Emission Summary and Dispersion Modeling Report

Executive Summary - DRAFT

The Owens Corning Guelph Glass facility is requesting a site specific annual standard for hexavalent chromium under Section 32 of Ontario Regulation 419/05: Air Pollution – Local Air Quality (O. Reg. 419/05). The facility is located at 247 York Road, Guelph, Ontario in the Township of Guelph/Eramosa and Wellington County. This Emission Summary and Dispersion Modeling Report (EDSMR) is a required element of Owens Corning's request.

The facility produces textile glass yarn and fiberglass for reinforcements for commercial and industrial markets worldwide. This facility is the sole producer of fiberglass for reinforcements in Ontario and Canada and has been operating in Guelph since 1951. Due to the nature of the process, the facility operates continuously 24 hours per day, 365 days per year. The facility currently processes approximately 22,000 tonnes of molten glass per year.

Glass fibers are produced by melting raw materials in gas fired furnaces and transporting the molten glass through forehearth channels to "bushings" where it is mechanically pulled to form the fibers. Subsequently, the fibers are used to make glass yarns, mat and reinforcements. The raw materials used to manufacture these high-tech glass fibers consist of dry solids, in powder and granular form, including clay, sand, limestone, dolomite and nepheline syenite (a naturally occurring igneous rock). The glass melting and molten glass transport structures utilize chromic oxide refractory of which an extremely small fraction is transformed into hexavalent chromium and emitted to atmosphere.

Ontario provincial air standards (established by O.Reg. 419/05) are based on scientific data and risk assessments. On July 1, 2016, a new hexavalent chromium air standard will come into effect. The future standard has been set at 0.00014 micrograms per cubic meter ($\mu g/m^3$) on an annual average basis. The standard is protective of human health. This new air standard represents a 99% reduction from the current standard for hexavalent chromium.

The MOECC recognizes that some facilities will not meet the standards on the July 1, 2016 effective date because of unique technical challenges and related economic limitations. To address this problem, the regulation allows facilities to establish an **interim site specific standard**. The MOECC approves the site specific standard and closely oversees the facility's progress using a risk management framework. The Guideline for the Implementation of Air Standards in Ontario (GIASO) and the Guide to Requesting an Alternative Air Standard are the primary Ministry documents that describe the risk-based process for setting a site specific air standard.

An interim site-specific standard is a modeled air concentration at a selected "Point of Impingement" (POI) developed and approved using site-specific emissions, meteorological data, and an approved air dispersion model, combined with a site-specific Action Plan. This compliance approach focuses on actions the facility can take to reduce hexavalent chromium concentrations to the extent possible, taking into consideration available technology, best practices and economic feasibility. A site specific standard is an interim standard established for a specific period of time to ensure continued review of available and feasible technologies.

Several documents are provided as part of the request for a site specific standard. These documents include the:

- Emission Summary and Dispersion Modeling Report (ESDMR)
- Technical Benchmarking Report,
- Economic Feasibility Study, and
- Action Plan for achieving the lowest air concentrations possible considering both technical and economic feasibility.

For the Owens Corning Guelph facility, emission estimates for hexavalent chromium are based on validated source testing conducted in 2014 on all sources of hexavalent chromium including the glass melting furnace, forehearths and furnace hall general ventilation. These emission estimates were then modeled using the AERMOD air dispersion model version 14134 and a 5 year site specific meteorological data set processed by the MOECC in accordance with Section 7 and Section 13 approvals. The results of this modeling indicated that the facility would not meet the future hexavalent chromium standard.

For the purpose of requesting a site specific standard for hexavalent chromium, Section 20 and schedule 3 of Regulation 419/05 are considered to apply for this contaminant.

The Action Plan for the Owens Corning Guelph Glass Plant incorporates a significant re-configuration of the glass melting process in 2016 to address global marketplace requirements. This re-configuration opens a window of opportunity for the expansion of recently prototyped technologies for the forehearths which will result in a reduction of the generation of hexavalent chromium in the process. Additionally as part of the facility reconfiguration process, several process exhausts will undergo re-engineering in order to optimize dispersion. These improvements will be implemented prior to July 1, 2016.

The following table summarizes the current facility emissions and POI concentrations as well as the post-Action Plan concentrations.

Emission Summary Table – Owens Corning Guelph Glass Plant - DRAFT

Contaminant	Location of Point of Impingement (POI) [1]	Avg. Time	Air Dispersion Model	Emission Rate (g/s)	Max. Modelled Conc. (ug/m^3)	MOE POI Criteria (ug/m^3)	Limiting Effect	Regulation Schedule No.	% of Criteria
Hexavalent Chromium (Current)	Off property [2]	24-hr	AERMOD	0.00024	0.0815	0.07	Health	Schedule 6	> URT [3]
	Sensitive receptor	24-hr	AERMOD	0.00024	0.0133	0.07	Health	Schedule 6	< URT
	Off property	Annual	AERMOD	0.00024	0.0208	--	--	--	--
	Sensitive receptor	Annual	AERMOD	0.00024	0.0016	--	--	--	--
Hexavalent Chromium [4] (After Action Plan)	Off property	Annual	AERMOD	0.00017	0.0024	--	--	--	--
	Sensitive receptor	Annual	AERMOD	0.00017	0.0006	--	--	--	--
PM - PARTICULATE MATTER	Off property	1/2 hr	Reg 346	0.8302	68.053	100	visibility	Schedule 2	68%
NITROGEN OXIDES	Off property	1/2 hr	Reg 346	3.7775	341.8	500	health	Schedule 2	68%
SULPHUR DIOXIDE	Off property	1/2 hr	Reg 346	1.6800	157.6	830	health	Schedule 2	19%
CARBON MONOXIDE	Off property	1/2 hr	Reg 346	0.0580	5.439	6000	health	Schedule 2	0.1%
ZINC OXIDE	Off property	1/2 hr	Reg 346	0.1002	9.398	100	particulate	Schedule 2	9%
HYDROGEN FLUORIDE [6]	Off property	1/2 hr	Reg 346	0.0173	1.625	4.3	vegetation	Schedule 2	38%
HYDROGEN CHLORIDE	Off property	1/2 hr	Reg 346	0.0104	0.975	60	health	Schedule 2	2%
METHANOL (METHYL ALCOHOL)	Off property	1/2 hr	Reg 346	0.5396	50.61	12000	health	Schedule 2	0.4%
ETHANOL (ETHYL ALCOHOL)	Off property	1/2 hr	Reg 346	0.4978	46.68	19000	odour	1/2 hr Guideline	0.2%
TOLUENE	Off property	1/2 hr	Reg 346	0.0215	2.017	2000	odour	Schedule 2	0.1%
ACETIC ACID	Off property	1/2 hr	Reg 346	0.5339	50.06	2500	odour	Schedule 2	2%
Dibromoacetonitrile	Off property	1/2 hr	Reg 346	0.0008	0.072	39.6		Half hour JSL	0.2%
SILICA-RESPIRABLE (<10um)	Off property	1/2 hr	Reg 347	0.0363	0.877	15	health	1/2 hr Guideline	6%
Chromium (Di-,Tri-,metallic)	Off property	1/2 hr	Reg 348	0.0007	0.064	1.5	health	Schedule 2 [5]	4%

[1] The maximum concentration for all off property locations occurs on the facility property line.

[2] The maximum POI location is on the property line. Only 2 receptors (on the property line) are above the 24 hr criteria.

[3] URT refers to the upper risk threshold which is not a standard

[4] Owens Corning is applying for a site specific standard for hexavalent chromium

[5] Future (July 1, 2016) standard (more stringent than the current standard)

[6] assessed against the most stingent criteria for Gaseous Growing Season