EMISSION SUMMARY AND DISPERSION MODELLING REPORT FOR THE CARMEUSE DUNDAS OPERATIONS

FINAL REPORT

April 13, 2023

Prepared for:
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Dundas Operations
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Project Number:
160930424

Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by Carmeuse Lime (Canada) Limited (Carmeuse) to prepare an Emission Summary and Dispersion Modelling (ESDM) Report for Carmeuse's facility located at 600 Highway #5 near Dundas, Ontario. Carmeuse operates a lime manufacturing facility which converts limestone to lime by heating the stone in three horizontal rotary lime kilns. The existing Environmental Compliance Approval for the Dundas Operations permits Carmeuse to burn coal, petroleum coke (petcoke), natural gas, and fuel oil in the kilns.

This ESDM Report is an update to the existing ESDM Report, prepared in support of the application for Site-Specific Standards (SSS) submitted to the Ministry of the Environment, Conservation and Parks (Ministry) in 2016. The purpose of the update was to confirm compliance with current air quality limits and the new limit for Sulphur Dioxide which will become effective on July 1, 2023, utilizing the regulatory-approved air dispersion model (AERMOD). The Dundas Operations currently have Site-Specific Standards for Calcium Oxide (CaO) and Total Suspended Particulate Matter (TSP) approved under Section 35(1) of Ontario Regulation 419/05 in place until February 23, 2028.

A facility-wide emission inventory was developed based on the up-to-date information for facility operations, sources, and materials. The AERMOD (version 19191) dispersion model was used to predict the maximum ground level concentration of each significant contaminant. Compliance was assessed utilizing the O. Reg. 419/05 Schedule 3 air quality standards and other applicable criteria in the Ministry's Air Contaminant Benchmarks List (ACB List). A maximum operating scenario, which assumes all equipment at the facility are operating at their maximum production rate, was developed. All dispersion modelling was conducted using this maximum emissions scenario, which provides conservative (*i.e.,* over-estimates) predictions of off-property impacts relative to the actual facility operations, which have not operated at maximum annual capacity in over 15 years.

Table ES.1 provides the Emission Summary Table which shows that the predicted maximum off-property ground-level concentrations (GLC) are below their respective Point of Impingement criteria for the maximum operating scenario. It has been demonstrated that the Carmeuse Dundas Operations can operate in compliance with applicable air quality criteria.

Table ES.1 Emission Summary Table

Contaminant	CAS No.	Total Facility Emission Rate (g/s)	Air Dispersion Modelling Approach	Maximum POI Concentration (ug/m^3)	Averaging Period (hour)	MECP POI Limit (ug/m^3)	Limiting Effect	POI Limit Reference (Note 1)	Percent of Criteria (%)
Nitrogen Oxides	10102-44-0	2.53E+01	AERMOD	32.8	1	400	Health	Standard	8%
Nitrogen Oxides	10102-44-0	2.53E+01	AERMOD	15.4	24	200	Health	Standard	8%
Carbon Monoxide	630-08-0	1.59E+01	AERMOD	25.0	0.5	6000	Health	Standard	<1%
Carbon Dioxide	124-38-9	2.32E+04	AERMOD	14088	24	255800	Visibility	Standard	6%
Total Suspended Particulate Matter (<44 µm diameter)	N/A	4.61E+00	AERMOD	138	24	187	Visibility	SSS	74%
PM_{10} - Particulate Matter (<10 µm diameter)	N/A1	9.12E-01	AERMOD	1.2E+00	24	50	Visibility	Standard	2%
Sulphur Dioxide	7446-09-5	7.00E+01	AERMOD	90.4	1	100	Health & Vegetation	Standard	90%
Sulphur Dioxide	7446-09-5	7.00E+01	AERMOD	3.3	8760	10	Health & Vegetation	Standard	33%
Arsenic	7440-38-2	4.14E-04	AERMOD	0.1	24	0.3	Health	Guideline	17%
Manganese	7439-96-5	6.07E-04	AERMOD	0.1	24	0.4	Health	Standard	13%
Nickel	7440-02-0	1.65E-04	AERMOD	4.90E-04	8760	0.04	Health	Standard	1%
Hydrogen Chloride	7647-01-0	2.03E+00	AERMOD	1.23E+00	24	20	Health	Standard	6%
Benzo(a)pyrene	50-32-8	6.43E-08	AERMOD	3.00E-09	8760	0.00001	Health	Standard	<1%
Biphenyl	92-52-4	4.23E-02	AERMOD	5.47E-02	1	60	Odour	Guideline	<1%
Naphthalene	91-20-3	2.20E-01	AERMOD	4.70E-01	0.167	50	Health Odour	Guideline	<1%
Naphthalene	91-20-3	2.20E-01	AERMOD	1.34E-01	24	22.5	Health Odour	Guideline	<1%
Acrolein	107-02-8	4.91E-04	AERMOD	6.30E-04	1	4.5	Health	Standard	<1%
Acrolein	107-02-8	4.91E-04	AERMOD	3.00E-04	24	0.4	Health	Standard	<1%
Benzene	71-43-2	2.20E-03	AERMOD	1.00E-04	8760	0.45	Health	Standard	<1%
Benzene	71-43-2	2.20E-03	AERMOD	3.46E-03	0.5	300	Health	URT	<1%
Benzene	71-43-2	2.20E-03	AERMOD	1.33E-03	24	100	Health	URT	<1%
Benzyl chloride	100-44-7	1.18E-03	AERMOD	7.20E-04	24	0.102	Health	SL-JSL	<1%
Cyanide	74-90-8	4.23E-03	AERMOD	2.57E-03	24	8	Health	Standard	<1%
Dimethyl sulfate	77-78-1	8.12E-05	AERMOD	5.00E-05	24	0.1	*de minimus*	*de minimus*	<1%
Methyl hydrazine	60-34-4	2.88E-04	AERMOD	1.70E-04	24	0.05	Health	SL-JSL	<1%
Dioxin and Furans Toxicity Equivalency Quotient (TEQ)	D/F	8.85E-10	AERMOD	1.15E-09	24	1.00E-07	Health	Standard	1%
Calcium Oxide	1305-78-8	1.66E+00	AERMOD	47.8	24	73	Corrosion	SSS	65%
Magnesium Oxide	1309-48-4	8.63E-01	AERMOD	32.4	24	120	Particulate	Standard	27%

Notes:

1. References to POI Limits:
Standard - O. Reg. 419/05 Schedule 3 Standard with variable averaging times to be used with AERMOD dispersion model.
Guideline - Guideline Level
JSL - Jurisdictional Screening Levels
SSS - Dundas Site-Specific Standard
de minimus - For contaminants without other POI limits