution combination* if it differs from the default option. The assessment of frequency of exceedence for these technically feasible *pollution control combinations* is important for several reasons including:

- there are situations where it can be shown that the best technically feasible *pollution control combination* does not consistently result in the lowest POI concentrations at the maximum POI location (or other receptor identified in s. 30(8) of the O. Reg. 419/05);
- it is possible that the frequency of exceedence at the type of receptors listed in subsection 30 (8) of O. Reg. 419/05 may increase for some of the technically feasible *pollution control combinations*; or
- in situations where the best technically feasible *pollution control combinations* that minimizes POI concentrations has not been selected as the *preferred technically feasible pollution control combinations* approach for reasons that must be documented and discussed in the submission.

Assessment of the frequency of exceedences based on any monitoring data must also be included in the ESDM report in addition to the modelled frequency results. The ministry may request more information on frequency and magnitude. For more information, see GIASO and Appendix A of this Guide.

3.6 Economic Feasibility Analysis (Optional)

O. Reg. 419/05, subsection 33 (4), allows a facility requesting a site-specific air standard to submit information regarding economic feasibility. After completing a Technology Benchmarking Report, facilities may claim they cannot afford to meet the air standard or implement the *preferred technically feasible pollution combination* to maximize the reduction of POI concentrations within a reasonable period of time. If that is the case, a facility may choose to bring forward an economic feasibility analysis to support another *preferred technically feasible pollution control combination* in their request. The report on economic feasibility **must** be based on both the entire corporation as well as the individual facility. This will allow for a more comprehensive assessment of economic feasibility.

The Technology Benchmarking Report can include information about the cost of each of the feasible technical solutions that have been short listed. However, issues regarding economic hardship or impacts are to be kept separate from the decisions made for technically feasible *pollution control combinations*. Economic issues should be

discussed by the proponent in a document entitled “Economic Feasibility Analysis Report”.

To cost out the various technically feasible *pollution control combinations* for contaminant concentration reduction, a recommended methodology is the one described in the US EPA’s Office of Air Quality Planning and Standards (OAQPS) Cost Control Manual, sixth edition (2002) be used. According to the manual, Cost Estimating Functions are based on a “study” estimate of +/- 30% accuracy. The Cost Estimating Functions are used to calculate the Total Capital Investment (TCI) and Total Annual Cost (TAC) amortized over the expected life of the technology.

The TCI consists of Purchased Equipment Costs (PEC), Direct Installation Costs (DIC) and Indirect Installation Costs (IIC). TCI includes all costs required to purchase, ship, install, and test the pollution control system. There are three elements associated with the TAC of the technically feasible *pollution control combination*. These are: direct costs (DC), indirect costs (IC) and recovery credits (RC).

The final ranking of technically feasible *pollution control strategies and their combinations* must be based upon the minimization of POI concentrations for the site. If the request for a site-specific air standard does not include an (optional) Economic Feasibility Analysis Report, then the best technically feasible *pollution control combination* is to be selected as the *preferred technically feasible pollution control combination*. For more information, see also GIASO Chapter 2.4.3.1 Ranking Technically Feasible Options and Appendix A Technology Benchmarking Reports of this Guide.

A copy of the Economic Feasibility Analysis Report must be available to the public at the pre-submission consultation meeting. For more information on an Economic Feasibility Analysis Report, please refer to Chapter 2.5 Economic Considerations of GIASO and ministry Guideline F-14: Economic Analyses of Control Documents on Private Sector and Municipal Projects.

3.6.1 Cost Effectiveness

Cost effectiveness indicators may also be considered on a case-by-case basis subject to approval by the ministry. In 2009, the ministry published a report on how to assess cost-effectiveness. The report resulted in development of a methodology for evaluating the cost-effectiveness of potential POI reduction measures. The methodology derives a dimensionless value that provides an indicator of Total Resource Effectiveness (TRE) for the POI reduction measure being evaluated. A User Guide was developed and is available on the ministry website: “Application of Cost Effectiveness Methodology and Indicators for Use in Section 32 Requests under Ontario Regulation 419: Air Pollution – Local Air Quality, USER GUIDE, Total Resource Effectiveness (TRE) Methodology and Calculations”, dated June 2009. This guide provides step-by-step instructions on how to complete a cost-effectiveness evaluation using the TRE methodology. Standardized form(s) have also been developed to aid the environmental professional in collecting, estimating and presenting the various elements needed to determine TRE values. The

TRE value uses standard costing methods referenced in the USEPA Office of Air Quality Planning and Standards (OAQPS): OAQPS' EPA Air Pollution Control Cost Manual (Sixth Edition), EPA/452/B-02-001. (this manual may be periodically updated so it is recommended that the most recent version be used).

3.7 Summary Report from Public Meeting with Local Stakeholders

O. Reg. 419/05 requires the proponent to hold a public meeting prior to submitting a request for a site-specific standard. Sections 34 and 34.1 of O. Reg. 419/05 specify the requirements for stakeholder involvement (see Part 3.2.4 Pre-submission Consultation with Local Stakeholders of this Guide). As set out in paragraph 8 of subsection 33 (1) of O. Reg. 419/05, the facility must provide a written summary of the questions, comments and responses discussed at the public meeting. This must be submitted as part of the request for a site-specific air standard as a separate document. This meeting must occur prior to the submission of the request for a site-specific air standard. The facility needs to be able to answer questions on all facets of the process and provide a copy of all material that will be submitted, if requested. Copies of the material may also be requested within 30 days after the public meeting.

While the ministry will likely attend the public meeting, their primary role will be to act as observers and listen to the company's proposal and the response of the stakeholders.

A person making a request under section 32 may make the request without holding a public meeting if the Director has ever set a site-specific standard under section 35 for the same contaminant in respect of the same facility.

3.8 Action Plan

A separate document detailing an action plan must also be submitted as part of the request for a site-specific standard air standard. Subsection 33 (1) paragraph 7 and subsection 33 (4) paragraph 4 of O. Reg. 419/05 requires the submission of a plan on how the facility will implement the preferred technically feasible *pollution control combination* identified through its analysis of technically feasible methods (or technically and economically feasible) (see GIASO, Chapter 2.7 The Action Plan). The preferred technically feasible *pollution control combination* shall be implemented according to the approved final action plan. The final action plan must include a schedule setting out timelines for the implementation of the *preferred technically feasible pollution control combinations* including interim steps, if applicable. Elements of the action plan may be included as a conditions of the approval instrument for a site-specific air standard; conditions of an order issued under subsection 35 (14) of the Regulation; or the ECA (see subsections 35 (6) to 35 (8) of O. Reg. 419/05).

The facility must demonstrate that it is doing the best that it can reasonably do to reduce the concentrations of the contaminant that is the subject of the request. If a site-specific air standard, which is valid for a specified period of time, is granted, the facility may

submit a subsequent request with the goal of meeting the standard over time. Some facilities may never meet the air standard and instead will be regulated under one of the other compliance approaches. However, this ensures the action plan is periodically reviewed to ensure continuous improvement. For more information, please refer to GIASO, Chapter 2.8 Continuous Improvement.

Subsections 35 (6) and 35 (7) of O. Reg. 419/05 require a facility to provide follow up verification that the steps outlined in the action plan, that have been imposed as conditions in the site-specific air standard approval, have been implemented. This verification is to be provided to the local ministry district office with a copy to Standards Development Branch. For more information, please refer to GIASO, Chapter 2.9 Verification/Monitoring.

Subsection 35 (9) of O. Reg. 419/05 allows the Director to approve a facility to operate with a site-specific air standard for a period of 5 to 10 years. The submission should clearly outline the period of time a site-specific standard is being requested for. The ministry will consider the request but will also consider other factors as outlined in GIASO in determining the period of time requested for the site-specific standard.

Under subsection 35 (10), a facility may make subsequent requests for a site-specific air standard. Any future request would be required to meet all requirements under section 32 including a complete update of all materials, etc. Please note that if another request is being contemplated, sufficient time should be allowed for the ministry to review the request before the any existing approval for the site-specific standard expires. It is recommended that subsequent requests to extend a site-specific standard should be submitted at least 15 months prior to the expiry of any existing section 35 approval. As per subsection 35 (11) of O. Reg. 419/05, the Director may consider the number of previous requests for that contaminant in making a decision on whether or not to approve a current request. If the approval of the site-specific air standard has lapsed and the facility is operating above the Schedule 3 standard, then they are considered to be in non-compliance and they may be subject to compliance and enforcement action.

3.9 Post Submission Requirements

Once a request has been approved, there are post-submission requirements that must be met. For example, clause 35(7) (b) of O. Reg. 419/05 states that the facility that made the request shall notify the ministry when conditions of the site-specific air approval have been complied with. Clause 35 (7) (a) of O. Reg. 419/05 states that the site-specific air standard is only in effect if the facility is complying with the conditions imposed in the approval. Under subsection 37 (1), the Director has the authority to issue a notice that revokes the approval of the site-specific air standard. Compliance and enforcement action is also possible.

4.0 Processing Requests for Site-Specific Air Standards

This part of the Guide is intended to inform the proponent of the review process that will generally be used to process a request for a site-specific air standard. It also provides general information on the type of information to be included in the request for a site-specific air standard. Various forms will also be available on the ministry website - Rules on air quality and pollution.

4.1 Acknowledgment Letter

The facility requesting a site-specific air standard and the facility's technical contact designated on the request for a site-specific air standard form will receive a standard acknowledgement letter once the request form is submitted and reviewed for completeness. The acknowledgement letter will provide a ministry reference number and a ministry contact name.

4.2 Proposal Notice Requirements on EBR

A request for a site-specific air standard under section 32 of O. Reg. 419/05 is classified as a Class I Instrument under Regulation 681/94. The ministry is required to post a Notice of Proposal for a section 32 request under O. Reg. 419/05. Hence in addition to the public meeting held prior to the request being submitted to the ministry, the facility's request for a site-specific air standard will also be posted on the Environmental Bill of Rights (EBR) Registry for public consultation. A minimum 30 day comment period is required. However, a longer period may be considered in appropriate circumstances. If an order is to be issued under subsection 35 (14), the order will also be posted on EBR for public consultation.

Facilities requesting a site-specific air standard are required to provide a project description on the request for a site-specific air standard application form. The ministry reserves the right to edit the project description in order to meet its requirements under the EBR.

The ministry will consider the summary of comments from the local community as well as input from other interested stakeholders submitted via the EBR Registry when making a final decision on the request. The reason that public consultation is required is to give the public an opportunity to review and comment on the request. As such it is of the utmost importance that the material provided to the public is easily understandable and complete in order to achieve the purpose of this portion of the Regulation.

The Director's final decision on the granting of a request cannot be rendered until the EBR comment period has expired and only after all relevant comments have been taken into consideration. However, this process can run concurrently with the ministry's review.

It should be noted that while the approval of the site-specific standard decision instrument cannot be appealed to the Environmental Review Tribunal by the facility, nor is the instrument subject to the leave to appeal provisions of the Environmental Bill of Rights, there exists a possibility for a judicial review request.

For more information on the EBR or Environmental Registry, please visit the website.

4.3 Ministry Regional/District Input

Facilities requesting a site-specific air standard must submit the original package to SDB (including electronic copies of material) with one complete copy of the request to EAB and a complete copy to the local ministry District Office at the same time. The request will be processed by SDB. SDB will request comments from the local ministry District Office on site-specific issues that may not be provided by the proponent including:

- existing abatement issues;
- compliance history;
- complaint history;
- unusual terrain characteristics or elevated receptors;
- site-specific items that may be included as conditions on the ECA; and
- any other local concerns from the ministry District or the community.

4.4 Incomplete Requests

Requests for site-specific air standards will be screened to determine if the request appears to be complete. Missing information may delay the ministry's ability to render a decision on a site-specific air standard. If you have questions regarding the requests, please contact the ministry (SDB) in advance of the submission.

During the technical review of the submitted documents, clarifications or additional information may be requested by the reviewer.

4.5 Refusal of Requests

The Director may only approve a request for a site-specific air standard if it is complete (see criteria set out in subsections 35(1) and 35(2)). If, despite the efforts of both parties, the request is not sufficient, the Director may refuse the request.

4.6 Revocations/Amendments

The following sections of O. Reg. 419/05 set out amendments related to site-specific standard and revocations:

Section 36 of the Regulation: Amendments related to site-specific standard

36. (1) If the Director sets a site-specific standard under subsection 35 (1), the Director may give a person to whom the site-specific standard applies a notice,

(a) altering the conditions imposed under subsection 35 (6);

(b) altering the period referred to in subsection 35 (9) so that it ends on an earlier date, if the Director is of the opinion that the person should be capable of complying with a more stringent standard by the earlier date;

(c) altering the period referred to in subsection 35 (9) so that it ends on a later date that is not more than 10 years after the date the period began;

(d) replacing the site-specific standard with a more stringent site-specific standard, if the Director is of the opinion that,

(i) the person is capable of complying with the more stringent site-specific standard, or

(ii) discharges of the contaminant that are permitted by the site-specific standard may cause an adverse effect;

(e) replacing the site-specific standard with a site-specific standard for another averaging period, if Schedule 3 sets out a standard for the other averaging period and, after the first-mentioned site-specific standard was set, an amendment to Schedule 3 removed the standard set out in Schedule 3 for the averaging period to which the first-mentioned site-specific standard applied; or

(f) setting an additional site-specific standard for another averaging period, if,

(i) after the first site-specific standard was set, an amendment to Schedule 3 added a new standard that applies to the other averaging period, and

(ii) the Director is of the opinion that the additional site-specific standard can be complied with by implementing the plan that was submitted under paragraph 7 of subsection 33 (1) or paragraph 4 of subsection 33 (4) with the request that related to the first site-specific standard.

(2) Before the Director gives a person a notice under subsection (1), the Director shall give the person a draft of the notice and an opportunity to make written submissions to the Director during the period that ends 90 days after the draft is given. O. Reg. 282/11, s. 11.

(3) References in this Regulation to a site-specific standard set under subsection 35 (1) include a replacement site-specific standard or additional site-specific standard set

under clause (1) (d), (e) or (f).

Section 37 of the Regulation: Revocation of site-specific standard

37. (1) The Director may give a person to whom a site-specific standard applies a written notice revoking the site-specific standard if the Director is of the opinion that,

(a) discharges of a contaminant that are permitted as a result of the site-specific standard may cause an adverse effect;

(b) conditions referred to in subsection 35 (6) or (8) are not being met;

(c) the person is unable to comply with section 20, even though the site-specific standard was set; or

(d) the person would be able to comply with section 20 without the site-specific standard. O. Reg. 282/11, s. 12.

(2) Before the Director gives a person a notice under subsection (1), the Director shall give the person a draft of the notice and an opportunity to make written submissions to the Director during the period that ends 30 days after the draft is given. O. Reg. 507/09, s. 32 (1).

Appendix A: Technology Benchmarking Reports

Technical Guidance for Preparing a Technology Benchmarking Report submitted as part of a Request for a Site-Specific Air Standard and O. Reg. 419/05

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1.0 INTRODUCTION

1.1 Purpose

The purpose of this Appendix A to the "Guide for Requesting a Site-Specific Air Standards" (hereafter referred to as GRSSS or the "Guide") is to provide supplemental technical guidance for the preparation of a Technology Benchmarking Report in support of Ontario Regulation 419/05: Air Pollution – Local Air Quality (O. Reg. 419/05 or the Regulation). A Technology Benchmarking Report must be submitted as part of a section 32 request for a site-specific air standard. The Technology Benchmarking Reports are required to be prepared in accordance with paragraphs 3 to 6 of subsection 33 (1) and are to be consistent with the Ministry of the Environment and Climate Change (the ministry) "Guideline for the Implementation of Air Standards in Ontario" (GIASO).

GIASO Chapter 2.4 Technology Benchmarking (Risk Control) describes a five step "top-down" process for organizing and presenting a thorough review of technology that has been evaluated to determine the best level of pollution control feasible for the sources of the contaminant that is the subject of the request for a site-specific air standard. O.Reg.419/05 requires the Point of Impingement (POI) that a site-specific standard be as close to the standard as possible. The Technology Benchmarking Report must be able to demonstrate that this is true. Technology Benchmarking Reports may also be required to be developed in response to a notice issued under section 27.1 of O. Reg. 419/05. The information contained in this Appendix A to the Guide is intended to assist in assessing the completeness and acceptability of any Technology Benchmarking Report.

This Appendix A to the Guide is not meant to be a stand-alone document and must be read in conjunction with O. Reg. 419/05. Other related documents to which the facility requesting a site-specific air standard must refer include the latest versions of the:

- Guideline for the Implementation of Air Standards in Ontario (GIASO);
- Procedure for Preparing an Emission Summary and Dispersion Modelling Report (ESDM Procedure Document); and
- Air Dispersion Modelling Guideline for Ontario (ADMGO).

For reference purposes, a glossary of terms is included at the end of the Appendix A of the Guide. Any term that is in the glossary is *italicized* for easy reference.

1.2 Background

Section 20 of O.Reg.419/05 requires that concentrations of a contaminant, emitted from all sources of contaminant within a property, at a POI shall not exceed a standard in Schedule 3 of the O. Reg. 419/05. Section 35 of O. Reg. 419/05 authorizes a Director

appointed under section 5 of the Environmental Protection Act to, under certain circumstances, grant a site-specific air standard that will replace the Schedule 3 standards for that facility with a site-specific standard. A request for a site-specific air standard is to include the following information:

- An Emission Summary and Dispersion Modelling (ESDM) report for all contaminants emitted from the facility. For the contaminant that is the subject of the request, an approved dispersion model with meteorological inputs is required in order to assess the frequency of exceedences. Other applicable approved models may be used for the other contaminants. The local or site-specific meteorological data inputs to the approved dispersion model must be approved in advance by the Director (see Table 3-2 Pre-submission Requirements of the Guide). The location and frequency of exceedences of Schedule 3 standards at specified receptors listed in subsection 30 (8) of the O. Reg. 419/05 must be determined (see Part 3.5 Assessing Concentrations and Frequency at Receptors of the Guide). The modelling to support this information should be in the ESDM report and summarized in the Technology Benchmarking Report;
- A "Technology Benchmarking Report" that provides a list of all of the available methods to reduce POI concentrations of the contaminant(s) that is the subject of the request and an analysis, ranking and selection of the methods to minimize POI concentrations of the contaminant(s);
- A description and summary of the results of a public meeting that is held prior to making the request for a site-specific air standard; and
- A plan to implement the *preferred technically feasible pollution control combination* that will minimize POI concentrations of the contaminant(s) that is the subject of the request.

It is important to understand that at the time a Technology Benchmarking Report is submitted, a facility requesting a site-specific air standard should have already concluded and documented in the ESDM report that their facility is not capable of meeting the Schedule 3 standard(s) that is the subject of the request. The ESDM report also provides important information, to support the technology benchmarking analysis, on the relative contribution and significance of the various emission sources to the exceedence of the Schedule 3 standard. A Technology Benchmarking Report provides a systematic and transparent approach for organizing and presenting the optimal *pollution control strategy*(s) for each source and the overall *pollution control combination* for multiple sources of contaminant(s). This assessment will include information regarding *available and applicable technologies*, and site-specific feasibility considerations.

A Technology Benchmarking Report is an important element in assessing whether or not to grant a request for a site-specific air standard. The ministry encourages the facility requesting a site-specific air standard to engage in discussion early in the process to ascertain ministry expectations regarding the content of the submission. If a consultant is to be retained by the facility requesting a site-specific air standard to assist

in preparing the report(s), it may be desirable to have the consultant(s) participate in the preliminary discussions.

A well-constructed Technology Benchmarking Report must demonstrate that all technically feasible *pollution control strategies and combinations* have been identified and considered in determining that a site-specific air standard is required. The use of a "*top-down analysis*" is an approach originally developed by the United States Environmental Protection Agency (US EPA) that can be used to identify, in a systematic manner, the most effective *pollution control strategy* for a source or *pollution control combination* for multiple sources. For more information, please refer to the US EPA document, "Prevention of Significant Deterioration and Non attainment Area Permitting", Draft, October 1990 for background information on the *top-down analysis* approach. Please note that while the ministry developed steps detailed in this document that are similar to the US EPA steps, they are not the same. The differences are explained in this document. Organizing information as described in the GIASO five step "top-down" process should streamline the ministry review of the technical information presented.

The Technology Benchmarking Report will provide important information that is to be used in community outreach activities by the facility requesting a site-specific air standard. The proponent must make available to everyone in attendance at the pre-submission consultation meeting, a written copy of the executive summary of the request and an explanation, written in language that is understandable to persons without specialized scientific training, of the materials that are to be submitted as part of the request. The executive summary is to include a brief description of the basis of the request and the reasons why the site-specific air standard is needed. The proponent must also offer to provide a complete written copy of the proposed submission to every person in attendance who asks for a copy. Anyone can request a copy of this information within 30 days of the public meeting. A copy of the information will also be available at the local ministry offices; Standards Development Branch (SDB) Office; and the office of the facility making the request.

The following parts in this document will follow each of the five steps as discussed in Chapter 2.4 Technology Benchmarking (Risk Control) of GIASO.

2.0 STEP 1: DEVELOP A LIST OF ALL POLLUTION CONTROL METHODS

The following is from GIASO which states:

Step 1. Developing a List of All Methods Available for Use to Reduce POI Concentrations based upon:

- a comparison of methods used by other facilities within the same or similar industrial sector to reduce concentrations of the contaminants. This must consider both non-negligible sources reduction methods and overall facility reduction methods;
- a review of requirements and pollution control strategies, from other jurisdictions (e.g., the United States and Europe, etc.), that are relevant to the facility and will reduce air emissions and contribute to reduced POI concentrations of the contaminant;
- an assessment of the possibility of transferring technology and control strategies from other industrial sectors using the same or similar contaminants; and
- a consideration of inherently less polluting processes/practices, including pollution prevention and changes in materials used within and produced by the facility.

2.1 Identification and Description of Sources for Technology Benchmarking Evaluation

The Technology Benchmarking Report must contain a description of each source(s) that discharges the contaminant that is the subject of the request for a site-specific air standard. The description of each source must contain an explanation of the type of operation and processes being evaluated as well as relevant site information that might relate to assessing pollution control methods to reduce POI concentrations of the contaminant(s) being evaluated for a site-specific air standard. All of the source information must be contained in the ESDM report.

In most situations, the technology benchmarking evaluation must be conducted for all sources of the contaminant(s) that emit the contaminant that is the subject of the request for a site-specific air standard. However, there may be cases where a source(s) of the relevant contaminant is a negligible source(s) of the contaminant. In such instances, the facility requesting a site-specific air standard should refer to section 8 of O. Reg. 419/05 (negligible sources of contaminant), and the corresponding

guidance in Chapter 7 Assessment Of The Significance Of Contaminants And Sources of the ESDM Procedure Document, to determine whether a specific source(s) can be deemed to be negligible. If a source(s) of a contaminant has been deemed to be negligible, this must be documented in the ESDM report with appropriate ministry approval, if required (see Part 3.3.1 Negligible Sources and Table 3.2 Pre-submission Requirements of the Guide). Negligible sources must be identified in the ESDM report but are not required to be included in the technology benchmarking evaluation or the modelling.

In addition to the source summary table, a table that summarizes the contribution of each source of the contaminant that is the subject of the request to the overall maximum POI must be included in the ESDM report. This table should also be referenced or reproduced in the Technology Benchmarking Report. A table summarizing the source contributions at each surrounding receptor (as set out in s. 30(8) of O. Reg. 419) where the standard is exceeded is also useful and must be included in the reports. A sample table is provided below in Table 2-1 Example Table for Summarizing the Relative Source Contributions to Point of Impingement Concentrations of Contaminant “X”. It will first be necessary to determine the date and time at which the maximum POI concentration occurred at each of the studied receptors. The model must be re-run for each specific date/time (typically a short model run of only a few minutes) with each source (or collection of sources) in its own source group in the model. It is important to note that this table represents specific snapshots in time for each of the receptors and the contributions to the maximum POI concentration are only for that specific date/time. However, as the ultimate goal is to reduce the maximum POI concentration, it is important to have this information to be able to assess the impacts of the proposed actions on the POI concentrations. To keep this table manageable in size, the number of receptors examined should be carefully chosen.

Table 2-1: Example Table for Summarizing the Relative Source Contributions to Point of Impingement Concentrations of Contaminant "X"

Contaminant:					
Source	**Emission (g/s)**	**Total Emissions (%)**	**% Contribution to Point of Impingement Concentrations**		
			At Point of Maximum Concentration	**At Receptor 1**	**At Receptor 2**
Source 1					
Source 2					
Source 3					
Totals:					
Date and Time of Maximum (dd/mm/yy)					

There are additional tables that may also be prepared. These tables may help in clarifying to the reader which sources are the dominant in terms of POI exposures and hence which are important to control for the facility. This dominant source analysis can be useful in presenting the results at public meetings. For example, Table 2-2 Example Table for Summarizing the Maximum Concentrations of Each Source of Contaminant "X" presents the maximum POI concentrations from each source individually. This table provides useful information that can be used to determine the success of a *pollution control option or strategy* on a source and/or at a receptor.

Table 2-2: Example Table for Summarizing the Maximum Concentrations of Each Source of Contaminant "X"

Contaminant							
Source	Maximum POI Receptor			Maximum POI At Receptor 1		Maximum POI At Receptor 2	
	Location (m,m)	Date/Time (dd/mm/yy)	Con'c ($\mu g/m^3$)	Date/Time (dd/mm/yy	Con'c ($\mu g/m^3$)	Date/Time (dd/mm/yy	Con'c ($\mu g/m^3$)
Source 1							
Source 2							
Source 3							

Another useful table is one that shows the frequency of exceedence as well as the average concentration of the exceeded values or the range of the concentrations at that receptor point. This table will be useful when explaining to members of the public and the public health staff. For example, assume the standards for the contaminant is100 $\mu g/m^3$. If it is presented that the maximum concentration is 250 $\mu g/m^3$ and the standard is exceeded 50 times in a year, the perception is that 50 times a year the concentration will be 250 $\mu g/m^3$. Presenting the average value of all of the concentrations that exceed the criteria will put this in perspective. Alternatively, the information could be presented as the median concentration or the range of concentrations.

Table 2-3: Sample Table that Illustrates Frequency (%) of Exceedences and Average Concentration of Exceedences of Contaminant "X"

Contaminant			
All Sources	**Maximum POI Receptor**	**At Receptor 1**	**At Receptor 2**
[i]Frequency above Standard (% of time exceedence occurs at receptor)			
Average Concentration above Standard ($\mu g/m^3$)			
Median or Range of Concentrations above the Standard ($\mu g/m^3$)			

Note i: The frequency presented should be the highest frequency at any receptor point on the receptor property. Alternatively, the ministry may consider the highest frequency of the receptor point that is most likely to occur at the human receptors on the property. Pre-discussion with the ministry may be required.

2.2 Identification of All Available Pollution Control Options

A *pollution control option* can be any technical method that results in the reduction of a POI concentration of the contaminant that is the subject of the section 32 request from a particular source. A *pollution control strategy* refers to any technical methods that result in the reduction of POI concentration of the contaminant from a combination of *pollution control options* for a source. *Pollution control options* must be identified in each of the following three categories: material substitution, process changes and add-on controls.

- Material Substitution – Material substitutes and their associated technology, that have inherently lower air emissions of the contaminants under consideration.
- Process Change – Production processes and work practices that result in lower air emissions.

- Add-on Controls – Devices such as oxidizers, catalytic converters, scrubbers and fabric filters that control and reduce air emissions after they are produced.

Material and process changes that result in lower emissions (and hence reduced POI concentrations) should be considered based on demonstrations made on manufacturing systems that produce identical or similar products and that use identical or similar raw materials. Add-on controls on the other hand may be considered based on the physical and chemical characteristics of the contaminant-bearing emission stream. Hence, available add-on controls may have been applied to a broad range of emission sources that are similar with respect to emissions characteristics.

The first step is to identify and list all available *pollution control options* for each source(s) of the contaminant. *Pollution control options* must be identified for each source or group of similar sources emitting the contaminant under evaluation. If multiple similar sources are operated at a site, the technology review does not need to be duplicated. One review will suffice for the source group.

No attempt should be made at this stage to evaluate the feasibility, or appropriateness of potentially available *pollution control options* or technologies. This initial step is intended to identify and record the universe of potential *pollution control options* to be evaluated. Each feasible *pollution control option* i.e. material substitution, process change and add-on control must be ranked separately at this stage for the source(s) under review.

Identification of available *pollution control options* for the benchmarking report should be as broad as reasonably possible based upon readily available information sources (described in Part 2.3 Information Resources of this Appendix A to this Guide). A one or two sentence description of each *pollution control option* is the appropriate level of presentation at this stage. The broad range of potentially available *pollution control options* should include not only existing controls for the source category under evaluation but also controls applied to similar source categories, emission streams and emerging control technologies. An "*emerging technology*" is a technology that has the potential to achieve an emission reduction but is still under development and has not been demonstrated in commercial application on identical or similar emission sources. Opportunities for "*technology transfer*", where a control technology has been successfully applied to full scale operations at source categories or sectors other than the source under consideration and has the potential to be applied to the subject source(s), should also be considered. These types of transferable and emerging technologies must be identified even if they are currently not applied in Canada or in the same sector.

Further discussion on the identification of the *pollution control options* for each of the three categories, namely material substitution, process changes and add-on controls is discussed below.

2.2.1 Material Substitution

Emissions of a given contaminant may be eliminated or reduced by changing one or more of the materials employed in the *production process*. For example, changing the type of surface coating materials (paints) used in automotive coating operations changes the emissions levels of Volatile Organic Compounds (VOCs). Available coating types, such as low solids, powder, latex, high solids, waterborne, radiation-cured, supercritical fluid and vapour injection cure should be identified at the initial stage, regardless of their technical feasibility. In some instances, contaminant reductions can be achieved by changing the chemistry of one of the subsidiary materials used in production. For example, in an iron casting operation, molten iron is poured into sand moulds and then cooled and cleaned to produce iron castings. Changing the chemistry of the resins used for binding the sand mould, could result in lower emissions of benzene, which is a by-product of incomplete combustion of the resin that occurs during the metal (iron) pouring, cooling and shakeout process. Substitutions of the subsidiary materials are not always obvious but can result in significant reductions of pollution. The report should make no value judgment regarding the feasibility of identified materials at this stage of the review.

2.2.2 Process Change

A *production process* may be made inherently less polluting by changing certain aspects of the process or by adopting alternative work practices. Such opportunities must be identified as available *pollution control options*. Generally, the facility requesting a site-specific air standard is not expected to redefine the fundamental design of the facility. For example, a facility requesting a site-specific air standard who produces a metal product that undergoes a series of forming, machining and assembly operations requires an organic coating (the source operation of concern) to achieve functional (corrosion protection) and other product requirements. The facility need not consider a change to manufacturing a plastic product to eliminate the organic coating step. A *production process* constitutes physical and chemical unit operations used to produce a desired product from a specified set of raw materials. In this example, consideration of coating material substitution, process improvements and add-on controls would be appropriate to evaluate effect on POI concentrations from the operation.

The option of reducing the production of the facility to reduce air emissions must be one of the options considered in the technology benchmarking report. The facility should consider possible process changes to de-rate[5] the throughput of the process to the

[5] Please note that if this option became the preferred approach, the Environmental Compliance Approval (ECA (Air) would have to be amended to match this new maximum throughput rate.

maximum required operating levels (as opposed to maximum design capacity which may be unattainable).

Redesign of the existing *production process* should be considered as a way to reduce emissions. For example, a coating operation may be performed using dip, flow, brush, roller or spray application. Further, spray application methods include air atomized, rotational atomized, high volume/low pressure, low volume/low pressure, airless, air assisted airless, thin film atomization, low voltage electrostatic and high voltage electrostatic. Each of these application methods result in varying efficiencies of material usage that may directly relate to release of volatile emissions. Even though some of these application methods may not be suitable for use in the subject facility, they must be identified in this part of the Technology Benchmarking Report. Their feasibility or infeasibility should not be considered at this stage. The evaluation of technical feasibility can be elaborated on later in the report.

Options to reduce air emissions can range from cleaner production, to pollution prevention, to end-of-pipe (add-on controls), each with inherently different qualities, costs, and environmental performance. While end-of-pipe options are essential for many industries and processes, preference should always be given to cleaner production options and pollution prevention methods.

An example of pollution prevention would be the use of low volatile or water-based paints that eliminate pollution at the source. Adoption of pollution prevention techniques may also include alternate work practices that may also result in significant reduction of emissions from the process. Modifications of the *production processes* and/or work practices are typically more environmentally beneficial than add-on controls, because they can result in less solid waste and waste water generation, and are often more energy efficient.

2.2.3 Add-on Controls

Devices such as fabric filters, regenerative thermal oxidizers, and scrubbers control and reduce emissions after they are produced. Their suitability for use depends more on the physical and chemical characteristics of the emission streams than on the *production process* itself. Hence, add-on controls may be applied to a broad range of sources with similar emission characteristics. Opportunities for *technology transfer* are much higher for add-on controls than either process change or material substitution. Available technologies may include control technologies adopted by industry sectors other than the sector under review. For example, biofiltration, (use of porous substrate and microbial populations to control organic air emissions) is used in Europe for certain low air flow processes such as storage of cloth solvent wipes prior to laundering primarily for odour control. It is not widely used in North America, but it should be identified as an available technology for volatile emission control.

Any *pollution control option* identified may be eliminated later in the report based on site-specific feasibility arguments.

2.3 Information Resources

Facilities requesting site-specific air standards are expected to identify both demonstrated and potentially *applicable pollution control options* compiled from available information sources. The ministry review will consider the background search and resulting list of *pollution control options* or alternatives presented by the facility to check that it is reasonably complete and comprehensive.

Following are some of the information resources that are expected to be used to identify available *pollution control options* and/or technologies:

- **Sector analysis** (if available) – Occasionally, technology assessments are performed for groupings of business or industries engaged in similar activities (sectors). Sometimes these assessments are performed by government agencies, trade associations, industry groups, equipment and/or material suppliers, etc. These can provide a good source of overview material.
- **Clean Air World** – The National Association of Clean Air Agencies (formerly STAPPA and ALAPCO) maintains a website to help learn about air pollution, find the latest news and information on important air topics and link to governmental air pollution control agencies around the world.
- **RACT/BACT/LAER Clearing House** – A voluntary repository of air emission information maintained by US EPA. It is an incomplete registry of information that can be quite misleading, but can provide a starting point to direct further investigation.
- **RACT** – Reasonably Available Control Technology, used by states and US EPA to establish minimum levels of priority contaminant control expected for source categories (i.e. VOC emissions from automotive topcoat painting, NO_x emissions from natural gas fired boilers, etc.). RACT rules are available from states and US EPA. Access to the background information used to establish specific RACT rules are a better source of information on the underlying technology.
- **BACT** – Best Available Control Technology used by states and US EPA and is a performance level determined for each major source of priority contaminant at the time of installation or modification. Requirements are determined by application of the 5-step top-down review process established by US EPA for sources in geographic regions designated as having attained air quality standards. Permit applications are the best source of information regarding technology determined to be BACT. Permits often only present the resulting emission rates required to achieve BACT. The BACT process is source specific and results vary by facility.
- **LAER –** Lowest Achievable Emission Rate used by states and US EPA and represents the lowest emission rate contained in a rule or permit that has been achieved in practice. LAER applies in geographic regions designated as having not attained air quality standards by US EPA and does not require a technology review, but merely requires the lowest emission values be identified and adopted.

- **MACT Standards** – Maximum Achievable Control Technology used by states and US EPA are standards developed for specific source categories to control a designated list of hazardous air pollutants (HAPs). The standards are set based upon a thorough review of available technology and performance for all sources within the category. The background documents used to establish the standard will normally contain a wealth of information regarding process, controls and performance as well as an assessment of the category.
- **Trade associations** – A valuable source of information regarding member activities. Some trade associations participate in joint research and development activities that can provide considerable insight into the status of source technology. Information is often available via internet access. Rarely would trade associations be a source of new or *emerging technology* since this would typically be proprietary competitive information to members.
- **Technical publications** – Trade magazines and web sites are an excellent source of new and *emerging technology* information. Caution must be used in assessing the capability and viability assertions for technology presented in these publications since they are often presented with a vested interest in marketing and sale of the technology. Actual capabilities can be significantly different.
- **Government websites** – Government agencies at all levels are increasingly making incredible quantities of information available via web links. These sites are highly variable in terms of ease of use and quality of information. Usually a web site can be found that presents a good general overview of most source sectors with special attention to typical air emission control technology. US EPA maintains a large library of information including original research papers. States such as Texas and Michigan have their own resources. Other worthwhile sites include those of Environment Canada, the European Union as well as individual countries such as United Kingdom and Germany.
- **Control technology vendors, suppliers and environmental consultants** – Vendors can provide highly detailed technical information regarding existing as well as new and *emerging technology*. However, caution must be used since vendors are in the business of selling technology and performance and cost frequently differ with operation.
- **Permits that have already been issued** – Many government agencies issue air discharge permits for new or modified sources and these can provide valuable information regarding technology planned. More valuable is the information submitted in the application for the approval. Permits and applications can be difficult to obtain. However, more agencies are now posting this information on accessible web sites.

Following completion of an initial identification of potentially available *pollution control options* for each source, it would be appropriate for the facility requesting a site-specific air standard to review findings with the ministry. It would be advisable to proceed with report writing only after a common understanding between the proponent and the ministry of non-negligible sources and list of *pollution control options* to be assessed

has been obtained. An interactive discussion of potentially available *pollution control options* may reveal additional approaches or technologies deserving evaluation.

For further information, please contact the ministry's Standards Development Branch (SDB).

3.0 STEP 2: DEVELOP A LIST OF TECHNICALLY FEASIBLE POLLUTION CONTROL OPTIONS

The following is from GIASO which states:

> **Step 2.** An analysis of the methods identified under Step 1 and (if applicable) combinations of those methods which are technically feasible; and an explanation of why other viable options are not feasible for that facility.

The result of Step 1 was a list of all possible *pollution control options* for all sources while considering the three categories: material substitution, process change, or add-on controls. In this step, the list must be narrowed down to those *pollution control options* that are technically feasible for the subject facility.

Some *pollution control options* may be shown to not be technically feasible by applying simple screening criteria while others will require a more in-depth explanation of why the option is not technically feasible for the source in question.

3.1 Screening Out of Pollution Control Options

The universe of potentially available *pollution control options* may be reduced by an initial screening review by the facility requesting a site-specific air standard to eliminate obviously infeasible *pollution control options*. For example, in many cases, technologies that are in a research and development stage and not commercially *available* can be eliminated without a formal technology feasibility study. Typically, bringing a control technology concept to reality involves six stages:

- Concept stage
- Research and patenting
- Bench scale or laboratory testing
- Pilot scale testing
- Licensing and commercial demonstration
- Commercial sales

A control technology is considered *available*, within the context presented above, when it has reached the licensing and commercial sales stage of development. A facility requesting a site-specific air standard should be able to purchase or construct a material, process or add-on control device that has already been demonstrated in practice in an industrial setting. A facility would not be expected to endure extended time delays or resource penalties to allow research to be conducted on a new technique. Neither is a facility required to undertake extended trials to determine how the technology is applied on a new and dissimilar source type. Hence, technologies in

the pilot scale testing stages of development would not be considered in the technology benchmarking review. For technologies at a research stage, a one or two sentence explanation of why a *pollution control option* is not viable is the appropriate level of presentation.

However, the facility requesting a site-specific air standard may present a case to the ministry to consider a particular *pollution control option* using an *emerging technology* that is on the brink of commercial application.

3.2 Technical Feasibility

Evaluation of the technical feasibility of identified available *pollution control options* must be presented in the report for each non-negligible source of the contaminant that is the subject of the request for a site-specific air standard.

"*Availability*" and "*applicability*" are two key concepts in determining the feasibility of a *pollution control option*. Commercially unavailable technologies may be screened out, without a formal technical feasibility evaluation by the facility requesting a site-specific air standard as described in Part 3.1 Screening Out of Pollution Control Options above. However, commercial *availability* alone does not necessarily qualify a technology as feasible for a particular site. It has to be *applicable*. An *available* technology or *pollution control option* becomes an *applicable technology* if it can reasonably be installed and operated on the source type under consideration. A *pollution control option* that is *available* and *applicable* is technically feasible.

Demonstrated technologies which have been implemented on similar emission units within the source category under consideration may prove to be infeasible due to particular source-specific reasons such as:

- physical restrictions;
- resource availability;
- chemical restrictions;
- final product specifications;
- engineering principles; and/or
- significant safety concerns that cannot be reasonably mitigated.

Economic issues must not be used as a demonstration of technical infeasibility. For more information on economics, please see Part 3.6 Economic Feasibility Analysis (Optional) of this Guide.

Technical feasibility can include a fundamental change in the method of operation, though it does not need to. For example, though it can be, a natural gas fired electric generator need not be evaluated for conversion to solar power or wind energy. However, for this example, changes in burners, maximum operating capacity, combustion chamber volume and add-on emission controls are all possible *pollution*

control options. The technology benchmarking report must describe the fundamental change in operating method that leads to a *pollution control option* being considered technically infeasible.

For *pollution control options* involving material substitution or process change, an assessment is made based on a comparison of the operational processes associated with the source under consideration and the sources to which the process technique has been applied previously. If the processes are similar then the *pollution control option* under consideration is technically feasible and can be applied to the source under review. However, in some instances, although the processes of the two sources are similar and they result in the production of similar products, there may be other factors unique to that particular source that makes the process change or material substitution technologies under consideration technically infeasible. As an example of infeasibility, powder coating has been installed and operated at several automobile/light duty truck coating operations. However, the high curing temperatures required makes it infeasible for facilities that manufacture automobile bodies with integral plastic components. The plastic components are a fundamental part of the design of the product and in some applications can save weight for improved vehicle fuel economy. The high curing temperature required for powder coating would warp and distort plastic components and hence powder coating is technically infeasible at these facilities but feasible at others.

An add-on control technology is presumed to be technically feasible if it is commercially *available* and has been employed on a similar source or is a transferable technology. Technical feasibility evaluation would be based initially on the physical and chemical characteristics of the contaminant-bearing gas stream. The characteristics of the gas stream with the control device on it are compared to the characteristics of the gas stream from the source under review. If they are similar, then technical feasibility may be assumed. However, there may be other facility-specific factors that make the control device unsuitable for use on the source, such as the geographic location of the facility, space constraints within the facility, stability of the physical structure of the building that would house the device, etc. The facility requesting a site-specific air standard must describe the reasons for technical infeasibility in order for the ministry to make a reasonable decision.

To prove technical infeasibility, a facility requesting a site-specific air standard must make a factual demonstration, based on a technical assessment considering physical, chemical and engineering principles, and/or empirical data showing that the technology would not work on the source of contaminant under review, or that irresolvable technical difficulties prevent the successful application of the technology to that facility. Physical modifications needed to resolve technical obstacles such as strengthening the roof structure to house a control device, do not by themselves provide a justification for eliminating that particular control option on the basis of technical infeasibility.

The Technology Benchmarking Report must contain a suitably detailed presentation to justify and document technical infeasibility of any *pollution control option* identified for a source or combination of sources in the initial stage. The depth and breadth of the

demonstration may vary from a paragraph to several pages depending upon the complexity of the infeasibility issue and the significance of the source in contributing to POI concentrations of the contaminant that is the subject of the request.

Economic feasibility must not be addressed in the Technology Benchmarking Report. If a facility determines that a *pollution control option* is not feasible due to economic factors, a companion Economic Feasibility Analysis Report is required (see Part 3.6 Economic Feasibility Analysis (Optional) of this Guide).

3.2.1 Combinations of Technical Methods

Part 3.2 Technical Feasibility of this Appendix A to the Guide discusses the assessment of feasible technical methods or *pollution control options* for individual sources. The proponent must, for each source, evaluate feasible methods in the following three categories: material substitution; process modifications; and add-on controls. However, paragraph 5 of subsection 33(1) of O. Reg. 419/05 also requires that a combination of methods be considered. The Regulation requires a list of the methods and combinations of methods that are technically feasible. Employing combinations of material substitutions, process modifications and add-on controls for a source may yield more effective emissions reductions than any one *pollution control option* alone. This is further discussed in Part 4 Step 3: Ranking Based On Feasible Control Options And Combinations of this Appendix A to the Guide.

4.0 STEP 3: RANKING BASED ON FEASIBLE CONTROL OPTIONS and COMBINATIONS

The following is from GIASO which states:

> **Step 3.** Ranking of the technically feasible options and combinations of options that are based upon a *top-down analysis* approach[6] to reduce air emissions that will in turn contribute to reduced concentrations for the contaminant(s) that are the subject of the request.

Paragraph 5 of subsection 33 (1) of O. Reg. 419/05 requires a list of the methods and combinations of methods that are determined under paragraph 4 to be technically feasible. Paragraph 6 of subsection 33 (1) of O. Reg. 419/05 requires that a ranking of the methods and combinations of methods be provided with a request for a site-specific air standard and this ranking be based on the effectiveness at minimizing the POI concentration(s) of the contaminant. The most effective technically feasible *pollution control option* or combination of options is generally listed at the top.

Feasible *pollution control options* or technologies must be identified and ranked for each source that contributes to the POI of the contaminant that is the subject of the request for a site-specific air standard. For the purposes of this Appendix A to the Guide, a combination of p*ollution control options* for a source is referred to as a *pollution control strategy* for that source. Material substitution, process changes, and add-on control categories for each source must be presented separately for ranking purposes. The combination of technically feasible *pollution control strategies* for each source can then be derived from this ranking. An illustration of this approach is further discussed below and presented in Table 4-1 Sample Presentation of an Initial Ranking for a Source.

To assist in simplifying the analysis when there are multiple sources of the relevant contaminant and multiple feasible *pollution control strategies* for each source, the ranking may generally be developed using the following sub-steps:

> **Step 3a**: an initial ranking of *pollution control options* within each category (i.e., material substitution; process change; and add-on pollution control) for each source.

[6] "*Top-down analysis*" is an approach developed by the United States Environmental Protection Agency (US EPA) that can be used to identify, in a systematic manner, the most effective *pollution control strategy* for a source or combination of sources. See the US EPA document, "Significant Deterioration and Nonattainment Area Permitting", Draft, October 1990. Refer to www.epa.gov/ttn/nsr/gen/wkshpman.pdf

Step 3b: identification of the *pollution control strategy* for each source that is based upon a default combination, for each source, of the best material substitution option; plus best process change option; and best add-on control option. This step may also involve a further technical feasibility assessment for this combination of *pollution control strategies* for the source.

Step 3c: the default combination, for all sources of the facility, is the best technically feasible *pollution control strategy* for each source. This overall facility-wide best approach to minimizing the POI concentrations from all sources may also be subject to a final technical feasibility assessment to determine the technical feasibility of the *pollution control combination* overall.

Step 3d: the final selection of the best technically feasible *pollution control combination* (which considers the best *pollution control strategies* for each source) and an assessment of the frequency of exceedences at specified receptors.

The purpose of the Technology Benchmarking Report is to present an orderly and systematic review of feasible *pollution control options* and *pollution control strategies* for each source that are appropriate for reducing POI concentrations of the contaminant that is the subject of the request for a site-specific standard as much as possible. The methodology suggested in this document will standardize the approach to assessing appropriate approaches and will ensure that analysis amongst sectors is more consistent.

4.1 Step 3a: Initial Ranking for Each Category and Source

Step 3a: an initial ranking within each category (i.e., material substitution; process change; and add-on pollution control) for each source.

At this stage in the development of the report, a facility has identified all *pollution control options* that are feasible for any particular source of the contaminant that is the subject of the request. Material substitution, process changes and add-on control categories must be presented separately and not combined at this stage. Table 4-1 Sample Presentation of an Initial Ranking for a Source presents an example of an initial ranking of the various *pollution control options* within these source categories using a variety of emission metrics. Emission metrics may be appropriate in some cases where they can be demonstrated to reflect the overall POI concentrations (see Part 4.1.1 Emission Metrics below).

Table 4-1: Sample Presentation of an Initial Ranking for a Source

Category	Options	Performance Efficiencies	Current situation
Material Substitution	Material 1	X lb/gallon	X+5 lb/gallon
	Material 2	X+2 lb/gallon	
	Material 3	X+4 lb/gallon	
Process Change	Process 1	Y+3%	Y% (usage rate)
	Process 2	Y+2%	
	Process 3	Y+1%	
Add –on Controls	Control 1	95%	0%
	Control 2	95% (different than 1)	
	Control 3	90%	

Table 4-1 Sample Presentation of an Initial Ranking for a Source summarizes each feasible *pollution control option* for one source from each of the three categories i.e. material substitution, process change and add-on control. The process must be repeated for each source that emits the contaminant that is the subject of the request. The initial ranking of options for each source must be ranked separately at this stage for each of the three categories. As illustrated in Table 4-1 Sample Presentation of an Initial Ranking for a Source above, the most effective *pollution control option* within a category must be ranked at the top followed by the second most effective option and so on with the least effective option at the bottom. For example, Material 1 is the most effective approach in the material substitution category and results in X lb/gallon of the subject contaminant, while the current material used at the facility results in X +5 lb/gallon.

Process 1 is the most effective *pollution control option* in the process change category as it increases process efficiency by 3% which in turn results in lower emissions. Controls 1 and 2 are equally effective add-on *pollution control options*, both with a destruction efficiency of 95%.

Each category (material substitution, process change and add-on control) can have different units of measure. But within each control category the same units must be used to enable comparisons based on their effectiveness.

4.1.1 Emission Metrics

The ranking of *pollution control options* must be based on their ability to reduce POI concentrations. However, it may be appropriate in many situations to develop a series of source specific assessments including an initial ranking of the *pollution control*

options within each category (i.e., material substitution, process change and add-on pollution control) using common metrics by which the performance of reduction in emissions can be evaluated. This was the approach illustrated in Table 4-1 Sample Presentation of an Initial Ranking for a Source. For example, add-on control devices may present contaminant removal efficiencies; coatings may present volatile percentages or solids content, etc. Other common units of measure may be helpful to compare and rank *pollution control options* or technologies based on their emissions reduction potential which can be linked to overall reduction in POI. This may also be useful when comparing process change and material substitution *pollution control options* to each other or to *pollution control options* for add-on controls. The most widely-used and effective method is to express emission performance as an average steady state emissions level per unit of product produced or processed. Examples of metrics include:

- Grams of VOC emissions per square meter of surface area coated;
- Grams of contaminant (i.e. particulate) emissions per ton of metal melted;
- Grams of contaminant emissions per ton of product; or
- Grams of SO_2 emissions per kilowatt of electric power produced.

The objective of the technology ranking is to evaluate *pollution control options* for reducing POI concentrations resulting from the source operation. This reduction in POI concentration contributions from that source will contribute to the overall reduction of POI concentrations from that facility. This step of the evaluation process is presenting feasible *pollution control options* for the source operation. There may be situations where dispersion modelling at this stage can be avoided. For example, if the only variable that changes in the dispersion modelling is the emission rate, then modelling results for the different *pollution control options* can be prorated. However, ranking the feasible *pollution control options* and *pollution control strategies* based on POI reduction potential will be necessary in the event that one or more of the methods involve significant changes in dispersion characteristics. Examples of changes that would significantly affect dispersion modelling results include:

- stack height;
- stack temperature;
- stack flow or velocity;
- stack location;
- building downwash (new buildings or extensions to existing, changes in elevation;
- pattern of emissions throughout the day; and
- batch release vs. continuous operation.

It may be appropriate to limit this modelling to the sources that are affected by the possible change in dispersion modelling characteristics unless there is an anticipated

increase in the overall POI concentration because of a *pollution control option* that affects dispersion characteristics (e.g. a large building that induces downwash).

Ranking of Technologies

Each technically feasible *pollution control strategy* for each non-negligible source needs to be ranked in the order of reduction of POI concentration. To simplify the modelling, each source could be modelled separately and the maximum POI concentration determined anywhere within the modelling domain. Different technologies will affect the mass emission rate of the contaminant in question but also may result in changes to either the physical stack parameters (stack height, location, diameter, etc.) or the air flow characteristics (temperature, flow rate, etc.). All technology options for that source may be modelled in a single model run with the use of source "groups".

A Note on Performance of Control Options over a Range of Operation

Performance of any given technology can rarely be described by a single value. It should be anticipated that similar technology applied at different sources will exhibit a range of performance levels. For example, a thermal oxidizer controlling a solvent-rich exhaust stream could be capable of achieving destruction efficiencies better than 99 percent; however, actual performance may be as low as 90 to 95 percent efficient for a more dilute solvent exhaust stream. The Technology Benchmarking Report shall identify the range of performance typically experienced for the type of source being evaluated. The report must indicate the value within that range that has been selected for evaluation and why. If a value outside the typical range is selected to describe anticipated technology performance, then a more detailed explanation regarding the reasoning must be provided.

4.2 Step 3b: Default Combination for Each Source and Further Assessment of Technical Feasibility

Step 3b: identification of the *pollution control strategy* for each source that is based upon a default combination, for each source, of the best material substitution *pollution control option*; plus best process change *pollution control option*; and best add-on *pollution control option*. This step may also involve a further technical feasibility assessment for this *pollution control strategy* which is a combination of these *pollution control options* for the source.

The next step is to identify the default combination of the top ranked *pollution control options* (i.e. a combination of the top ranked material substitution *pollution control option* with the top ranked process change *pollution control option* with the top ranked add-on *pollution control option*), for each source, that represents the lowest POI concentration (which may in many situations be represented by the lowest emission rate or similar metric as discussed in the above Part 4.1.1 Emission Metrics of Appendix A of the Guide). However, this default top-ranked *pollution control strategy* for each source may be technically infeasible. For example, the top ranked material process *pollution control*

option may not work with the top ranked process change *pollution control option*. For example, in the case of automotive coating operations, the material with the lowest VOC emissions and hence the top ranked material would be waterborne paint. However, waterborne paint cannot be applied using the highest voltage electrostatic applicators, which might be the most efficient spray application process *pollution control option*. In addition, there may be situations where for individual sources, *pollution control options* are technically feasible but a combination of *pollution control options* for a number of sources may result in a technically infeasible *pollution control strategy*. A *pollution control strategy* may be technically infeasible due to site geometry constraints, physical, chemical, engineering principles and/or safety concerns that cannot be mitigated (see criteria listed in Part 3.2 Technical Feasibility of this Appendix A to the Guide). In that instance, the next best technically feasible *pollution control strategy* must be selected for the next stage of assessment. The next combination would consider the second best technically feasible *pollution control option* with the first best of the other categories and so on until a technically feasible *pollution control strategy* is determined. Decisions need to be well documented by the applicant along with the rationale to support the selection so that each step is clearly understood and acceptable to both the ministry and to the public.

4.3 Step 3c: Overall Default Combination for All Sources and Final Assessment of Technical Feasibility

> **Step 3c:** the default combination, for all sources of the facility, is the best of all technically feasible *pollution control strategies* for each source. This overall facility-wide best approach to minimizing the POI concentration from all sources may also be subject to a final technical feasibility assessment to determine the technical feasibility of the combination of *pollution control strategies* overall. This is referred to as the overall best technically feasible *pollution control combination*.

In this step, the default combination of best technically feasible *pollution control strategies* for all sources is determined based on minimizing the POI concentration of the contaminant from all sources. The default combination, for all sources of the facility, is the best technically feasible *pollution control strategy* for each source. This becomes the default approach because it combines the technically feasible combinations of best materials substitution and best process change and best add-on control for each source that will minimize POI concentrations as much as possible. The overall best technically feasible *pollution control combination* may need to be evaluated again to assess technical feasibility (e.g., using similar criteria and approach to that used in Step 3b, above). If so, the process must be reasonable, clear and well documented in the Technology Benchmarking Report.

4.4 Step 3d: Final Selection of Preferred Option and Assessment of Frequency of Exceedence

> **Step 3d:** the final selection of the best technically feasible *pollution control combination* and an assessment of the frequency of exceedences at specified receptors.

The final selection of the best technically feasible *pollution control combinations* for all sources should be clearly identified and presented in a top-down hierarchy that is based upon reduction in overall POI concentration for the contaminant that is the subject of the request for site-specific air standard, relative to other combinations (including the default combination). **The ESDM report must include details of the results of dispersion modelling for the status quo scenario; the overall default technically feasible *pollution control combinations* and the selected or *preferred technically feasible pollution control combinations* for all sources (if it is different than the default combination).**

Table 4-2 Example of a Tabulated Ranking of Combinations of Control Options, below, provides an example of a tabulated presentation where the best technically feasible *pollution control combination* for all sources is actually the second most effective approach at minimizing the overall POI concentration.

Table 4-2: Example of a Tabulated Ranking of Combinations of Control Options

Ranking	Source and Pollution Control Strategies	% Reduction in Individual Maximum POI Concentrations	Overall % of Schedule 3 Standard
Current Situation			300%
Default *Pollution Control Combination* (not a technically feasible combination)	Source 1: Strategy 1	50%	150%
	Source 2: Strategy 1	100%	
	Source 3: Strategy 1	75%	
Best Technically Feasible *Pollution Control Combination*	Source 1: Strategy 1	50%	160%
	Source 2: Strategy 1	100%	
	Source 3: Strategy 2	40%	
Third Best Technically Feasible *Pollution Control Combination*	Source 1: Strategy 1	50%	170%
	Source 2: Strategy 1	100%	
	Source 3: Strategy 3	25%	
All Other *Pollution Control Combinations*	In this example, all other *Pollution Control Combinations* were not modelled because it was reasonably assumed (based upon the review of emission metrics used in the source-by-source assessments) that they would result in higher POI concentrations.		

Notes for Table 4-2 Example of a Tabulated Ranking of Combinations of Control Options:

i) Strategy 1 means the best *pollution control strategy* which includes a combination of technically feasible *pollution control options* which considered the best material substitution, with the best process change, with the best add-on control for each source;

ii) Strategy 2 means the second best *pollution control strategy* which includes the combination of technically feasible *pollution control options* for each source; and

iii) Strategy 3 means the third best *pollution control strategy* which includes the combination of technically feasible *pollution control options* for each source.

Selection of Technically Feasible Pollution Control Combinations with Similar Point of Impingement Reduction Potential

As indicated in Chapter 2.4.3.1, Ranking Technically Feasible Options of the ministry's "Guideline for the Implementation of Air Standards in Ontario" (GIASO), in most cases, if two or more technically achievable combinations are within 15% of each other in terms of maximum concentrations of the relevant contaminant, then for the purposes of this analysis they are considered equivalent options. Therefore, in the example listed in Table 4-2 Example of a Tabulated Ranking of Combinations of Control Options above, either of the two top technically feasible *pollution control combinations* would generally be acceptable since there is only an overall POI difference of 10% (e.g., 160% or 170% of the Schedule 3 standard).

In choosing the *preferred technically feasible pollution control combination,* the Director must also consider other factors such as the frequency of exceedences. The *preferred technically feasible pollution control combination* would be chosen from this short list and an action plan for implementing this option would be part of the submission under section 32.

4.5 Assessment of Frequencies at Specified Receptors

Under a section 32 request for a site-specific air standard, the Director must also consider the frequency of POI exceedences. A written statement of the frequency of occurrence of the exceedences and the magnitude at all the locations set out in subsection 30 (8) of O. Reg. 419/05 as well as at the maximum POI concentration based upon the use of the most site-specific approved meteorological data in conjunction with an approved dispersion model must be provided (see ADMGO for more information on the appropriate use of an approved dispersion model). Frequency of POI exceedence must be assessed for the best technically feasible *pollution control combination* and the status quo. If the preferred approach is not the best technically feasible *pollution control combination,* then a frequency analysis for this combination must also be undertaken along with the preferred technically feasible *pollution control combination*. This assessment of frequency is to appear in the ESDM report for the facility and forms part of the request for a site-specific air standard. The results in the ESDM report shall be summarized in the Technology Benchmarking Report.

In general, dispersion modelling predictions and the assessment of frequency of exceedence shall be conducted and presented (in the ESDM report and summarized in the Technology Benchmarking report) for the best technically feasible *pollution control combination* at the specified receptors listed in subsection 30 (8) of O. Reg. 419/05 as well as the maximum POI.

In the event that dispersion modelling and assessments of the frequency of exceedence are anticipated to be necessary for different technically feasible *pollution control combinations,* then the best POI reduction potential combination must be ranked at the top followed by the next best POI reduction potential combination and so on, as illustrated in Table 4-3: Sample Presentation of Frequency Table.

Table 4-3: Sample Presentation of Frequency Table

Ranking	Pollution Control Strategies and Combinations	Overall Maximum POI % of Schedule 3 Standard	POI Exceedence (Receptor with highest % frequency)	% of Maximum POI Concentration at Specified Receptor
Current Situation	Status Quo	300%	30% (at nearest dwelling)	250% (at nearest dwelling)
Best Technically Feasible *Pollution Control Combination*	Source 1: Strategy 1 Source 2: Strategy 1 Source 3: Strategy 2	160%	10% (at nearby dwelling)	130% (at nearby daycare)
Third Best Technically Feasible *Pollution Control Combination*[2]	Source 1: Strategy 1 Source 2: Strategy 1 Source 3: Strategy 3	170%	10% (at nearest daycare)	130% (at nearest dwelling)

Note 1: Frequency information for the default *Pollution Control Combination* would normally be presented but is not necessary to present it in this case since this is not a technically feasible combination.

Note 2: Frequency information for the third best option would not normally be presented unless it was the preferred Technically Feasible *Pollution Control Combination* based on an economic feasibility assessment.

The above examples are provided for illustration purposes only.

5.0 Step 4: Documentation and Reporting

The following is from GIASO which states:

Step 4.	Documentation and Reporting

Chapter 2.4.4 Step 4: Reporting and Documentation of the Technology Benchmarking Process of GIASO outlines the need for comprehensive documentation of relevant information. There are multiple reports submitted to support a request for a site-specific air standard. The ESDM report (as per s.26 of O. Reg. 419/05) submitted to support a site-specific standard request must contain information on all sources of the contaminant that is the subject of the request. It must also contain information on and the combined modelling/monitoring analysis for the existing situation (i.e. the status quo). The ESDM report must also contain information on modelling for each of the technically feasible p*ollution control options* and/or technically feasible *pollution control*

strategies and the best technically feasible *pollution control combinations* identified in the Technology Benchmarking Report. The contribution of each source to the overall POI concentrations (at the maximum as well as key receptors) as described above is also useful information that can help support decisions on the request. The ESDM report must contain a section or an appendix to support each of the required modelling scenarios for each technically feasible *pollution control options or strategies or combinations* that required an assessment of POI concentration reduction potential. For information on how to minimize modelling requirements, see Part 4.1.1 Emission Metrics of the Appendix A of this Guide. The ESDM report must also include the information to support the analysis of the frequency of exceedences at each of the receptors identified in subsection 30 (8) of O. Reg. 419/05 as well as the maximum POI.

The Technology Benchmarking Report should clearly cross-reference the relevant portions of the ESDM report and present a summary of the information as required to rank based on POI reduction or minimizing POI concentrations. In addition, both the ESDM report and the Technology Benchmarking Report should contain information on the frequency of exceedences at receptors (as discussed in Part 3.5 Assessing Concentrations and Frequency at Receptors of this Guide and Step 3 of the Appendix to the Guide).

6.0 Scoring System for Exceedences: An Optional Step

In addition to the above assessment, a facility may also choose to consider a scoring system to rank technically feasible *pollution control combination(s)*. The scoring is optional but can be a useful approach to assessing the relative effectiveness of different options and contaminants. It should be noted, however, that this scoring system is not a formal toxicological review. The scoring system was developed by a group of stakeholders that included industry, public health, and ENGO representatives. The score is determined using a combination of the magnitude of an exceedence, the frequency of exceedences, and a weighting factor based on the limiting effect of the standard. In 2009, the scoring methodology was incorporated into a procedure to help assess the cost effectiveness of various technical options (see the User Guide: Application of Cost Effectiveness Methodology and Indicators for Use in Section 32 Requests under Ontario Regulation 419: Air Pollution – Local Air Quality (as amended) – available on the ministry website). This document shows how to calculate a Total Resource Effectiveness (TRE) value to assess cost-effectiveness and compare different technically feasible *pollution control combination(s)*. For more information on this scoring system, please see Appendix B of this Guide.

7.0 Conditions relating to Technology Benchmarking

When granting a site-specific air standard request, the ministry may consider placing conditions within the approval instrument for the facility. For instance, the ministry may

include a condition in the site-specific air standard approval that requires the facility requesting a site-specific standard to re-assess a technology that was dismissed during the technology evaluation process, after a specified duration. The ministry may also require the facility to re-consider a technical solution within a certain time frame (e.g. 2 to 5 years) and report the findings of the evaluation to the ministry. This information may be useful for possible future subsequent requests for a site-specific air standard.

In some instances, the ministry may require the facility requesting a site-specific air standard to monitor the status of relatively mature emerging technologies, and re-evaluate them for implementation in the subject facility when or if they become available.

Elements of an action plan to implement the *preferred feasible pollution control combination* is required to be submitted as part of the request and may form part of the conditions for approval.

8.0 GLOSSARY

Applicable technology – is a technology that can reasonably be installed and operated on the source type under consideration.

Available technology – is a technology that is commercially available for purchase.

Emerging technology - a technology that has the potential to achieve an emission reduction but is still under development and has not been demonstrated in commercial application on identical or similar emission sources.

Feasible technology – must be available and applicable to a facility.

Production process - constitutes physical and chemical unit operations used to produce a desired product from a specified set of raw materials.

Pollution control option(s) – means any technical method for a source that results in the reduction of the POI concentration of the contaminant that is the subject of the section 32 request: material substitution, process change, and add on control.

Pollution control strategy(s) – means the possible combination of *pollution control options* for each source from the 3 categories (material substitution, process change and add-on control). The default technically feasible *pollution control strategy* is the best of all 3 categories for the source eliminating control strategies using an assessment of feasibility.

Pollution control combination(s) – means the possible combinations of methods for all the sources overall to reduce the overall POI concentrations at a facility. The default technically feasible *pollution control combination* is the best of all technically feasible *pollution control strategies* for each source once it has been assessed for feasibility.

Preferred technically feasible pollution control combination – is the recommended *pollution control combinations* chosen amongst the technically feasible *pollution control strategies* for maximizing the overall reduction of the POI concentration.

Technology transfer – transfer of known technology used in one type of application to another.

Top-down analysis – generally means a top-down process that provides an assessment of all the methods and combinations be ranked in descending order of the effectiveness in minimizing the POI concentration of the contaminant that is the subject of the request. The most effective or "top" alternative is examined first.

That alternative is established as the best method or combination unless the applicant demonstrates, and the ministry in its informed judgment agrees, that technical and/or economic considerations justify a conclusion that the most stringent technology is not feasible in that case. If the most stringent technology is eliminated in this fashion, then the next most effective alternative is considered, and so on.

Appendix B: Scoring Method (Optional)

In addition to the steps described in Parts 2 Step 1: Develop A List Of All Pollution Control Methods, 3 Step 2: Develop A List Of Technically Feasible Pollution Control Options, 4 Step 3: Ranking Based On Feasible Control Options And Combinations, and 5 Step 4: Documentation and Reporting of Appendix A to this Guide, a facility may also choose to consider a scoring system to rank technically feasible *pollution control combinations*. The scoring system is determined using a combination of the magnitude of an exceedence, the frequency of exceedences, and a weighting factor based on the limiting effect of the standard (see Table B-1: Consequence Categories Corresponding Weights). It should be noted, however, that this is not a formal toxicological review. The score system is a relative score and should never be used in isolation to make determinations about health and environmental impacts. In order to understand the basis of the score method, some background information has been provided in this Appendix B to the Guide.

The scoring method may also be used in the procedure to help assess the cost effectiveness of various technical options (see the User Guide: Application of Cost Effectiveness Methodology and Indicators for Use in Section 32 Requests under Ontario Regulation 419: Air Pollution – Local Air Quality (as amended) – available on the ministry website). This document shows how to calculate a Total Resource Effectiveness (TRE) value to assess cost-effectiveness and compare different technically feasible *pollution control combinations*. For more information on the TRE factor, see also Chapter 2.5.1.1 Cost Effectiveness of GIASO.

B: 1.1 Concepts

The scoring system comprises the following five components:

- The hazard inherent in an activity that is otherwise deemed beneficial,
- A potential undesirable event, which brings out the hazard,
- Adverse consequence (and severity) of the undesirable event,
- Likelihood of whether the undesirable event will happen or not, and
- Perception about the combination of the above components (perceptions arise because of the uncertainty about the hazard, likelihood and consequence components of risk).

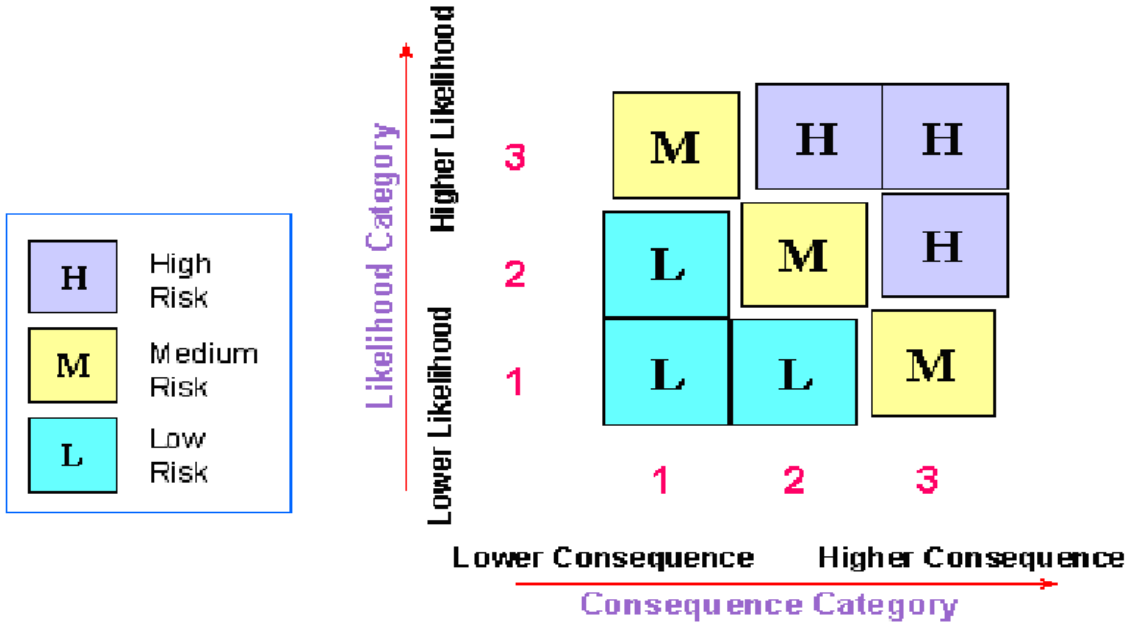
In this context:

- “hazards” are the potential health and environmental effects of the contaminants emitted into the air,
- “undesirable events” are exceedences of the ministry air standards or ministry POI limits,
- “consequences” can be described as the various health and environmental effects that are possible for a given exceedence of an ministry standard or ministry POI limit for a contaminant, and

- "likelihood" is defined as the frequency or probability of occurrence of the exceedence.

Conceptually, decisions are made based on the premise that the higher the likelihood or consequence of the event, the greater the significance of it and the need for action. Figure B-1 Ranking Matrix Example is an illustration of the concepts used in the development of this scoring system.

Figure B-1: Ranking Matrix Example



B: 1.2 Background on Scoring Methodology

The scoring methodology considers a system of assessing the consequences of being exposed to a contaminant as well as the likelihood of being exposed. The score is based on the following:

Consequence of the Effect **x** Likelihood of the Event

In assessing information on any chemical, a variety of effects may be identified. Examples of possible effects are outlined in Table B-2: Consequence Categories and Examples of Possible Health & Environmental Effects of Exposure. The scoring methodology assigns each consequence category a weighting factor (W_C) to account for the significance of that effect relative to another category. In order to keep the scoring

simple, the limiting effect of the standard or limit is chosen to develop the score even though exceedences of the standard could mean that effects, in addition to the limiting effect of the standard, may occur. There were originally 6 consequence categories summarized in Table B-1 in order of significance and their assigned weights[7]. The consequence categories were reduced to 3 categories for the purposes of calculating the TRE.

Table B-1: Consequence Categories Corresponding Weights (W_C)

Consequence (see Table B-2) ↑

Consequence Categories	Weights (W_C)	Consequence Categories for TRE	Weights (W_C)* To use with TRE
Major Health	10	Major Health	1.43
Medium Health	7		
Major Environmental	6	Medium Health	1.00
Medium Environmental	3		
Minor Health	2	Environmental and Minor Health	0.86
Minor Environmental	1		

***** *Note: For the purposes of using this scoring used for a TRE calculation of cost-effectiveness, the general 6 consequence categories were reduced to 3 categories namely, Major Health, Medium Health, and Environmental and Minor Health. The relative scaled 'scores' were converted to absolute values by dividing each by the Medium Health score (7): Major Health (10/7 = 1.43), Medium Health (7/7 = 1.00) and Environmental and Minor Health (6/7 = 0.86).*

[7] Weighting criteria may change or be reassessed by the ministry periodically.

Table B-2: Consequence Categories and Examples of Possible for Health & Environmental Effects of Exposure (developed by ILSI expert panel – International life Sciences Institute):

1) Minor Environmental Effects	2) Minor Health Effects	3) Medium Environmental Effects	4) Major Environmental Effects	5) Medium Health Effects	6) Major Health Effects
Minor environmental impairment, i.e. impairment of the environment that is localized, short in duration with no potential for long term impact.	Minor human health impact, i.e. short in duration and no long term effects; and likely does not require medical attention.	Known or anticipated adverse impact to animal, plant, property or resources which are amenable to full or substantial remediation through the application of abatement measures.	Known environmental impairment, i.e. results in irreparable harm, permanent damage to an ecosystem, requires significant resources to contain, abate or manage.	Known or anticipated human health impact, i.e. acute and/or chronic exposure to contaminants, hospitalization, or serious illness.	Known human health impact, i.e. results in death, or could result in death or multiple deaths.
EXAMPLES					
Vegetation < Changes in pigmentation < Temporary coating with dust/particulate matter that impairs photosynthesis. **Property** < Discolouration < Soiling < Short Term Odour	**Generally reversible, generally not life-shortening:** - Irritation (eye, skin, mucosal that is transient) - Sensitization (allergy) - Reversible acute organ or system effects (gastrointestinal inflammation) Others include: - Chronic Odour - mild irritation (eyes, respiratory) - Nausea, dizziness - mild asthma in existing asthmatic	**Vegetation** < Minor necrosis or chlorosis. < Minor reductions in growth or vegetative period. < Premature senescence (early loss of leaves or fruit). **Property** < Minor corrosion or pitting of material	**Vegetation** < Plant Death < Significant necrosis or chlorosis. < Major reductions in growth or vegetative period. **Property** < Significant corrosion of material	**May be reversible, could be life-shortening:** - Immunotoxicity - Neurotoxicity - Nephrotoxicity (kidney damage) - Hepatotoxicity (liver damage) - Pulmonary toxicity (lung damage) - severe asthma -Cardiotoxicity (heart damage) - Possible or Probable carcinogen	**Irreversible/Life-shortening effects:** - Reproductive effects - Teratogenic effects (birth defects) - Acute fatal or acute severe & irreversible effects (e.g., fatal poisoning) - Mutagenicity - Known Human Carcinogen

Table B-3: Consequence Category Assignments and Basis of Current ministry Standards assigns a consequence category for the limiting effects of each of the current ministry standards. The "likelihood" scale (also referred to as "frequency of occurrence" or "probability of occurrence") is also given a weighting factor to account for low to high frequencies of exposure (W_L). In this framework, W_L is the percentage of time the air dispersion model predicts an exceedence of the ministry standard (or ministry POI limit) using the appropriate averaging time period for that contaminant. For example, if the standard for a contaminant is based on a 24-hour averaging time period, then W_L would be the total number of days or 24hr periods that the model predicts an exceedence of the ministry standard (or ministry POI limit) in the given 5 year meteorological data set used to run the approved air dispersion models. In order to determine the frequency of occurrence or likely exceedence of the ministry standard, the most site-specific local meteorological data sets accepted by ministry must be used. The frequency is then based on the calculated percentage. Monitoring information may also be considered along with the modelled results but should not be used in isolation.

A sample calculation for W_L for a standard with a 24hr averaging period would be calculated as follows:

$$W_L = \left(\frac{\#\text{ of 24 hr (or days) exceedences of the ministry standard}}{\text{Total \# of days}} \right) * 100$$

= % [# of 24 hr (or days) of exceedences]

B: 1.3 Scoring Methodology

A further description of the optional scoring methodology is discussed below.

The scoring formula is:

$R = RQ * W_{cs} * W_L$

where

R = a dimensionless score
RQ = Risk Quotient = [(Cmax)/ministry Standard]
Cmax = the maximum POI concentration

W_{cs} = a weight assigned to one of the 6 consequence categories identified in Table B-1 based on the limiting effect of the ministry standard (or ministry POI limit)

W_L = percentage of time the model predicts an exceedence of the ministry standard (or ministry POI limit)

The scoring method can also be used if there are multiple contaminants involved. An example is provided in Table B-4 below. These scores are not intended to provide an estimation of the risk associated with a contaminant. Rather they are intended as a

screening tool to compare options. For example, the scoring method can be used to illustrate and rank the technically feasible *pollution control combinations* for multiple contaminants.

Note: The same scoring method may be used to calculate both co-benefits (options that also reduce other harmful pollutants) and dis-benefits (options that increase concentrations of other harmful pollutants). If a facility wants to do this, further discussion with ministry is recommended.

Table B-4: Example of Scoring System for Multiple Contaminants

In order calculate a score for multiple contaminants, the maximum concentration for each contaminant in each technically feasible pollution control combination (technical combination (TC)) would be determined. This would then be used to compute an equivalent score for that technical combination. Each TCi will have a score calculated for each contaminant that would result if the technical combinations were implemented. For example, each TCi is a "scenario" and the score is calculated as follows:

$R_{TCi} = \sum R_{cj} = R_{c1} + R_{c2} + \ldots$

Where

R_{TCi} = Score for Technical Combination "i" (and i=1, 2, 3…)

Cj = contaminant "j" (and j=1, 2, 3…)

$RQ_{cj} = [(C_{maximum})_{cj} /$ ministry standard]

W_{cs} = a weight assigned to one of the 6 consequence categories identified in Table B-1 (Appendix II) based on the limiting effect of the ministry standard being exceeded

W_L = percentage of time the model predicts an exceedence of the ministry standard at the point that represents the maximum POI concentration.

R_{cj} = Score for contaminant "j" = $(RQ)_{cj} * (W_{cs})_{cj} * (W_L)_{cj}$

Where the technical combination involves the reduction of more than one contaminant, calculate the maximum concentration and frequency of exceedences for each contaminant individually. These dimensionless score may then be added together for an overall score for that technology combination. If the scores are used in the assessment, then another table showing the ranking of technical combinations based on the scores may also be provided. However, this is in addition to ranking the options based on individual contaminant POI concentrations as set out in Step 3, which is a regulatory requirement. Use of this score is optional and is not a regulatory requirement.

Table B-3: Consequence Category Assignments and Basis of Current Ministry Standards

Item	CAS Number	CHEMICAL NAME	CONSEQUENCE CATEGORY (See Note # 1)	BASIS of CURRENT ministry Standard : NC: Non Carcinogenicity – based C: Carcinogenicity-based (See Note # 2)
1	75-07-0	Acetaldehyde	MINOR	NC
2	64-19-7	Acetic acid	MINOR	NC
3	67-64-1	Acetone	MINOR	NC
4	75-05-8	Acetonitrile	MINOR	NC
5	74-86-2	Acetylene	MINOR	NC
6	107-02-8	Acrolein	MEDIUM	NC
7	79-06-1	Acrylamide	MEDIUM	NC
8	107-13-1	Acrylonitrile	MEDIUM	C
9	7664-41-7	Ammonia	MINOR	NC
10	7440-36-0	Antimony	MEDIUM	NC
11	7440-38-2	Arsenic and compounds	MAJOR	C

Item	CAS Number	CHEMICAL NAME	CONSEQUENCE CATEGORY (See Note # 1)	BASIS of CURRENT ministry Standard : NC: Non Carcinogenicity – based C: Carcinogenicity-based (See Note # 2)
12	7784-42-1	Arsine	MAJOR	NC
13	7440-41-7	Beryllium and compounds	MAJOR	C
13.1	71-43-2	Benzene	MAJOR	C
13.2	50-32-8	Benzo(a)pyrene	MAJOR	C
14	7440-42-8	Boron	MINOR	NC
15	10294-33-4	Boron tribromide	MINOR	NC
16	10294-34-5	Boron trichloride	MINOR	NC
17	7637-07-2	Boron trifluoride	MINOR	NC
18	7726-95-6	Bromine	MINOR	NC
18.1	106-99-0	Butadiene, 1,3-	MAJOR	C
19	7440-43-9	Cadmium	MAJOR	C
20	1305-62-0	Calcium hydroxide	MINOR	NC

Item	CAS Number	CHEMICAL NAME	CONSEQUENCE CATEGORY (See Note # 1)	BASIS of CURRENT ministry Standard : NC: Non Carcinogenicity – based C: Carcinogenicity-based (See Note # 2)
21	1305-78-8	Calcium oxide	MINOR	NC
22	1333-86-4	Carbon black	MEDIUM	NC
23	75-15-0	Carbon disulphide	MINOR	NC
24	630-08-0	Carbon monoxide	MEDIUM	NC
25	56-23-5	Carbon tetrachloride	MEDIUM	NC
26	7782-50-5	Chlorine	MINOR	NC
27	10049-04-4	Chlorine dioxide	MINOR	NC
28	67-66-3	Chloroform	MAJOR	C
29	7440-50-8	Copper	MINOR	NC
30	1319-77-3	Cresols	MINOR	NC
31	110-82-7	Cyclohexane	MEDIUM[3]	NC
31.1	7440-47-3	Chromium	MEDIUM	NC

Item	CAS Number	CHEMICAL NAME	CONSEQUENCE CATEGORY (See Note # 1)	BASIS of CURRENT ministry Standard : NC: Non Carcinogenicity – based C: Carcinogenicity-based (See Note # 2)
31.2	7440-47-3	Hexavalent Chromium	MAJOR	C
32	17702-41-9	Decaborane	MINOR	NC
33	117-81-7	Di(2-ethylhexyl)phthalate [DEHP]	MEDIUM	NC
34	19287-45-7	Diborane	MINOR	NC
35	131-15-7	Dicapryl phthalate	MINOR	NC
36	106-46-7	Dichlorobenzene, para-	MEDIUM	NC
36.1	N/A	Dioxins, Furans and Dioxin-like PCBs	MAJOR	NC
37	624-92-0	Dimethyl disulphide	MINOR	NC
38	75-18-3	Dimethyl sulphide	MINOR	NC
39	117-84-0	Di-n-octyl phthalate [DNOP]	MINOR	NC
40	N/A	Dustfall	MINOR	NC
41	141-78-6	Ethyl acetate	MINOR	NC

Item	CAS Number	CHEMICAL NAME	CONSEQUENCE CATEGORY (See Note # 1)	BASIS of CURRENT ministry Standard : NC: Non Carcinogenicity – based C: Carcinogenicity-based (See Note # 2)
42	140-88-5	Ethyl acrylate	MINOR	NC
43	100-41-4	Ethyl benzene	MEDIUM	NC
44	60-29-7	Ethyl ether	MINOR	NC
45	107-06-2	Ethylene dichloride	MAJOR	C
46	1309-37-1	Ferric oxide (iron oxide)	MEDIUM	NC
47	7664-39-3	Fluorides (as HF) - Gaseous (Growing Season)	MEDIUM ENV	NC
48	7664-39-3	Fluorides (as HF) - Total (Growing Season)	MEDIUM ENV	NC
49	7664-39-3	Fluorides (as HF) - Total (Non-Growing Season)	MEDIUM ENV	NC
50	50-00-0	Formaldehyde	MEDIUM	C and NC Consider overall basis as NC
51	64-18-6	Formic acid	MINOR	NC
52	98-01-1	Furfural	MINOR	NC
53	98-00-0	Furfuryl alcohol	MINOR	NC

Item	CAS Number	CHEMICAL NAME	CONSEQUENCE CATEGORY (See Note # 1)	BASIS of CURRENT ministry Standard : NC: Non Carcinogenicity – based C: Carcinogenicity-based (See Note # 2)
54	4035-89-6	HDI biuret (HDI-BT), Hexamethylene diisocyanate trimer (Hexamethylene Diisocyanate Biuret)	MEDIUM	NC
55	3779-63-3	HDI isocyanurate (HDI-IC)	MEDIUM	NC
56	28182-81-2	HDI Polyisocyanate (HDI-BT & HDI-IC)	MEDIUM	NC
57	822-06-0	Hexamethylene diisocyanate (HDI) monomer	MEDIUM	NC
58	7647-01-0	Hydrogen chloride	MINOR	NC
59	74-90-8	Hydrogen cyanide	MEDIUM	NC
60	7783-06-4	Hydrogen sulphide	MEDIUM	NC
61	15438-31-0	Iron (metallic)	MINOR	NC
62	67-63-0	Isopropanol (Isopropyl alcohol)	MEDIUM	NC
63	98-82-8	Isopropyl benzene (cumene)	MINOR	NC
64	7439-92-1	Lead	MAJOR	NC
65	7580-67-8	Lithium hydrides	MINOR	NC

Item	CAS Number	CHEMICAL NAME	CONSEQUENCE CATEGORY (See Note # 1)	BASIS of CURRENT ministry Standard : NC: Non Carcinogenicity – based C: Carcinogenicity-based (See Note # 2)
66	7439-93-2	Lithium (other than hydrides)	MINOR	NC
67	1309-48-4	Magnesium oxide	MINOR	NC
67.1	7439-96-5	Manganese and Manganese Compounds	MEDIUM	NC
68	74-93-1	Mercaptans (as Methyl mercaptan) -total	MINOR	NC
69	7439-97-6	Mercury (Hg)	MEDIUM	NC
70	7439-97-6	Mercury (as Hg) - alkyl compounds	MEDIUM	NC
71	101-68-8	Methane diphenyl diisocyanate (MDI)-monomer	MEDIUM	NC
72	9016-87-9	Methane diphenyl diisocyanate (MDI)-polymer (Polymeric MDI)	MEDIUM	NC
73	67-56-1	Methanol (Methyl alcohol)	MEDIUM[3]	NC
74	96-33-3	Methyl acrylate	MINOR	NC
75	78-93-3	Methyl ethyl ketone (2-Butanone)	MEDIUM[3]	NC
76	108-10-1	Methyl isobutyl ketone	MEDIUM	NC

Item	CAS Number	CHEMICAL NAME	CONSEQUENCE CATEGORY (See Note # 1)	BASIS of CURRENT ministry Standard : NC: Non Carcinogenicity – based C: Carcinogenicity-based (See Note # 2)
77	624-83-9	Methyl isocyanate	MEDIUM	NC
78	80-62-6	Methyl methacrylate	MINOR	NC
79	75-09-2	Methylene chloride (Dichloromethane)	MEDIUM	C
80	N/A	Milk powder	MINOR	NC
81	N/A	Mineral Spirits	MEDIUM	NC
82	74-89-5	Monomethyl amine	MINOR	NC
83	142-82-5	n-Heptane	MINOR	NC
84	110-54-3	n- Hexane (mixture)	MEDIUM	NC
85	110-54-3	n- Hexane (n-Hexane and Hexane isomers only)	MEDIUM	NC
86	7440-02-0	Nickel and Nickel Compounds	MAJOR	NC/C
87	13463-39-3	Nickel carbonyl	MAJOR	C
88	7697-37-2	Nitric acid	MEDIUM	NC

Item	CAS Number	CHEMICAL NAME	CONSEQUENCE CATEGORY (See Note # 1)	BASIS of CURRENT ministry Standard : NC: Non Carcinogenicity – based C: Carcinogenicity-based (See Note # 2)
89	139-13-9	Nitrilotriacetic acid	MEDIUM	C
90	10102-44-0	Nitrogen oxides	MEDIUM	NC
91	10028-15-6	Ozone	MEDIUM	NC
92	19624-22-7	Pentaborane	MEDIUM	NC
93	127-18-4	Perchloroethylene (Tetrachloroethylene (PERC))	MEDIUM	NC
94	108-95-2	Phenol	MEDIUM	NC
95	75-44-5	Phosgene	MEDIUM	NC
96	7664-38-2	Phosphoric acid (as P205)	MEDIUM	NC
97	85-44-9	Phthalic anhydride	MINOR	NC
98	78-87-5	Propylene dichloride	MINOR	NC
99	75-56-9	Propylene oxide	MEDIUM	C
100	7440-22-4	Silver	MINOR	NC

Item	CAS Number	CHEMICAL NAME	CONSEQUENCE CATEGORY (See Note # 1)	BASIS of CURRENT ministry Standard : NC: Non Carcinogenicity – based C: Carcinogenicity-based (See Note # 2)
101	100-42-5	Styrene	MEDIUM	NC
102	7446-09-5	Sulphur dioxide	MAJOR	NC
103	7664-93-9	Sulphuric acid	MEDIUM	NC
104	N/A	Suspended particulate matter (< 44 um diameter)	MEDIUM	NC
105	13494-80-9	Tellurium - excluding hydrogen telluride	MEDIUM	NC
106	109-99-9	Tetrahydrofuran	MEDIUM	NC
107	7440-31-5	Tin	MINOR	NC
108	7440-32-6	Titanium	MINOR	NC
109	108-88-3	Toluene	MEDIUM	NC
110	584-84-9	Toluene diisocyanate (2,4-Toluene diisocyanate (TDI))	MEDIUM	NC
111	26471-62-5	Toluene diisocyanates, 2,4 and 2,6-TDI (mixed isomers)	MEDIUM	NC
112	71-55-6	Trichloroethane, 1,1,1,- (Methyl chloroform)	MEDIUM	NC

Item	CAS Number	CHEMICAL NAME	CONSEQUENCE CATEGORY (See Note # 1)	BASIS of CURRENT ministry Standard : NC: Non Carcinogenicity – based C: Carcinogenicity-based (See Note # 2)
113	79-01-6	Trichloroethylene (TCE)	MEDIUM	C
114	76-13-1	Trifluorotrichloroethane	MAJOR ENV	NC
114.1	7440-61-1	Uranium and Uranium Compounds in particulate matter that is less than 10 µm in diameter	MEDIUM	NC
115	7440-62-2	Vanadium	MEDIUM	NC
116	75-01-4	Vinyl chloride	MAJOR	C
117	75-35-4	Vinylidene chloride (1,1-Dichloroethene)	MEDIUM	NC
118	1330-20-7	Xylenes (mixed isomers)	MINOR	NC
119	7440-66-6	Zinc	MINOR	NC

Notes:

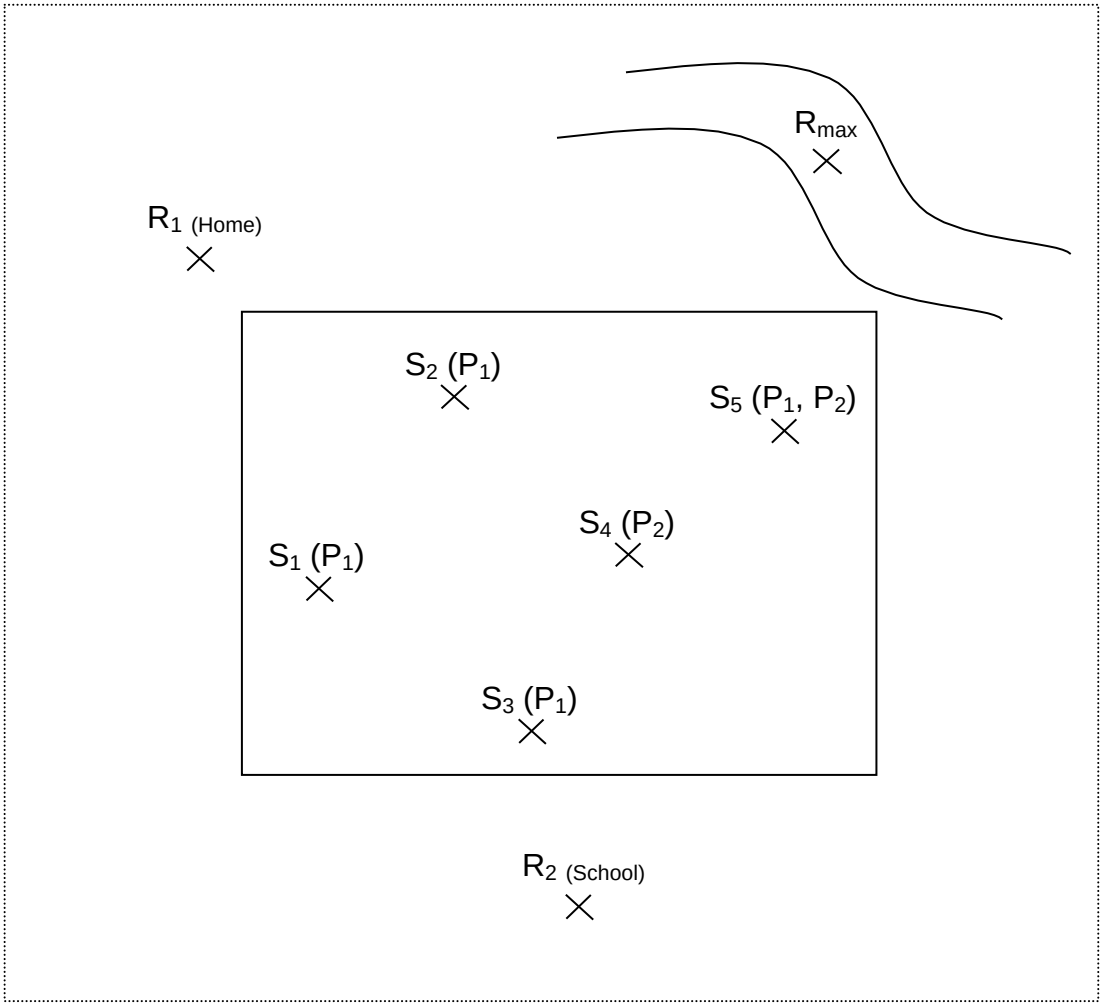
#1: These Consequence Category assignments are intended for use with the optional scoring method described in this Appendix B to this Guide. The categories designated as 'MINOR', 'MEDIUM' or 'MAJOR' all refer to Health categories in Table B-1. If category is followed by 'ENV' then the category refers to Environmental categories in Table B-1.

#2: This column identifies the basis of the current standard or the limiting effect. For substances with no Upper Risk Thresholds identified in Schedule 6 of O. Reg. 419, this basis designation may provide guidance as to the level of the Upper Risk Threshold as per section 3.0 of GIASO.

#3: These substances were classified as 'medium' even though the limiting effects of the standard were reproductive effects. This was done in light of the lack of definitive human evidence for developmental/reproductive effects and the relatively large magnitude of the standards (i.e., > 1000 ug/m^3). In cases, where exceedences of these standard occur by more than 2-fold, the consequence categories may have to be reassessed for those specific situations.

APPENDIX C: Example of Scoring System

A sample facility layout is presented below, where the sources and associated contaminants being emitted are identified, along with neighbouring receptors.



Where:

R – Receptor
S – Source
P – Pollutant or Contaminant
$S_1(P_1)$ – Source # i, emitting Contaminant i
R_{max} – Maximum modelled POI concentration

Example: One Contaminant

This example illustrates the use of the scoring method.

Identify Contaminant(s) Exceeding the Ministry Air Standards

The ESDM report identifies contaminants that are exceeding the standard. Identify base-case existing maximum POI concentrations for the contaminant that is the subject of the request for a site-specific standard. Sample data output from the model has been summarized in Table C-1: Count of Exceedences.

Table C-1: Count of Exceedences

POI Co-ordinates		Cmax (ug/m3)	Total Count of 24-hr exceedences in a 5 Yr Period
X	Y		
595	621	50	183
720	380	39.585	132
553	627	35.616	99
753	406	33.587	82
636	615	26.721	43
511	634	22.161	21
740	336	26.041	21
787	433	16.96	4
470	640	19.264	2
820	460	17.114	1
854	487	17.023	1

Identify dominant sources contributing to POI

The contribution of sources to the overall maximum POI can be determined as part of the ESDM report and air dispersion modelling.

Source	Contribution to maximum POI
1	30%
2	25%
3	20%
4	13%
5	12%

Step 1: Identify Technical Options for Contaminants

- Sources: MACT; Top-Down BACT; CCME; Industry Codes of Practice

Table C-2: Pollution Control Options*

Available	Source 1	Source 2	Source 3	Source 4	Source 5

Technology Name					
T_a	T_a	T_a		T_a	
T_b	T_b	T_b	T_b		T_b
T_c	T_c	T_c			
T_d				T_d	
T_e	T_e	T_e	T_e		T_e

** Note: pollution control options for each source include material substitution, process change and add on control. The default technically feasible pollution control strategy is the best of all 3 categories for the source eliminating control strategies using assessment of feasibility.*

Step 2: Eliminate options that are not technically feasible

All options that were considered must be documented in the technology benchmarking report. If some of these options are not technically feasible, then a written rationale to explain why options that are technically feasible for other facilities may not be feasible for this facility is required. There is no assessment of economics at this stage. If economic feasibility is requested to be assessed as part of the request, a separate Economic Feasibility Analysis must be submitted. Factors to consider:

- Plant limitations, etc;
- Operational scenarios; and
- Determine Technically Feasible Pollution Control Strategies/Combinations for the Facility.

Step 3: Rank Technically Feasible Pollution Control Combinations based on POI

- Assess ability to develop pollution control strategies for each source.
- Determine *technically feasible pollution control combinations* for the facility.
- Re-run the air dispersion model for each feasible option to re-evaluate C_{max}.
- Rank Technically Feasible Pollution Control Combinations based on ability to minimize POI.

Step 4: Document Results (with Risk Score (Optional))

From the data, it shows that the POI (maximum) = Cmax = 50 ug/m^3

Optional: Compute the base-case score.

Where: W_{CS} *= consequence category weight*
W_L *= frequency of occurrence*

$$W_L = \frac{183}{5 \times 365} \times 100 = 10\%$$

Assuming W_{CS} =10 and ministry Limit (24 hour average) = 1 ug/m^3

$$R_0 = \frac{50}{1} \times W_{cs} \times W_L$$

= 50 X 10 X 10%

= 50

$$R_{0(BaseCase)} = \left[\frac{GLC_{max-allsources}}{MOE\_Limit} \right] \cdot W_{CS} \cdot W_L$$

e.g., $R_0 = 50$

Assuming:
W_L = 10 %, W_{CS} = 10, ministry Limit = 1 ug/m^3, POI concentration for TC1 = 20 ug/m^3

With these assumptions, the value of the calculated risk score is:

$$R_{TC1} = \left[\frac{GLC_{max-allsources}}{Ministry\_Limit} \right] \cdot w_{CS} \cdot w_L$$

$$R_{TC1} = \frac{20}{1} \times 10 \times 10\% = 20$$

Table B-3: Technically Feasible Pollution Control (TFPC) Combinations

Combination	**Source 1**	**Source 2**	**Source 3**	POI	Risk Score	Optional: $\Delta R=R_o-R_i$
TFPC Combination 1	$T_e(S_1)$	$T_e(S_1)$	$T_c(S_1)$	20	20	50-20=30
TFPC Combination 2	$T_c(S_2)$	$T_e(S_2)$	$T_c(S_2)$	40	40	50-40=10
TFPC Combination 3	$T_e(S_3)$		$T_b(S_3)$	30	30	50-30=20

Rank technically feasible pollution control combinations based on POI concentrations as well as Risk Scores: 1) TFPC Combination 1; 2) TFPC Combination 3; and 3) TFPC Combination 2. Hence, TFPC Combination 1 is the preferred option and must be used because it reduces the POI concentration to get as close to the standard as possible. It also has the lowest risk score. Note: even it had a higher risk score, the Regulation would still require it be chosen since it produces the lowest POI concentration.

Results should be documented and reported in the technology benchmarking report.