Action Plan
Hexavalent Chromium
Owens Corning Composite Materials Canada LP
Guelph Plant
Revision 1

Prepared for: Owens Corning Composite Materials Canada LP

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1. Introduction

1.1 Background

In 2011, O.Reg. 419/05 was amended to introduce new air standards for a number of compounds including hexavalent chromium along with a 5 year phase in period for these standards. 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.

O.Reg. 419/05 contains provisions to request a Site Specific Standard for a contaminant listed in Schedule 3 if a facility is unable to demonstrate compliance with the air standard by July 1, 2016. Air dispersion modeling indicates that the facility would not meet the future hexavalent chromium standard and that a site-specific standard is necessary, therefore the Owens Corning Guelph facility is requesting a Site Specific Standard for hexavalent chromium. The Action Plan is a required element of an application for a Site Specific Standard.

1.2 Purpose

This Action Plan Report has been prepared to support the Owens Corning Guelph Glass request for 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 report has been prepared in accordance with the methodology provided by the MOECC in the document "*Guide to Requesting an Alternative Air Standard*" (GRAAS), December, 2007, to meet the requirement of Section 33(4) sub paragraph 4. The Action Plan identifies and provides the timing for the planned steps that will be implemented to reduce point of impingement (POI) concentrations of hexavalent chromium.

The facility has completed the required elements of a Technology Benchmarking Report (TBR) identifying all commercially available and technically feasible emission control technologies (and combinations of technologies) to reduce the concentrations of hexavalent chromium. The resulting pollution control strategies that can reduce the maximum predicted POI concentration were then assessed using an Economic Analysis methodology acceptable to the MOECC. The Economic Feasibility Report is a companion document included in the Site Specific Standard application.

Several of the technically feasible pollution control strategies that are predicted to achieve some reductions in predicted POI concentrations were excluded from further consideration due to the outcome of the economic feasibility assessment.

These assessments were used to determine the most appropriate pollution control option combination (Action Plan) for the facility.

The objectives of this Action Plan Report are to:

- Identify the pollution control combination selected to reduce hexavalent chromium POI concentrations
- Provide timelines associated with the action plan commitments

2. Facility Description

The Owens Corning facility is located at 247 York Road in Guelph Ontario. 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.

Detailed process descriptions and documentation of emission estimates are located in the Emission Summary and Dispersion Modeling (ESDM) Report.

3. Preferred Pollution Control Combination Implementation

The economic assessment indicated that none of the technically feasible pollution control strategies would be considered a reasonably effective use of resources to achieve the POI improvements predicted. However, Owens Corning is committed to reducing POI concentrations of hexavalent chromium, and has selected a combination of options for implementation that are expected to reduce the predicted off-site POI concentration more than 85% by the middle of 2016. The facility has selected this option for implementation and therefore it is the Preferred Option.

In addition to the assessment of reduction options related to the hexavalent chromium emissions as part of the technology benchmarking and Site Specific Standard Request, the facility has a planned facility reconfiguration. In the first half of 2016, the facility will be investing approximately $10 million dollars to rebuild a furnace that has been out of service for several years, and to focus their operations on the Continuous Filament Mat (CFM) line. The Chopped Strand Mat (CSM) line will be taken out of service, which will result in the shutdown of the 107 furnace and the removal of a section of conventional forehearth. Owens Corning is requesting a site specific standard for a 10 year time span to reflect the investment and operation cycle of the furnace which dictates that 2026 will be the next available opportunity to install new reduction technologies.

The action plan includes the installation of state of the art gas and oxygen flow measurement and flow metering on all sections of the forehearth. This will provide improved control of the combustion ratio which impacts the combustion atmosphere by reducing excess oxygen which contributes to the formation of hexavalent chromium. Improved channel superstructure techniques are also needed to prevent air ingress into the controlled combustion atmosphere. The improved construction technique has been referred to previously as ‘construction of front end superstructures’.

In addition to the installation of the above technologies, four exhaust stacks will be re-engineered as part of the action plan. When the 105 furnace rebuild occurs in 2016, the two historical stacks (B24/B25) associated with that furnace will be re-used with several modifications including height extensions and velocity cones. Only one forehearth stack (B38) will remain in service after the reconfiguration and action plan implementation. This new/modified stack will be designed with additional height to mitigate dispersion challenges related to the specific building influences at this facility.

With the rebuild of the historical 105 furnace, a general ventilation exhaust fan near the furnace is needed to remove excess radiant heat from the furnace. The new general ventilation exhaust (B33) is being designed to discharge at a higher elevation with increased exit velocity for improved dispersion. The operational life span of the remaining furnace hall general ventilation exhausts will be reviewed

regularly and replaced with re-engineered exhausters to improve dispersion as needed.

The majority of the Action Plan commitments are scheduled for completion prior to the middle of 2016 which will achieve a significant reduction in POI concentrations (greater than 85%). However, Owens Corning is also committing to conducting source testing to verify the anticipated hexavalent chromium reductions from the forehearth technology installation. This will occur within two years of installing the technology.

Owens Corning has made significant progress in research and development of technologies to better understand and prevent the formation of hexavalent chromium in the process. The technologies being installed as part of the Action Plan have been developed in the last 5 - 7 years.

Owens Corning will continue to evaluate and, where feasible, implement new technologies to prevent formation of hexavalent chromium at the source and limit emissions. This includes researching the impact of alternative combustion systems in the forehearths on formation of hexavalent chromium and the feasibility of alternative refractory materials.

Technology is changing at a fast pace and Owens Corning will continue to monitor for the development / emergence of technologies that decrease formation or improve capture of hexavalent chromium emissions over the next 8-10 years.

The following table provides a summary of the Action Plan commitments and timelines.

Action Plan Summary

Timeline	Actions
Early 2016	Replace the existing furnace (107) with a new smaller furnace (105) with improved technology. Install state of the art combustion controls system and use improved construction techniques on all remaining sections of the process (forehearths). Re-engineer the following stacks to overcome site specific dispersion challenges: • furnace stacks (B24/25) • forehearth stack (B38) • general ventilation exhauster for the new furnace (B33)
2017 - 2018	Evaluate reductions using source testing.
Ongoing 2017- 2026	Review operational life span of the remaining furnace hall general ventilation exhausters and replace with re-engineered exhausters to improve dispersion.
Ongoing 2015 - 2023	Continue to evaluate, research and implement new technologies to prevent formation of hexavalent chromium at the source and limit emissions including: • research impact of alternative combustion technologies in the forehearths on formation of hexavalent chromium • **monitor the technical effectiveness of further combustion control improvements and/or changes including oxygen combustion, air combustion and electric heat** • **drive innovation with suppliers of refractory materials including chrome, zircon, and other future potential materials** • explore the development/emergence of technologies that decrease formation or improve capture of hexavalent chromium emissions

4. Statement of Limitations

LEHDER Environmental Services Limited ("LEHDER") prepared this report ("Report"), for the sole benefit and exclusive use by Owens Corning Composite Materials Canada LP, Guelph Facility.

LEHDER has performed the work as described in the Scope of Work and, made the findings and conclusions set out in the Report in a manner consistent with the level of care and skill normally exercised by members of the environmental science profession practicing under similar conditions at the time the work was performed.

In preparing this Report, LEHDER has relied in good faith on information provided by others as noted in this Report and has assumed the information provided by those individuals is both factual and accurate.

The material in this report reflects LEHDER's best judgement in light of the information available to it at the time of preparing the Report. Any use which a third party makes of the Report, or any reliance on or decisions made based on it, are the responsibility of such third parties. LEHDER accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on the Report.