St. Marys Cement Inc. (Canada)
Bowmanville Facility

Annual Compliance Report 2024
(ECA No. 0550-CEAHMA)

Site Location:

410 Bowmanville Avenue
Bowmanville, Ontario
L1C 7B5

June 2025

INTRODUCTION

This annual compliance report has been prepared by St. Marys Cement Inc. (Canada) (SMC) in accordance with Condition 16.1 of their Environmental Compliance Approval (ECA No.0550-CEAHMA, dated September 19, 2022) for their cement plant located at 410 Bowmanville Avenue in Bowmanville, Ontario (Bowmanville Facility) for the 2024 calendar year.

Condition 16.1 of the ECA states that:

Excerpt from the ECA

"The Company shall prepare and submit by June 30 of each year to the District Manager, an Annual Report summarizing the operation of the Facility, covering the previous calendar year. The Annual Report shall include, as a minimum, the following information:

- *a) a statement of whether the Facility was in compliance with this Approval, including compliance with the Performance Limits;*
- *b) the Emission Summary Table and Acoustic Assessment Summary Table for the Facility as of December 31 from the previous calendar year;*
- *c) clinker and cement production in tonnes per year;*
- *d) maximum daily feed rate and average daily feed rate of Alternative Low-Carbon Fuels and Conventional Fuels in the Cement Kiln for each month of the preceding calendar year, and the weight percentage of each category of Alternative Low-Carbon Fuels approved under Condition 7 of this Approval, of the total monthly Alternative Low-Carbon Fuel used.*
- *e) maximum and average percent thermal replacement of Conventional Fuels by combined Alternative Low-Carbon Fuels for each month;*
- *f) a summary of data from CEM System, CPM System, Source Testing and Carbon Dioxide Emission Intensity testing described under conditions 10.3(a) and (b), 11 and 12 of this Approval, and a description of the status of compliance with the Performance Limits, Alternative Low-Carbon Fuel definition under this Approval and Alternative Low-Carbon Fuels operational requirements described in Schedule E of this Approval;*
- *g) a summary of dates, duration and reasons for any operational events including but not limited to events described in condition 8.7 of this Approval that may have negatively impacted the quality of the environment and corrective measures taken to address these impacts;*
- *h) details of environmental complaints including a summary of complaints received, causes of complaints and action taken to avoid the recurrence of similar incidents, as described in condition 14 of this Approval."*

This report has been divided into eight separate sections (Sections A to H) to address Conditions 16.1 a) through h), respectively, as described above.

SECTION A

This Section addresses Condition 16.1a) of the ECA described as below:

“Statement of whether the Facility was in compliance with this Approval, including compliance with the Performance Limits.”

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St Marys Cement
410 Bowmanville Avenue, Bowmanville, Ontario L1C 7B5
Tel 905 623 3341, Fax 905 623 4695
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May 5, 2024

Ministry of the Environment, Conservation and Parks
Director, Client Services and Permissions Branch
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

Re: Statement of Facility Operations within Performance Limits
Environmental Compliance Approval with Limited Operational Flexibility
(ECA Number 0550-CEAHMA)

This is to confirm that St. Marys Cement Inc. (Canada)'s (St. Mary's) Bowmanville Cement Plant, located at 410 Bowmanville Avenue in Bowmanville, Ontario, during the 2024 Calendar Year, operated in material compliance with Section 9 of the Environmental Protection Act, and with the conditions of our Environmental Compliance Approval (ECA) with Limited Operational Flexibility (LOF), including the Performance Limits set forth in Condition 4 of the ECA with the exception of the following

- Exceedance of the URT and B1 of SO_2 1-Hr; and
- Exceedance of the B1 of NO_x 1-Hr and 24-Hr.

The facility is currently working with the MECP on NO_x and SO_2 abatement plans.

Sincerely,

5/5/25

Joe Frost
Environmental Manager
Bowmanville Cement Plant

Mobile: 416-908-9992
joe.frost@vcimentos.com
410 Bowmanville Avenue, Bowmanville, Ontario L1C7B5

SECTION B

This Section addresses Condition 16.1b) of the ECA described as below:

“The Emission Summary Table and Acoustic Assessment Summary Table for the Facility as of December 31 from the previous calendar year”.

Table 1. Emission Summary Table

Contaminant	CAS Number	Total Facility Emission Rate [g/s]	Air Dispersion Model Used	Max. POI Conc. [µg/m³](1)	MECP Limit						Percentage of MECP POI Limit [%]
					Avg. Period Emission Rate	Avg. Period POI Concentration	Value [µg/m³]	Limiting Effect	ACB Source(2)	Category	
Criteria Air Contaiminants											
PM	PM	1.57E+01	AERMOD v22112 & CALPUFF v7.3.2	9.83E+01	24 hr	24 hr	120	Visibility	S	B1	82%
RCS	14808-60-7	2.14E-01	AERMOD v22112	3.49E+00	24 hr	24 hr	5	Health	G	B1	70%
Nitrogen Oxides	10102-44-0	9.21E+01	AERMOD v22112 & CALPUFF v7.3.2	2.10E+02	1 hr	1 hr	400	Health	S	B1	53%
Nitrogen Oxides	10102-44-0	9.15E+01	AERMOD v22112 & CALPUFF v7.3.2	1.21E+02	24 hr	24 hr	200	Health	S	B1	60%
Sulphur Dioxide	7446-09-5	8.78E+00	AERMOD v22112 & CALPUFF v7.3.2	3.94E+01	1 hr	1 hr	100	Health & Vegetation	S	B1	39%
Sulphur Dioxide	7446-09-5	8.78E+00	AERMOD v22112 & CALPUFF v7.3.2	3.10E+00	Annual	Annual	10	Health & Vegetation	S	B1	31%
Carbon Monoxide	630-08-0	1.27E+02	AERMOD v22112 & CALPUFF v7.3.2	3.74E+03	1 hr	0.5 hr	6000	Health	S	B1	62%
Hydrogen Chloride	7647-01-0	1.90E+00	CALPUFF v7.3.2	1.68E+00	24 hr	24 hr	20	Health	S	B1	8%
Ammonia	7664-41-7	6.94E+00	CALPUFF v7.3.2	6.13E+00	24 hr	24 hr	100	Health	S	B1	6%
Metals											
Antimony	7440-36-0	1.47E-05	AERMOD v22112 & CALPUFF v7.3.2	3.00E-04	24 hr	24 hr	25	Health	S	B1	<0.1%
Arsenic	7440-38-2	3.30E-04	AERMOD v22112 & CALPUFF v7.3.2	2.05E-03	24 hr	24 hr	0.3	Health	G	B1	1%
Barium	7440-39-3	3.74E-03	AERMOD v22112 & CALPUFF v7.3.2	2.75E-02	24 hr	24 hr	10	Health	G	B1	0.3%
Beryllium	7440-41-7	5.69E-05	AERMOD v22112 & CALPUFF v7.3.2	1.34E-04	24 hr	24 hr	0.01	Health	S	B1	1%
Cadmium	7440-43-9	6.86E-05	AERMOD v22112 & CALPUFF v7.3.2	2.06E-04	24 hr	24 hr	0.025	Health	S	B1	1%
Chromium	7440-47-3	3.56E-03	AERMOD v22112 & CALPUFF v7.3.2	1.02E-02	24 hr	24 hr	0.5	Health	S	B1	2%
Cobalt	7440-48-4	2.12E-04	AERMOD v22112 & CALPUFF v7.3.2	2.25E-03	24 hr	24 hr	0.1	Health	G	B1	2%
Iron	7439-89-6	2.37E-01	AERMOD v22112 & CALPUFF v7.3.2	3.27E+00	24 hr	24 hr	4	Health & Soiling	S	B1	82%
Ferric Oxide	1309-37-1	3.38E-01	AERMOD v22112 & CALPUFF v7.3.2	4.68E+00	24 hr	24 hr	25	Health & Soiling	S	B1	19%
Lead	7439-92-1	2.52E-03	AERMOD v22112 & CALPUFF v7.3.2	5.52E-03	24 hr	24 hr	0.5	Health	S	B1	1%
Lead	7439-92-1	2.52E-03	AERMOD v22112 & CALPUFF v7.3.2	2.13E-03	24 hr	30 day	0.2	Health	S	B1	1%
Manganese	7439-96-5	3.05E-02	AERMOD v22112 & CALPUFF v7.3.2	7.04E-02	24 hr	24 hr	0.4	Health	S	B1	18%
Mercury	7439-97-6	7.54E-04	AERMOD v22112 & CALPUFF v7.3.2	7.62E-04	24 hr	24 hr	2	Health	S	B1	<0.1%
Nickel	7440-02-0	4.33E-03	AERMOD v22112 & CALPUFF v7.3.2	5.59E-03	Annual	Annual	0.04	Health	S	B1	14%
Nickel	7440-02-0	4.33E-03	AERMOD v22112 & CALPUFF v7.3.2	5.59E-03	24 hr	Annual	0.4	Health	MECP bulletin	AAV	1%
Nickel	7440-02-0	4.33E-03	AERMOD v22112 & CALPUFF v7.3.2	5.10E-02	24 hr	24 hr	2	Health	MECP bulletin	URT/DAV	3%
Selenium	7782-49-2	5.70E-04	AERMOD v22112 & CALPUFF v7.3.2	6.72E-04	24 hr	24 hr	10	Health	G	B1	<0.1%
Silver	7440-22-4	2.18E-04	AERMOD v22112 & CALPUFF v7.3.2	3.43E-04	24 hr	24 hr	1	Health	S	B1	<0.1%
Tin	7440-31-5	1.50E-04	AERMOD v22112 & CALPUFF v7.3.2	3.74E-03	24 hr	24 hr	10	Health	S	B1	<0.1%
Vanadium	7440-62-2	1.46E-03	AERMOD v22112 & CALPUFF v7.3.2	1.23E-02	24 hr	24 hr	2	Health	S	B1	1%
Volatile Organic Matter											
Acetaldehyde	75-07-0	8.58E-01	CALPUFF v7.3.2	7.58E-01	24 hr	24 hr	500	Health	S	B1	0%
Acetaldehyde	75-07-0	8.58E-01	CALPUFF v7.3.2	4.56E+00	0.5 hr	0.5 hr	500	Health	S	B1	1%
Acrolein	107-02-8	7.24E-02	CALPUFF v7.3.2	6.40E-02	24 hr	24 hr	0.4	Health	S	B1	16%
Acrolein	107-02-8	7.24E-02	CALPUFF v7.3.2	3.17E-01	1 hr	1 hr	4.5	Health	S	B1	7%
Benzene	71-43-2	3.56E-01	CALPUFF v7.3.2	5.39E-02	Annual	Annual	0.45	Health	S	B1	12%
Benzene	71-43-2	3.56E-01	CALPUFF v7.3.2	5.39E-02	24 hr	Annual	4.5	Health	MECP bulletin	AAV	1%
Benzene	71-43-2	3.56E-01	CALPUFF v7.3.2	3.15E-01	24 hr	24 hr	100	Health	MECP bulletin	URT/DAV	0.3%
1,3-Butadiene	106-99-0	6.73E-02	CALPUFF v7.3.2	1.02E-02	Annual	Annual	2	Health	S	B1	1%
1,3-Butadiene	106-99-0	6.73E-02	CALPUFF v7.3.2	1.02E-02	24 hr	Annual	20	Health	MECP bulletin	AAV	<0.1%
1,3-Butadiene	106-99-0	6.73E-02	CALPUFF v7.3.2	5.95E-02	24 hr	24 hr	300	Health	MECP bulletin	URT/DAV	<0.1%
Carbon tetrachloride	56-23-5	1.62E-02	CALPUFF v7.3.2	1.43E-02	24 hr	24 hr	2.4	Health	S	B1	1%
Chloroform	67-66-3	1.62E-02	CALPUFF v7.3.2	1.43E-02	24 hr	24 hr	1	Health	S	B1	1%
Dibromochloromethane	124-48-1	1.62E-02	CALPUFF v7.3.2	1.43E-02	24 hr	24 hr	0.2	Health	SL-JSL	B2	7%
1,2-Dichloroethane	107-06-2	1.62E-02	CALPUFF v7.3.2	1.43E-02	24 hr	24 hr	2	Health	S	B1	1%
1,1-Dichloroethene	75-35-4	1.62E-02	CALPUFF v7.3.2	1.43E-02	24 hr	24 hr	10	Health	S	B1	0.1%
Ethylene dibromide	106-93-4	1.62E-02	CALPUFF v7.3.2	1.43E-02	24 hr	24 hr	3	Health	G	B1	0.5%
Ethylene glycol	107-21-1	4.50E-01	AERMOD v22112	5.35E+00	24 hr	24 hr	12700	Health	G	B1	<0.1%
Phenol	108-95-2	2.28E+00	CALPUFF v7.3.2	2.01E+00	24 hr	24 hr	30	Health	S	B1	7%
Propionaldehyde	123-38-6	2.89E-01	CALPUFF v7.3.2	2.09E+00	10 min	10 min	10	Odour	G	B1	21%
1,1,2,2-Tetrachloroethane	79-34-5	2.41E-04	CALPUFF v7.3.2	2.13E-04	24 hr	24 hr	0.1	Health	SL-JSL	B2	0.2%
Vinyl chloride	75-01-4	1.66E-02	CALPUFF v7.3.2	1.47E-02	24 hr	24 hr	1	Health	S	B1	1%
Polycyclic Aromatic Hydrocarbons (PAHs)											
Acenaphthylene	208-96-8	5.76E-04	CALPUFF v7.3.2	5.09E-04	24 hr	24 hr	0.1	-	-	De Minimus Table B-2A	1%
Acenaphthene	83-32-9	5.71E-04	CALPUFF v7.3.2	5.05E-04	24 hr	24 hr	0.1	-	-	De Minimus Table B-2A	1%
Benzo(a)pyrene	50-32-8	2.54E-05	CALPUFF v7.3.2	3.84E-06	Annual	Annual	0.00001	Health	S	B1	38%
Benzo(a)pyrene	50-32-8	2.54E-05	CALPUFF v7.3.2	3.84E-06	24 hr	Annual	0.0001	Health	MECP bulletin	AAV	4%
Benzo(a)pyrene	50-32-8	2.54E-05	CALPUFF v7.3.2	2.25E-05	24 hr	24 hr	0.005	Health	MECP bulletin	URT/DAV	0.4%
Fluorene	86-73-7	4.88E-04	CALPUFF v7.3.2	4.31E-04	24 hr	24 hr	0.1	-	-	De Minimus Table B-2A	0.4%
2-Methylanthracene	613-12-7	1.08E-03	CALPUFF v7.3.2	9.54E-04	24 hr	24 hr	0.1	-	-	De Minimus Table B-2A	1%
2-Methylnaphthalene	91-67-6	4.17E-02	CALPUFF v7.3.2	3.68E-02	24 hr	24 hr	0.1	-	-	De Minimus Table B-2A	37%
1-Methylphenanthrene	832-69-9	3.46E-03	CALPUFF v7.3.2	3.06E-03	24 hr	24 hr	0.1	-	-	De Minimus Table B-2A	3%
9-Methylphenanthrene	883-20-5	2.11E-03	CALPUFF v7.3.2	1.86E-03	24 hr	24 hr	0.1	-	-	De Minimus Table B-2A	2%
Naphthalene	91-20-3	8.94E-02	CALPUFF v7.3.2	7.90E-02	24 hr	24 hr	22.5	Health	G	B1	0.4%
Naphthalene	91-20-3	8.94E-02	CALPUFF v7.3.2	6.46E-01	10 min	10 min	50	Odour	G	B1	1%
Phenanthrene	85-01-8	5.67E-03	CALPUFF v7.3.2	5.01E-03	24 hr	24 hr	0.1	-	-	De Minimus Table B-2A	5%

Notes:

(1) Modelling of the KILN source was in CALPUFF, while all other sources were modelled in AERMOD. For most contaminants, the sum of the maximum POI concentrations from AERMOD and CALPUFF were conservatively used to estimate the overall maximum POI. PM 24hr, NOx 1hr and SO2 1hr CALPUFF and AERMOD results were merged and then the maximum POI concentrations is reported with meteorological anomalies removed as per MECP Guideline A-10, "Air Dispersion Modelling Guideline for Ontario", Version 3.0, dated January 2016.

(2) ACB Source: "S" - Standard (for Section 20), "G" - Guideline (for Section 20), "SL-JSL" - Screening Level (SL) set by the MECP based on a review of toxicity information and/or other jurisdictional levels (JSL), "SL-PA" - Screening Level - Previously Accepted, "SL-MD" - Screening Level - Ministry Derived.

(3) Category: B1 (Benchmark 1) - Exceedence of a B1 concentration triggers specific actions under O. Reg. 419/05 and is an offence under O. Reg. 1/17.
B2 (Benchmark 2) - Exceedence of a B2 concentration, or if no B2 value exists, triggers a toxicological assessment to determine the likelihood of adverse effect.

DAV and AAV: "DAV" - Daily Assessment Value to be compared against maximum 24-hr POI concentration, "AAV" - Annual Assessment Value to be compared against maximum annual POI concentration but assuming peak 24-hr average emission rate occurs every day in the year, as per MECP technical bulletin: "Using assessment values for contaminants with annual air standards".

URT = Upper Risk Threshold. URTs listed in Schedule 6 of O. Reg. 419/05 are not standards. URTs have separate and distinct regulatory and notification requirements. These requirements are set out in section 30 of O. Reg. 419/05.

(4) MECP's procedure for the removal of meterological anomalies was applied for PM (24 hr), NO_x (1hr), and SO_2 (1hr) (ADMGO, February 2017).

(5) SMC is working on implementing the abatement action plan for nitrogen oxides and sulphur dioxide.

Table A3.1: Acoustic Assessment Summary Table - Non-Emergency Equipment

Point of Reception	Point of Reception Description	Sound Level at Point of Reception, LEQ [dBA]	Performance Limit, LEQ [dBA]	Compliance with Performance Limit	Acoustical Classification Area	Verified by Acoustic Audit
R1	Two storey home approx. 1450 m southeast of cement plant	42	50	Yes	Class 2	No
R3	Non-conforming single storey home approx. 350 m north of cement plant	50	50	Yes	Class 1	No
VL1	Vacant residential lot approx. 1490 m southeast of cement plant	41	50	Yes	Class 2	No

Table A3.2: Acoustic Assessment Summary Table - Emergency Equipment

Point of Reception	Point of Reception Description	Sound Level at Point of Reception, LEQ [dBA]	Performance Limit, LEQ [dBA]	Compliance with Performance Limit	Acoustical Classification Area	Verified by Acoustic Audit
R1	Two storey home approx. 1450 m southeast of cement plant	16	50	Yes	Class 2	No
R3	Non-conforming single storey home approx. 350 m north of cement plant	31	50	Yes	Class 1	No
VL1	Vacant residential lot approx. 1490 m southeast of cement plant	21	50	Yes	Class 2	No

SECTION C

This Section addresses Condition 16.1c) of the ECA described as below:

“Clinker and cement production in tonnes per year”.

St. Mary's Cement
410 Bowmanville Ave, Bowmanville, ON, L1C 7B5

Annual Report Condition 16.1C
Cement and Clinker Production Rates - 2024

Time Period	Total Clinker Production (tonne)	Total cement production (tonne)
Jan	98,311	27,697
Feb	137,014	62,553
Mar	11,844	72,520
Apr	133,583	61,347
May	125,884	73,658
Jun	76,054	98,259
July	101,131	80,164
Aug	55,574	43,052
Sep	96,422	41,896
Oct	86,664	45,346
Nov	76,632	46,838
Dec	59,465	31,494
Total	1,058,577	684,823

SECTION D

This Section addresses Condition 16.1d) of the ECA described as below:

“Maximum daily feed rate and average daily feed rate of Alternative Low-Carbon Fuels and Conventional Fuels in the Cement Kiln for each month of the preceding calendar year, and the weight percentage of each category of Alternative Low-Carbon Fuels approved under Condition 7 of this Approval, of the total monthly Alternative Low-Carbon Fuel used.”

St. Mary's Cement
410 Bowmanville Ave, Bowmanville, ON, L1C 7B5

Annual Report Condition 16.1d

	Condition 7 ALCFs Weight Percentage of Total ALCF for Month							
	a. Material that is biomass fuel derived from harvested plant and forest sources, end of life agricultural sources, Woodwaste or Agricultural Waste, and includes but is not limited to sawdust, wood chips, wood, miscanthus grass, millet, sorghum, hemp, switch grass, and maize	b. Material that is comprised of non-recyclable plastics, including but not limited to manufacturing rejects, material resource recovery facility rejects, plastics bags and packaging	c. Material that is comprised of construction, renovation & demolition waste, including but not limited to scrap wood, treated lumber, carpets, textiles, sawdust, floor laminates and asphalt shingles	d. Material that is comprised of non-recyclable paper fiber/wood/plastic composites, including but not limited to single-serve coffee pods, printed papers, paper towels, rejects and trimmings from paper recycling facilities such as Ragger Tails, end rolls and cores.	**Conventional Fuel**		**ALCF**	
2024 Month					**Maximum Daily Feed Rate (tonnes)**	**Average Daily Feed Rate (tonnes)**	**Maximum Daily Feed Rate (tonnes)**	**Average Daily Feed Rate (tonnes)**
Jan	93%	7%	0%	0%	595	465	187	34
Feb	91%	9%	0%	0%	561	428	188	87
Mar	98%	2%	0%	0%	455	189	107	25
Apr	97%	3%	0%	0%	647	439	282	139
May	82%	18%	0%	0%	628	443	293	110
Jun	87%	13%	0%	0%	596	306	256	103
Jul	93%	7%	0%	0%	583	378	254	122
Aug	81%	19%	0%	0%	456	224	184	60
Sep	92%	8%	0%	0%	630	374	183	77
Oct	92%	8%	0%	0%	558	371	203	72
Nov	84%	16%	0%	0%	494	364	250	137
Dec	82%	18%	0%	0%	551	306	235	113

SECTION E

This Section addresses Condition 16.1e) of the ECA described as below:

“Maximum and average percent thermal replacement of Conventional Fuels by combined Alternative Low-Carbon Fuels for each month.”

CEMView
by Nexus Solutions Inc.

St. Mary's Cement
410 Bowmanville Ave, Bowmanville, ON, L1C 7B5

Annual Report Condition 16.1e

Thermal Replacement of Conventional e. Fuels by Combined Alternative Low-Carbon Fuels (%)												
2024	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**
Avg. %	2%	12%	0.4%	13%	12%	11%	13%	6%	7%	10%	11%	5%
Max. %	20%	25%	10%	24%	35%	40%	33%	58%	23%	38%	32%	30%
Min. %	0%	0.1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

SECTION F

This Section addresses Condition 16.1f) of the ECA described as below:

"A summary of data from CEM System, CPM System, Source Testing and Carbon Dioxide Emission Intensity testing described under conditions 10.3(a) and (b), 11 and 12 of this Approval, and a description of the status of compliance with the Performance Limits, Alternative Low-Carbon Fuel definition under this Approval and Alternative Low-Carbon Fuels operational requirements described in Schedule E of this Approval."

St. Mary's Bowmanville Cement Plant, located at 410 Bowmanville Avenue in Bowmanville, Ontario (Facility), during the 2024 Calendar Year, operated in material compliance with the Performance Limits and complied with the Alternative Low-Carbon Fuel definitions under the Environmental Compliance Approval 0550-CEAHMA, dated September 19, 2022 (ECA) and ALCF operational requirements described in Schedule E of this ECA except where noted in Section A of this report.

A summary of data from CEM System, CPM System, Source Testing and Carbon Dioxide Emission Intensity testing described under conditions 10.3(a) and (b), 11 and 12 of the ECA is enclosed.

CEM Data Summary

CEMView
by Nexus Solutions Inc.

St. Mary's Cement
410 Bowmanville Ave, Bowmanville, ON, L1C 7B5

Annual Report Condition 16.1F-Summary of CPM Data

2024	TPM @ 11% O2, Daily				NOx, Daily				SO2, Daily			
	Average	Minimum	Maximum	Availability	Average	Minimum	Maximum	Availability	Average	Minimum	Maximum	Availability
	mg/Nm³			%	ppmv			%	ppmv			%
January	39	16	69	98	133	80	186	100	9	3	13	99
February	18	13	43	97	120	46	160	98	10	3	16	98
March	18	8	42	92	100	6	202	92	3	0	10	92
April	11	6	44	98	159	59	225	98	18	2	99	98
May	10	7	19	93	186	105	250	95	19	6	145	95
June	17	7	62	95	156	1	295	95	12	0	76	96
July	13	8	27	98	170	13	216	98	12	0	24	98
August	18	9	42	95	171	25	230	98	7	0	11	98
September	19	9	43	90	157	4	208	89	6	1	13	92
October	15	8	39	98	174	5	211	98	11	1	36	98
November	12	8	18	100	182	2	209	100	11	0	13	100
December	16	11	25	78	154	43	204	79	8	1	12	79

CPM Data Summary

CEMView
by Nexus Solutions Inc.

St. Mary's Cement
410 Bowmanville Ave, Bowmanville, ON, L1C 7B5

Annual Report Condition 16.1F-Summary of CPM Data

2024	Residual O2, Backend of Kiln				Residual O2, Calciner Downcomer Duct				CO, Backend of Kiln				CO, Calciner Downcomer Duct			
	Average	Minimum	Maximum	Availability	Average	Minimum	Maximum	Availability	Average	Minimum	Maximum	Availability	Average	Minimum	Maximum	Availability
	%			%	%			%	ppm			%	ppm			%
January	13	4	22	100	4	4	5	100	2.61E-05	2.00E-05	2.90E-05	100	1117	219	1797	64
February	7	4	11	100	6	4	11	100	2.90E-05	2.90E-05	2.90E-05	100	1439	1073	1901	100
March	10	5	22	100	7	5	8	100	2.28E-05	1.80E-05	2.90E-05	100	1292	1056	1639	100
April	10	5	12	100	5	3	6	100	2.40E-05	2.00E-05	2.90E-05	100	1480	1153	1791	100
May	12	7	21	100	8	3	20	100	2.46E-05	0.00E00	2.90E-05	100	1202	0	1663	100
June	14	9	22	100	6	4	20	100	2.90E-05	2.90E-05	2.90E-05	100	1077	4	1826	100
July	14	9	22	99	6	4	11	100	2.90E-05	2.90E-05	2.90E-05	99	863	606	1131	100
August	14	5	21	100	8	4	16	100	2.90E-05	2.90E-05	2.90E-05	100	893	595	1258	100
September	9	1	20	100	5	3	7	100	2.90E-05	2.90E-05	2.90E-05	100	1157	1030	1435	100
October	8	4	17	100	6	4	9	100	2.90E-05	2.90E-05	2.90E-05	100	981	591	1256	100
November	12	2	18	100	6	5	7	100	2.90E-05	2.90E-05	2.90E-05	100	575	468	665	100
December	11	7	18	100	6	5	10	100	2.90E-05	2.90E-05	2.90E-05	100	667	494	800	100

2024	Temperature, K5				Temperature, C5				THC			
	Average	Minimum	Maximum	Availability	Average	Minimum	Maximum	Availability	Average	Minimum	Maximum	Availability
	°C			%	°C			%	ppmv			%
January	808	738	826	100	893	891	895	100	111	20	134	100
February	812	683	833	100	892	889	896	100	115	26	157	99
March	674	180	815	100	894	886	899	100	49	5	146	92
April	804	652	828	100	896	886	898	100	132	47	183	99
May	805	611	834	100	895	851	898	100	131	3	180	98
June	648	24	824	100	895	889	898	100	76	1	161	100
July	780	359	823	99	896	892	898	100	98	3	153	100
August	781	527	818	100	896	888	904	100	57	2	125	99
September	745	35	820	100	883	701	898	100	71	4	125	99
October	781	283	829	100	895	885	899	100	75	3	107	100
November	758	179	826	100	898	897	899	100	107	8	149	100
December	742	288	819	100	897	891	899	100	81	3	133	100

Compliance Source Testing Data Summary

Table 1 - Sampling Parameters and Methods
Main Stack

Source Location	No. of Tests	Sampling Parameter	Sampling Method
Main Stack	6	Velocity, Temperature and Flow Rate	OSTC [1] Methods 1-4
	3	Particulate Matter	OSTC [1] Method 5
	3	Metals	U.S. EPA [2] Method 29
	3	SVOC's, Dioxins and Furans	Environment Canada Method RM/2
	3	Aldehydes	NCASI[3] Method A105
	3	HCl and Ammonia	U.S. EPA[2] Method 26A (isokinetic)
	3	Methanol and Phenol	NCASI[3] Method 98.01
	3	Volatile Organic Matter	U.S. EPA[2] SW 846 0030 VOST
	3	Carbon Monoxide	US EPA[2] Method 10
	3	Oxygen and Carbon Dioxide	US EPA[2] Method 3A

Notes:

[1] OSTC - Ontario Source Testing Code - Version 3

[2] U.S. EPA - United States Environmental Protection Agency

[3] NCASI - National Council for Air and Stream Improvement

Table 2: Sampling Summary and Sample Log

Main Stack

Source and Test #	Sampling Date	Start Time	End Time	Filter ID / Trap ID	Lab Sample ID
Velocity / Metals / Mercury					
Test #1	19-Nov-24	2:26 PM	6:51 PM	QZ12092	BU2401176-001
Test #2	20-Nov-24	10:21 AM	2:48 PM	QZ12103	BU2401176-002
Test #3	11-Dec-24	10:43 AM	3:28 PM	QZ11454	BU2401389-001
Velocity / Dioxins and Furans					
Test #1	19-Nov-24	2:26 PM	6:51 PM	TRAP #3	L2758194-1
Test #2	20-Nov-24	10:21 AM	2:48 PM	TRAP #4	L2758194-2
Test #3	11-Dec-24	10:43 AM	3:29 PM	L2758109-16	L2758409-1
HCl and Ammonia					
Test #1	20-Nov-24	3:25 PM	5:36 PM	-	BU2401173-001
Test #2	11-Dec-24	9:46 AM	11:52 AM	-	BU2401390-001
Test #3	11-Dec-24	12:12 PM	2:18 PM	-	BU2401390-002

Table 3: Sampling Summary - Flow Characteristics

Main Stack

Stack Gas Parameter		Test No. 1			Test No. 2			Test No. 3			TOTAL AVERAGE
		PM, Metals	D and F [1]	Average	PM, Metals	D and F [1]	Average	PM, Metals	D and F [1]	Average	Average
Testing Date											-
Stack Temperature	°F	121	122	122	120	121	120	117	117	117	**120**
	°C	50	50	50	49	49	49	47	47	47	**49**
Moisture	%	12.5%	12.7%	12.6%	12.4%	12.5%	12.4%	11.8%	11.8%	11.8%	**12.3%**
Velocity	ft/s	45.6	44.7	45.2	45.0	45.5	45.2	44.8	42.7	43.7	**44.7**
	m/s	13.9	13.6	13.8	13.7	13.9	13.8	13.6	13.0	13.3	**13.6**
Actual Flow Rate	CFM	696897	683023	689960	687414	694224	690819	683536	651940	667738	**682839**
Referenced Flow Rate[2]	CFM	559893	546552	553222	543594	547282	545438	543530	518371	530950	**543203**
	m^3/s	264	258	261	256	258	257	256	245	251	**256**
Sampling Isokinetic Rate	%	99	100	100	98	100	99	97	102	100	**100**

Notes :

[1] D and F = Dioxins, Furans, and Dioxin-like PCBs

[2] Referenced flow rate expressed as dry at 101.3 kPa, 25°C, and Actual Oxygen

Detailed sampling results including individual test results can be found in Appendix A and B

Table 4: PM, Metals and Mercury[1] - Averaged Results
Main Stack

Parameter	Concentration [2]	Concentration @ 11% O_2 [3]	Concentration @ 0°C, 10% O_2 [4]	Emission Rate
Particulate	**(mg/m^3)**	**(mg/m^3)**	**(mg/m^3)**	**(mg/s)**
Particulate Matter	6.94	9.82	9.9	1800
Metals	**($\mu g/m^3$)**	**($\mu g/m^3$)**	**($\mu g/m^3$)**	**(mg/s)**
Combined Train Arsenic (As)	< 0.346	< 0.489	< 0.494	< 0.0897
Combined Train Barium (Ba)	< 2.26	< 3.2	< 3.22	< 0.586
Combined Train Beryllium (Be)	< 0.0693	< 0.098	< 0.0989	< 0.0179
Combined Train Cadmium (Cd)	< 0.246	< 0.348	< 0.351	< 0.0636
Combined Train Chromium (Cr)	1.31	1.85	1.87	0.339
Combined Train Cobalt (Co)	< 0.198	< 0.28	< 0.282	< 0.0516
Combined Train Copper (Cu)	1.75	2.48	2.5	0.455
Combined Train Iron (Fe)	< 76	107	108	< 19.7
Combined Train Lead (Pb)	8.78	12.4	12.5	2.27
Combined Train Manganese (Mn)	6.22	8.8	8.87	1.63
Combined Train Molybdenum (Mo)	< 2.68	< 3.79	< 3.82	< 0.694
Combined Train Nickel (Ni)	1.74	2.46	2.48	0.45
Combined Train Selenium (Se)	< 0.693	< 0.98	< 0.989	< 0.179
Combined Train Silver (Ag)	< 0.315	< 0.446	< 0.449	< 0.0811
Combined Train Thallium (Tl)	< 0.206	< 0.291	< 0.294	< 0.0533
Combined Train Vanadium (V)	< 2.36	< 3.34	< 3.37	< 0.612
Combined Train Zinc (Zn)	9.73	13.8	13.9	2.53
Mercury	**($\mu g/m^3$)**	**($\mu g/m^3$)**	**($\mu g/m^3$)**	**(mg/s)**
Total Mercury	< 0.328	< 0.464	< 0.468	< 0.0851

Notes:

[1] Sampling followed OSTC Method 5 (PM) and U.S. EPA Method 29 (Metals)

[2] Referenced concentration values are expressed at 101.3kPa, 25 ^{o} C, actual oxygen

[3] Referenced concentration values are expressed at 101.3kPa, 25 ^{o} C, at 11% O_2

[4] Referenced concentration values are expressed at 101.3kPa, 0 ^{o} C, at 10% O_2

- When laboratory analysis was below the detection limit, the Reportable Detection Limit (RDL) was used to calculate the concentration and emission rate

Average of three tests

Detailed sampling results including individual test results can be found in Appendix A

Table 5: Dioxins and Furans - Averaged Results[1]

Main Stack

	Average Concentration [2]	Average Concentration @25°C and 11% O_2 [3]	Average Concentration @ 0°C and 10% O_2 [4]	Reg 419 Toxic Equivalency Factors			
				TEF	TEF Concentration @ 25°C and 11% O_2	TEF Concentration @ 0 °C and 10% O_2	TEF Emission Rate
Parameter	**(pg/m^3)**	**(pg/m^3)**	**(pg/m^3)**		**(pg TEQ/m^3)**	**(pg TEQ/m^3)**	**(pg/s)**
2,3,7,8-Tetra CDD *	< 0.226	< 0.32	< 0.323	1	< 0.32	< 0.323	< 57.4
1,2,3,7,8-Penta CDD *	< 0.165	< 0.233	< 0.235	1	< 0.233	< 0.235	< 41.8
1,2,3,4,7,8-Hexa CDD *	< 0.146	< 0.206	< 0.208	0.1	< 0.0206	< 0.0208	< 3.69
1,2,3,6,7,8-Hexa CDD *	< 0.335	< 0.474	< 0.478	0.1	< 0.0474	< 0.0478	< 8.5
1,2,3,7,8,9-Hexa CDD *	< 0.213	< 0.301	< 0.304	0.1	< 0.0301	< 0.0304	< 5.4
1,2,3,4,6,7,8-Hepta CDD *	< 0.89	< 1.26	< 1.27	0.01	< 0.0126	< 0.0127	< 2.26
1,2,3,4,6,7,8,9-Octa CDD *	< 3.3	< 4.67	< 4.71	0.0003	< 0.0014	< 0.00141	< 0.251
2,3,7,8-Tetra CDF **	2.75	3.89	3.92	0.1	0.389	0.392	69.7
1,2,3,7,8-Penta CDF **	1.01	1.43	1.44	0.03	0.0429	0.0432	7.68
2,3,4,7,8-Penta CDF **	0.547	0.774	0.78	0.3	0.232	0.234	41.6
1,2,3,4,7,8-Hexa CDF **	< 0.298	< 0.421	< 0.425	0.1	< 0.0421	< 0.0425	< 7.56
1,2,3,6,7,8-Hexa CDF **	< 0.291	< 0.412	< 0.415	0.1	< 0.0412	< 0.0415	< 7.38
2,3,4,6,7,8-Hexa CDF **	0.163	0.231	0.233	0.1	0.0231	0.0233	4.13
1,2,3,7,8,9-Hexa CDF **	< 0.196	< 0.277	< 0.28	0.1	< 0.0277	< 0.028	< 4.97
1,2,3,4,6,7,8-Hepta CDF **	< 0.705	< 0.997	< 1.01	0.01	< 0.00997	< 0.0101	< 1.79
1,2,3,4,7,8,9-Hepta CDF **	< 0.27	< 0.382	< 0.385	0.01	< 0.00382	< 0.00385	< 0.685
1,2,3,4,6,7,8,9-Octa CDF **	< 1.2	< 1.7	< 1.71	0.0003	< 0.000509	< 0.000514	< 0.0913
Parameter	**(pg/m^3)**	**(pg/m^3)**	**(pg/m^3)**		**(pg TEQ/m^3)**	**(pg TEQ/m^3)**	**(pg/s)**
33'44'-TetraCB-(77)	79.9	113	114	0.0001	0.0113	0.0114	2.03
344'5-TetraCB-(81)	14.9	21.1	21.3	0.0003	0.00632	0.00638	1.13
233'44'-PentaCB-(105)	58.6	82.9	83.6	0.00003	0.00249	0.00251	0.446
2344'5-PentaCB-(114)	5.32	7.52	7.59	0.00003	0.000226	0.000228	0.0405
23'44'5-PentaCB-(118)	198	280	282	0.00003	0.0084	0.00847	1.51
23'44'5'-PentaCB-(123)	< 5.2	< 7.35	< 7.42	0.00003	< 0.000221	< 0.000223	< 0.0396
33'44'5-PentaCB-(126)	5.14	7.27	7.33	0.1	0.727	0.733	130
HexaCB-(156)+(157)	11.6	16.4	16.5	0.00003	0.000492	0.000496	0.0883
23'44'55'-HexaCB-(167)	< 6.29	< 8.9	< 8.97	0.00003	< 0.000267	< 0.000269	< 0.0479
33'44'55'-HexaCB-(169)	< 0.802	< 1.13	< 1.14	0.03	< 0.034	< 0.0343	< 6.1
233'44'55'-HeptaCB-(189)	< 0.716	< 1.01	< 1.02	0.00003	< 0.0000304	< 0.0000306	< 0.00545
				Total Toxic Equivalency	**< 2.27**	**< 2.29**	**< 406**

Notes:

[1] Sampling followed Environment Canada Method RM/2 (Dioxin and Furans)

[2] Referenced concentration values are expressed at 101.3kPa, 25 ^{o} C

[3] Referenced concentration values are expressed at 101.3kPa, 25 ^{o} C, at 11% O_2

[4] Referenced concentration values are expressed at 101.3kPa, 0 ^{o} C, at 10% O_2

Average of three tests

- When laboratory analysis was below the detection limit, the detection limit was used to calculate the concentration and emission rate.

**CCD = Chloro Dibenzo-p-Dioxin,*

***CDF = chlorodibenzo-p-furan*

****CB = chlorobenzene*

Detailed sampling results including individual test results can be found in Appendix B

Table 6 - Polycyclic Aromatic Hydrocarbons (PAH's)
Main Stack

Parameter	Concentration [1]	Concentration @ 11% O_2 [2]	Concentration @ 0°C, 10% O_2 [3]	Emission Rate
PAH	**(µg/m³)**	**(µg/m³)**	**(µg/m³)**	**(µg/s)**
1-Methylnaphthalene	8.31	11.8	11.9	2080
1-Methylphenanthrene	13.5	19.1	19.3	3460
2-Chloronaphthalene	< 0.00138	< 0.00195	< 0.00197	< 0.35
2-Methylanthracene	4.2	5.94	5.99	1080
2-Methylnaphthalene	11.3	16	16.1	2840
3-Methylcholanthrene	< 0.0069	< 0.00976	< 0.00984	< 1.75
7,12-Dimethylbenzo(a)anthracene	< 0.00138	< 0.00195	< 0.00197	< 0.35
9,10-Dimethylanthracene	0.00718	0.0102	0.0102	1.81
9-Methylphenanthrene	8.25	11.7	11.8	2110
Acenaphthene	0.774	1.09	1.1	199
Acenaphthylene	1.43	2.02	2.04	366
Anthracene	0.232	0.328	0.331	59.7
Benzo(a)anthracene	0.00315	0.00446	0.00449	0.805
Benzo(a)fluorene	0.0184	0.026	0.0262	4.63
Benzo(a)pyrene	0.018	0.0255	0.0257	4.56
Benzo(b)fluoranthene	0.00628	0.00888	0.00896	1.61
Benzo(b)fluorene	0.0107	0.0151	0.0153	2.73
Benzo(e)pyrene	0.00745	0.0105	0.0106	1.88
Benzo(g,h,i)perylene	0.00783	0.0111	0.0112	1.94
Benzo(k)fluoranthene	0.00723	0.0102	0.0103	1.85
Chrysene/Triphenylene	< 0.00373	< 0.00528	< 0.00532	< 0.926
Coronene	< 0.0101	< 0.0143	< 0.0144	< 2.54
Dibenzo(a,c)anthracene	0.00725	0.0103	0.0103	1.86
Dibenzo(a,h)anthracene	0.00725	0.0103	0.0103	1.86
Fluoranthene	0.338	0.478	0.482	86.2
Fluorene	1.83	2.59	2.61	471
Indeno(1,2,3-cd)pyrene	0.00512	0.00724	0.0073	1.29
Naphthalene	24.3	34.4	34.7	6190
Perylene	< 0.00138	< 0.00195	< 0.00197	< 0.35
Phenanthrene	18.4	26	26.2	4680
Picene	< 0.0069	< 0.00976	< 0.00984	< 1.75
Pyrene	0.168	0.238	0.24	42.7
Tetralin	8.56	12.1	12.2	2200

Notes:

[1] Referenced concentration values are expressed at 101.3kPa, 25 ^{o} C

[2] Referenced concentration values are expressed at 101.3kPa, 25 ^{o} C, at 11% O_2

[3] Referenced concentration values are expressed at 101.3kPa, 0 ^{o} C, at 10% O_2

Average of three tests

- When laboratory analysis was below the detection limit, the detection limit was used to calculate the concentration and emission rate.

Detailed sampling results including individual test results can be found in Appendix B

Table 7: Hydrochloric Acid and Ammonia - Averaged Results
Main Stack

Parameter	Concentration [1]	Concentration @ 11% O_2 [2]	Concentration @ 0 °C, 10% O_2 [3]	Emission Rate
	(mg/m^3)	(mg/m^3)	(mg/m^3)	(mg/s)
Hydrochloric Acid	3.08	4.36	4.39	793
Ammonia (NH_3)	2.91	4.12	4.15	748

Notes:

[1] Referenced concentration values are expressed at 101.3kPa, 25 ^{o} C

[2] Referenced concentration values are expressed at 101.3kPa, 25 ^{o} C, at 11% O_2

[3] Referenced concentration values are expressed at 101.3kPa, 0 ^{o} C, at 10% O_2

Average of three tests

'<' indicates that the laboratory results were less than the Reportable Detection Limit (RDL). The RDL was used to calculate the concentration and emission rate.

Detailed sampling results including individual test results can be found in Appendix C

Table 8: Volatile Organic Compounds - Averaged Results
Main Stack

Parameter	Concentration[1]	Concentration @ 11% O_2 [2]	Concentration @ 0°C, 10% O_2 [3]	Emission Rate
	(mg/m^3)	(mg/m^3)	(mg/m^3)	(mg/s)
Dichlorodifluoromethane (FREON 12)	< 33.3	< 47.1	< 47.5	< 8.34
Vinyl Chloride	< 33.8	< 47.8	< 48.3	< 8.47
Bromomethane	< 33.9	< 48	< 48.4	< 8.49
Trichlorofluoromethane (FREON 11)	< 33.3	< 47.1	< 47.5	< 8.34
Acetone (2-Propanone)	< 60.3	< 85.3	< 86	< 15.1
1,1-Dichloroethylene	< 33.3	< 47.1	< 47.5	< 8.34
Methylene Chloride(Dichloromethane)	1080	1530	1540	271
trans-1,2-Dichloroethylene	< 33.3	< 47.1	< 47.5	< 8.34
Chloroform	< 33.3	< 47.1	< 47.5	< 8.34
1,2-Dichloroethane	< 33.3	< 47.1	< 47.5	< 8.34
Methyl Ethyl Ketone (2-Butanone)	< 33.3	< 47.1	< 47.5	< 8.34
1,1,1-Trichloroethane	< 33.3	< 47.1	< 47.5	< 8.34
Carbon Tetrachloride	< 33.3	< 47.1	< 47.5	< 8.34
Benzene	< 165	< 233	< 235	< 41.4
1,2-Dichloropropane	< 33.3	< 47.1	< 47.5	< 8.34
Trichloroethylene	< 33.3	< 47.1	< 47.5	< 8.34
Bromodichloromethane	< 33.3	< 47.1	< 47.5	< 8.34
Dibromochloromethane	< 33.3	< 47.1	< 47.5	< 8.34
Toluene	169	238	240	42.2
Ethylene Dibromide	< 33.3	< 47.1	< 47.5	< 8.34
Tetrachloroethylene	< 33.3	< 47.1	< 47.5	< 8.34
Ethylbenzene	< 33.3	< 47.1	< 47.5	< 8.34
m / p-Xylene	< 117	< 165	< 167	< 29.3
Styrene	< 33.3	< 47.1	< 47.5	< 8.34
o-Xylene	< 41.7	< 58.9	< 59.4	< 10.4
Bromoform	< 33.3	< 47.1	< 47.5	< 8.34

Notes:

[1] Sample volume and volumetric flow rate based on dry referenced conditions (101.3kPa, 25 °C)

[2] All referenced concentration values are expressed at 101.3kPa, 25 °C, and 11% Oxygen

[3] All referenced concentration values are expressed at 101.3kPa, 0 °C, and 10% Oxygen

Average of three tests

Detailed sampling results including individual test results can be found in Appendix D

Table 9: Aldehydes - Averaged Results
Main Stack

Parameter	Concentration [1]	Concentration @ 11% O_2 [2]	Concentration @ 0°C, 10% O_2 [3]	Emission Rate
	(mg/m^3)	(mg/m^3)	(mg/m^3)	(mg/s)
Acrolein	0.282	0.399	0.402	72.4
Acetaldehyde	3.4	4.81	4.85	858
Propionaldehyde	1.13	1.6	1.61	289

Notes:

[1] Referenced concentration values are expressed at 101.3kPa, 25 ^{o} C

[2] Referenced concentration values are expressed at 101.3kPa, 25 ^{o} C, at 11% O_2

[3] Referenced concentration values are expressed at 101.3kPa, 0 ^{o} C, at 10% O_2

Average of three tests

When laboratory analysis was below the detection limit, the Reportable Detection Limit (RDL) was used to calculate the concentration and emission rate

Flow rate from isokinetic tests were used to calculate the emission rate

Detailed sampling results including individual test results can be found in Appendix E

Table 10: Phenol and Methanol - Averaged Results
Main Stack

Parameter	Concentration [1]	Concentration @ 11% O_2 [2]	Concentration @ 0 °C, 10% O_2 [3]	Emission Rate
	(mg/m^3)	(mg/m^3)	(mg/m^3)	(mg/s)
Phenol	< 8.87	< 12.5	< 12.7	< 2280
Methanol	< 8.87	< 12.5	< 12.7	< 2280

Notes:

[1] Referenced concentration values are expressed at 101.3kPa, 25 ^{o} C

[2] Referenced concentration values are expressed at 101.3kPa, 25 ^{o} C, at 11% O_2

[3] Referenced concentration values are expressed at 101.3kPa, 0 ^{o} C, at 10% O_2

Average of three tests

When laboratory analysis was below the detection limit, the Reportable Detection Limit (RDL) was used to calculate the concentration and emission rate

Flow rate from isokinetic tests were used to calculate the emission rate

Detailed sampling results including individual test results can be found in Appendix F

Table 12: Results Comparison
Main Stack

Parameter	Stack Testing Results [1]	ECA Limit [2]
Limits in Schedule B of the C of A (0550-CEAHMA)		
Particulate Matter	9.82 mg/Rm^3	50 mg/Rm^3
Cadmium	< 0.348 $\mu g/Rm^3$	7 $\mu g/Rm^3$
Lead	12.4 $\mu g/Rm^3$	60 $\mu g/Rm^3$
Mercury	< 0.464 $\mu g/Rm^3$	20 $\mu g/Rm^3$
Dioxins and Furans	< 2.27 pg/Rm^3	80 pg/Rm^3 ITEQ
Hydrochloric Acid	4.36 mg/Rm^3	27 mg/Rm^3

Notes:

[1] - Concentration referenced to dry conditions at 25°C, 101.3kPa, and 11% oxygen

[2] – Schedule B of ECA referenced to dry conditions at 25°C, 101.3kPa, and 11% oxygen

Carbon Dioxide Intensity Testing Data Summary

Carbon Dioxide Emission Intensity Summary (O.Reg. 79/15) - 2024
St. Marys Cement Inc. (Canada) - Bowmanville Facility

CO_2 Intensity (kg CO_2/MJ) = Non-biological Carbon Content (%) × 3.67 kg CO_2/kg C ÷ Higher Heating Value (MJ/kg fuel)

Where:
- Non-biological Carbon Content = Total Carbon Content (%) * [100% - Biogenic Carbon Content (%)]
- Total Carbon Content = Result from fuel sample analysis
- Biogenic Carbon Content = Result from plastics carbon testing
- Higher Heating Value = Value from fuel sample analysis

Sample Calculation for EFS Plastics:
CO_2 Intensity (kg CO_2/MJ) = Non-biological Carbon Content (%) × 3.67 kg CO_2/kg C ÷ Higher Heating Value (MJ/kg fuel)
CO_2 Intensity (kg CO_2/MJ) = Total Carbon Content (%) × [100% - Biogenic Carbon Content (%)] × 3.67 kg CO_2/kg C ÷ Higher Heating Value (MJ/kg fuel)
CO_2 Intensity (kg CO2/MJ) = 50% × (100%-3%) × 3.67 kg CO2/kg C ÷ 21.84 (MJ/kg fuel)
CO_2 Intensity (kg CO2/MJ) = 0.0814

Carbon dioxide intentsity values for all fuels used in 2024 are included in Table X below.

Table 1. CO_2 Emission Intensity Summary

Parameter	Coal	Shot Pet Coke	Fluid Pet Coke	Shot/Fluid Pet Coke	Wood	Plastics			
						EFS	ReWorld Kitchener	ReWorld Niagara	Evolve
Sample No.	N/A	N/A	N/A	N/A	N/A	654425	LR008692	LR008692	LR008810
Biogenic Carbon Content	0%	0%	0%	0%	100%	3%	47%	47%	29%
Total Carbon Content	63%	83%	82%	83%	42%	50%	50%	50%	50%
Fuel HHV (MJ/kg)	25.52	32.57	31.65	32.11	16.45	21.84	21.84	21.84	21.84
CO_2 Intensity (kg CO_2/MJ)	0.0906	0.0930	0.0955	0.0943	0	0.0814	0.0445	0.0445	0.0596

As shown in Table 1 above, the carbon dioxide intensity values are lower for the Alternative Low Carbon Fuels than the conventional fuels.

600 Southgate Drive
Guelph, Ontario N1G 4P6

Tel: +1.971.940.5038
E-mail: Steve.Smith@rwdi.com

MEMORANDUM

DATE:	2025-06-25	RWDI Reference No.: 2409157
TO:	Joe Frost	EMAIL: Joe.Frost@vcimentos.com
FROM:	Steve Smith	EMAIL: Steve.Smith@rwdi.com
RE:	Carbon Dioxide Emission Intensity St Marys Cement Inc. Bowmanville, Ontario	

Dear Joe,

See the attachment for the carbon dioxide emission intensity. The stack testing program was conducted November 19th-20th, 2024.

If you have any questions or need clarification please let us know.

Yours truly,

Steven Smith, QSTI
Senior Project Manager/Associate
RWDI

SS/tmg

ATTACHMENTS

Carbon Dioxide Emission Intenstity

				Tests			
Lab no.			**Sample Type**	**1. Moisture, % wt.**	**2. Total Carbon, % wt.**	**3. Total Organic Carbon, % wt.**	**CO_2 Intensity**
8025-	Sample ID.	**Date**	**ASTM method**	**E870**	**D5373**	**D4129**	
1	Conventional #1	11/19/2024	Coal/Petcoke	7.48	62.96	62.31	9.9425
2	Conventional #2	11/20/2024	Coal/Petcoke	9.03	59.61	59.02	9.4135
3	Conventional #3	12/11/2024	Coal/Petcoke	10.33	65.57	64.26	10.3546
4	Conventional #4	12/12/2024	Coal/Petcoke	11.70	65.87	65.12	10.4020
5	ALCF-Biomass #1	11/19/2024	Wood	10.76	44.65	43.70	0.0414
6	ALCF-Biomass #2	11/20/2024	Wood	10.78	44.70	43.81	0.0415
7	ALCF-Biomass #3	12/11/2024	Wood	16.17	41.75	40.95	0.0388
8	ALCF-Biomass #4	12/12/2024	Wood	18.68	42.30	41.54	0.0394
9	ALCF -Plastic #1	11/19/2024	Plastic	9.97	53.89	52.27	5.9704
10	ALCF -Plastic #2	11/20/2024	Plastic	8.01	55.25	54.01	6.1691
11	ALCF -Plastic #3	12/11/2024	Plastic	14.30	60.78	59.13	6.7539
12	ALCF -Plastic #4	12/12/2024	Plastic	8.96	57.37	55.94	6.3896
-	Combined ALCF	11/19/2024	ALCF	-	-	-	1.2272
-	ALCF -Plastic #2	11/20/2024	ALCF	-	-	-	1.2670
-	ALCF -Plastic #3	12/11/2024	ALCF	-	-	-	1.3818
-	ALCF -Plastic #4	12/12/2024	ALCF	-	-	-	1.3094

Conventional Fuel mix - 50% Coal, 25% Pet Coke, 25% Fluid Coke

ALCF Ratio - 80% Wood, 20% Plastics

Petro Laboratories Inc.

1295 Matheson Blvd. East, Mississauga, Ontario, L4W 1R1 Tel: (905) 361-2388 Fax: (905) 361-2411
E-mail: petrolab@gmail.com

Laboratory Report

St. Marys Cement
400 Waverly Road South,
Bowmanville, Ontario
L1C 3K3

Lab no.: 7972- 1 to 6 (A)
Date Report: Dec 20 , 2024
Sample in: De 10, 2024
PO no.: 6300588575

Attention: Jason Schultz , Mike Pryde

Re: 4 Wood Chip & 2 Plastic Scrap samples from Nov 30,2024 for analysis.

Lab no.			7972-1	7972-2	7972-3	7972-4	7972-5	7972-6
Sample ID.			**905 Wood**	**York1 Wood**	**GFL Wood**	**Woodbridge**	**Re-World**	**EFS**
Tests	**Method ASTM**	**Unit**	**Results**					
1. Calorific Value, As Received	D5865	BTU/lb MJ/kg	7381 17.168	7118 16.556	7298 16.975	7082 16.472	9649 22.443	11866 27.600
2. Moisture content, As Received	E870	% wt.	12.98	16.03	13.23	14.80	15.03	8.56
3. Total Chlorine, As Received	D4208	% wt.	0.03	0.02	0.03	0.04	0.18	0.82
4. Sulfur, As Received	D1552	% wt.	0.19	0.30	0.13	0.22	0.64	0.20
5. Total Carbon, As Received	D5373	% wt.	43.80	42.39	43.96	42.48	54.17	57.59
6. Total Organic Carbon	D4129	% wt.	42.57	41.17	42.55	41.78	53.21	56.51
7. Ash content As Received	D4129	% wt.	0.55	1.41	0.88	0.61	7.19	7.56

Tested by : P.S / A.C.(Chemist)

Approved by James Szeto

Member of ASTM
JS:LN

James Szeto,B.Sc.
Chief Chemist

Petro Laboratories Inc.

1295 Matheson Blvd. East, Mississauga, Ontario, L4W 1R1 Tel: (905) 361-2388 Fax: (905) 361-2411
E-mail: petrolab@gmail.com

Laboratory Report

St. Marys Cement
400 Waverly Road South,
Bowmanville, Ontario
L1C 3K3

Lab no.: 8025-1 to 12
Date Report: Jan 2, 2025
Sample in: Dec 20, 2024
PO no.: 6300591354

Attention: Jason Schultz , Mike Pryde

Re: Samples of Coal/ Petcoke , wood & Plastic for testing as Received.

				Tests		
Lab no.			**Sample Type**	**1. Moisture , % wt.**	**2. Total Carbon, % wt.**	**3. Total Organic Carbon, % wt.**
8025-	Sample ID.	**Date**	**ASTM method**	**E870**	**D5373**	**D4129**
1	Conventional #1	11/19/2024	Coal/Petcoke	7.48	62.96	62.31
2	Conventional #2	11/20/2024	Coal/Petcoke	9.03	59.61	59.02
3	Conventional #3	12/11/2024	Coal/Petcoke	10.33	65.57	64.26
4	Conventional #4	12/12/2024	Coal/Petcoke	11.70	65.87	65.12
5	ALCF-Biomass #1	11/19/2024	Wood	10.76	44.65	43.70
6	ALCF-Biomass #2	11/20/2024	Wood	10.78	44.70	43.81
7	ALCF-Biomass #3	12/11/2024	Wood	16.17	41.75	40.95
8	ALCF-Biomass #4	12/12/2024	Wood	18.68	42.30	41.54
9	ALCF -Plastic #1	11/19/2024	Plastic	9.97	53.89	52.27
10	ALCF -Plastic #2	11/20/2024	Plastic	8.01	55.25	54.01
11	ALCF -Plastic #3	12/11/2024	Plastic	14.30	60.78	59.13
12	ALCF -Plastic #4	12/12/2024	Plastic	8.96	57.37	55.94

Tested by : Q.N.(Chemist)

Approved by James Szeto

Member of ASTM
JS:LN

James Szeto,B.Sc.
Chief Chemist

Petro Laboratories Inc.

1295 Matheson Blvd. East, Mississauga, Ontario, L4W 1R1 Tel: (905) 361-2388 Fax: (905) 361-2411
E-mail: petrolab@gmail.com

Laboratory Report

St. Marys Cement
400 Waverly Road South,
Bowmanville, Ontario
L1C 3K3

Lab no.: 8099- 1 to 5 (A)
Date Report: Jan 25, 2025
Sample in: Jan 10, 2025
PO no.: 6300588575

Attention: Jason Schultz , Mike Pryde

Re: 3 Wood Chip & 2 Plastic Scrap samples from Dec 30,2024 for analysis.

Lab no.			8099-1	8099-2	8099-3	8099-4	8099-5
Sample ID.			**905 Wood**	**GFL Wood**	**Woodbridge**	**Re-World**	**EFS**
Tests	**Method ASTM**	**Unit**	**Results**				
1. Calorific Value, As Received	D5865	BTU/lb MJ/kg	7054 16.407	7184 16.710	6128 14.253	8059 18.745	10621 24.704
2. Moisture content, As Received	E870	% wt.	15.94	15.62	22.70	23.28	9.77
3. Total Chlorine, As Received	D4208	% wt.	0.01	0.02	0.02	0.12	0.84
4. Sulfur, As Received	D1552	% wt.	0.21	0.31	0.27	0.58	0.21
5. Total Carbon, As Received	D5373	% wt.	41.94	41.67	35.45	50.55	54.72
6. Total Organic Carbon	D4129	% wt.	40.86	40.85	34.67	49.74	53.12
7. Ash content As Received	D4129	% wt.	0.85	0.75	1.33	8.23	10.92

Tested by : P.S / A.C.(Chemist)

Approved by James Szeto

Member of ASTM
JS:LN

James Szeto,B.Sc.
Chief Chemist

Petro Laboratories Inc.

1295 Matheson Blvd. East, Mississauga, Ontario, L4W 1R1 Tel: (905) 361-2388 Fax: (905) 361-2411
E-mail: petrolab@gmail.com

Laboratory Report

St. Marys Cement
400 Waverly Road South,
Bowmanville, Ontario
L1C 3K3

Lab no.: 7973-1 to 3
Date Report: Dec 20 , 2024
Sample in: Dec 10, 2024
PO. No.: 6300511592

Attention: Jason Schultz, Mike Pryde

Re: Coal and Coke samples from Nov 30, 2024 for analysis.
St. Mary Low Carbon Fuel project.

		Lab No.	7973-1	7973-2	7973-3
		Sample ID	Nov Coal	Nov PETCOKE	Nov FLUID COKE
Tests	**Method ASTM**	**Unit**	**Results**		
1. Calorific Value, As Received	D5865	BTU/lb MJ/kg	6181 14.377	14010 32.587	13590 31.610
2. Moisture content, As Received	D3302	% wt.	14.79	1.96	2.96
3. Total Carbon, As Received	D5373	% wt.	38.14	83.55	84.45

Tested by : P.S.(Chemist)

Approved by James Szeto

Member of ASTM
JS:LN

James Szeto,B.Sc.
Chief Chemist

Petro Laboratories Inc.

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E-mail: petrolab@gmail.com

Laboratory Report

St. Marys Cement
400 Waverly Road South,
Bowmanville, Ontario
L1C 3K3

Lab no.: 8081 -1 to 3
Date Report: Jan 14, 2025
Sample in: Jan 8, 2025
PO. No.: 6300511592

Attention: Jason Schultz, Mike Pryde

Re: Coal and Coke samples from Dec 30, 2024 for analysis.
St. Mary Low Carbon Fuel project.

		Lab No.	8081-1	8081-2	8081-3
		Sample ID	Dec Coal	Dec PETCOKE	Dec FLUID COKE
Tests	**Method ASTM**	**Unit**	**Results**		
1. Calorific Value, As Received	D5865	BTU/lb MJ/kg	13145 30.575	14312 33.289	14069 32.724
2. Moisture content, As Received	D3302	% wt.	1.13	1.30	2.43
3. Total Carbon, As Received	D5373	% wt.	72.66	82.48	82.52

Tested by : P.S.(Chemist)

Approved by James Szeto

Member of ASTM
JS:LN

James Szeto,B.Sc.
Chief Chemist

Beta Analytic, Inc.
4985 SW 74th Court
Miami, FL 33155 USA
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info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

January 21, 2025

Mike Pryde
St. Marys Cement (Canada) - Ontario - Bowmanville Plant
410 Bowmanville Avenue
Bowmanville, Ontario (ON) L1C 7B5
Canada

Dear Mike Pryde,

Please find enclosed your radiocarbon (C14) report for the material recently submitted. The result is reported as “% Biogenic Carbon”. This indicates the percentage carbon from “renewable” (biomass or animal by-product) sources versus petroleum (or otherwise fossil) sources . For reference, 100 % Biogenic Carbon indicates that a material is entirely sourced from plants or animal by-products and 0 % Biogenic Carbon indicates that a material did not contain any carbon from plants or animal by-products. A value in between represents a mixture of natural and fossil sources.

The analytical measurement is cited as “percent modern carbon (pMC)”. This is the percentage of C14 measured in the sample relative to a modern reference standard (NIST 4990C). The % Biogenic Carbon content is calculated from pMC by applying a small adjustment factor for C14 in carbon dioxide in air today. It is important to note is that all internationally recognized standards using C14 assume that the plant or biomass feedstocks were obtained from natural environments.

Reported results are accredited to ISO/IEC 17025:2017 PJLA #59423 standards and all chemistry was performed here in our laboratory and counted in our own accelerators in Miami, Florida.

The international standard method utilized for this analysis is cited under Summary of Results. The standard version used is the latest available as of the date reported (unless otherwise noted). The report also indicates if the result is relative to total carbon (TC) or only total organic carbon (TOC). When interpreting the results, please consider any communications you may have had with us regarding the analysis. If you have any questions, please contact us. We welcome your inquiries.

Sincerely,

Liliana Durham
Laboratory Management Group / AMS Instrumentation Manager

Beta Analytic, Inc.
4985 SW 74th Court
Miami, FL 33155 USA
Tel: (305) 667-5167
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

Summary of Results - % Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Validation:

Certificate Number:
DD204ED46D363B7CE7DC4F8EC362BC8C

To validate report, scan this QR code on a mobile device or go to https://verify.betalabservices.com and enter the requested information.

Submitter	Mike Pryde
Company	St. Marys Cement (Canada) - Ontario - Bowmanville Plant
Received Date	January 13, 2025
Report Date	January 21, 2025
Sample Code	905 Wood - WD - 0125

Result

99% Biogenic Carbon Content (as a fraction of total carbon)

Laboratory Number	Beta-729868
Percent modern carbon (pMC)	111.22 +/- 0.24 pMC
Atmospheric adjustment factor (REF)	99.4; = pMC/[1/(99.4/112)]

Labeling COC


VOC (1mm x 1mm scale)


3267.2mg analyzed (1mm x 1mm scale)

Disclosures: All analytical work is performed by BETA Analytic's professional staff, in its laboratories on our AMS, IRMS, CRDS and GC instruments. No subcontractors are ever used. We are a tracer-free 14C facility that does not accept or analyze materials that might contain artificial 14C (from biomedical, environmental, or other studies). Quality Assurance is maintained through our ongoing ISO/IEC 17025:2017 Laboratory Testing Accreditation, and verified by Quality Assurance Reports, posted to the web-library along with this report.

The published report is final and non-modifiable.

This report has been built with the information provided on the online form by the client. If different reporting information is required, a new sample analysis must be performed, with a new online form filled out to include exactly the information requested on the form.

Precision on the RESULT is cited as +/- 3% (absolute). The cited precision on the analytical measure (pMC) is 1 sigma (1 relative standard deviation). The reported result only applies to the analyzed material. The accuracy of the RESULT relies on the measured carbon in the analyzed material having been in recent equilibrium with CO2 in the air and/or from fossil carbon (more than 45,000 years old) such as petroleum or coal. The RESULT only applies to relative carbon content, not to relative mass content. The RESULT is calculated by adjusting pMC by the applicable "Atmospheric adjustment factor (REF)" cited in this report.

Beta Analytic, Inc.
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Miami, FL 33155 USA
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info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

Summary of Results - % Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Validation:

Certificate Number:
DD204ED46D363B7CE7DC4F8EC362BC8C

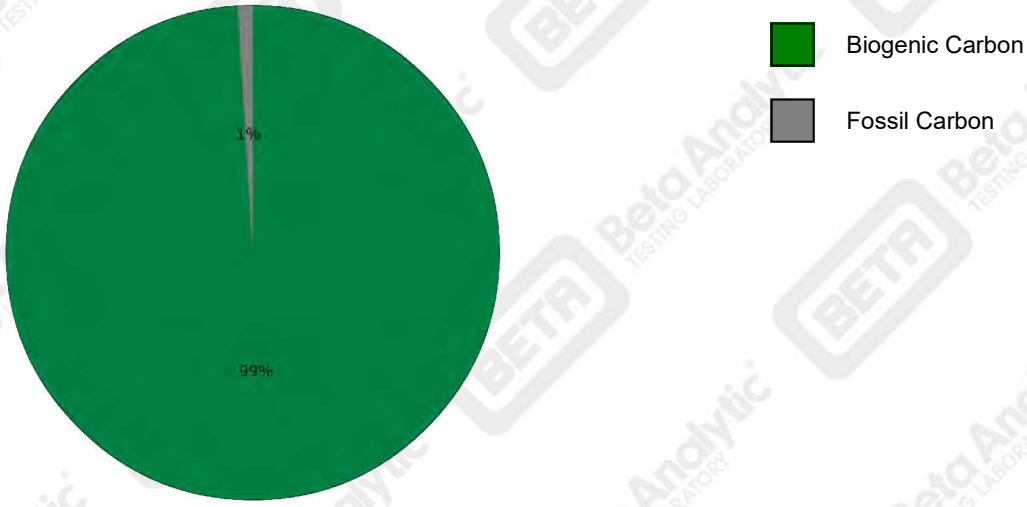
To validate report, scan this QR code on a mobile device or go to https://verify.betalabservices.com and enter the requested information.

Submitter	Mike Pryde
Company	St. Marys Cement (Canada) - Ontario - Bowmanville Plant
Received Date	January 13, 2025
Report Date	January 21, 2025
Sample Code	905 Wood - WD - 0125

Result

99% Biogenic Carbon Content (as a fraction of total carbon)

Laboratory Number	Beta-729868
Percent modern carbon (pMC)	111.22 +/- 0.24 pMC
Atmospheric adjustment factor (REF)	99.4; = pMC/[1/(99.4/112)]



Precision on the RESULT is cited as +/- 3% (absolute). The cited precision on the analytical measure (pMC) is 1 sigma (1 relative standard deviation). The reported result only applies to the analyzed material. The accuracy of the RESULT relies on the measured carbon in the analyzed material having been in recent equilibrium with CO2 in the air and/or from fossil carbon (more than 45,000 years old) such as petroleum or coal. The RESULT only applies to relative carbon content, not to relative mass content. The RESULT is calculated by adjusting pMC by the applicable "Atmospheric adjustment factor (REF)" cited in this report.

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% Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Explanation of Results

The result was obtained using the radiocarbon isotope (also known as Carbon-14, C14 or 14C), a naturally occurring isotope of carbon that is radioactive and decays in such a way that there is none left after about 45,000 years following the death of a plant or animal. Its most common use is radiocarbon dating by archaeologists. An industrial application was also developed to determine if consumer products and CO2 emissions were sourced from plants/biomass or from materials such as petroleum or coal (fossil-ba sed). By 2003 there was growing demand for a standardized methodology for applying Carbon -14 testing within the regulatory environment. The first of these standards was ASTM D6866-04, which was written with the assistance of Beta Analytic. Since ASTM was largely viewed as a US standard, European stakeholders soon began demanding an equivalent CEN standard while global stakeholders called for ISO standardization.

The analytical procedures for measuring radiocarbon content using the different standards are identical. The only difference is the reporting format. Results are usually reported using the standardized terminology “% biobased carbon”. Only ASTM D6866 uses the term “% biogenic carbon” when the result represents all carbon present (Total Carbon) rather than just the organic carbon (Total Organic Carbon). The terms “% biobased carbon” and “% biogenic carbon” are now the standard units in regulatory and industrial applications, replacing obscure units of measure historically reported by radiocarbon dating laboratories e.g. disintegra tions per minute per gram (dpm/g) or radiocarbon age.

The result was obtained by measuring the ratio of radiocarbon in the material relative to a National Institute of Standards and Technology (NIST) modern reference standard (SRM 4990C). This ratio was calculated as a percentage and is reported as percent modern carbon (pMC). The value obtained relative to the NIST standard is normalized to the year 1950 AD so an adjustment was required to calculate a carbon source value relative to today. This factor is listed on the report sheet as the terminology “REF”.

Interpretation and application of the results is straightforward. A value of 100% biobased or biogenic carbon would indicate that 100% of the carbon came from plants or animal by-products (biomass) living in the natural environment and a value of 0% would mean that all of the carbon was derived from petrochemicals, coal and other fossil sources. A value between 0-100% would indicate a mixture. The higher the value, the greater the proportion of naturally sourced components in the material.

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ISO/IEC 17025:2017-Accredited Testing Laboratory

Quality Assurance Report

This report provides the results of reference materials used to validate radiocarbon analyses prior to reporting. Known-value reference materials were analyzed quasi-simultaneously with the unknowns. Results are reported as expected values vs measured values. Reported values are calculated relative to NIST SRM-4990C and corrected for isotopic fractionation. Results are reported using the direct analytical measure percent modern carbon (pMC) with one relative standard deviation. Agreement between expected and measured values is taken as being within 2 sigma agreement (error x 2) to account for total laboratory error.

Report Date January 21, 2025

Submitter Mike Pryde

QA MEASUREMENTS

Reference 1	
Expected Value	129.41 +/- 0.06 pMC
Measured Value	129.39 +/- 0.32 pMC
Agreement	Accepted
Reference 2	
Expected Value	0.44 +/- 0.04 pMC
Measured Value	0.44 +/- 0.04 pMC
Agreement	Accepted
Reference 3	
Expected Value	95.86 +/- 0.37 pMC
Measured Value	96.21 +/- 0.24 pMC
Agreement	Accepted

Comment All measurements passed acceptance tests.

Validation 

Date January 21, 2025

Beta Analytic, Inc.
4985 SW 74th Court
Miami, FL 33155 USA
Tel: (305) 667-5167
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

January 21, 2025

Mike Pryde
St. Marys Cement (Canada) - Ontario - Bowmanville Plant
410 Bowmanville Avenue
Bowmanville, Ontario (ON) L1C 7B5
Canada

Dear Mike Pryde,

Please find enclosed your radiocarbon (C14) report for the material recently submitted. The result is reported as “% Biogenic Carbon”. This indicates the percentage carbon from “renewable” (biomass or animal by-product) sources versus petroleum (or otherwise fossil) sources . For reference, 100 % Biogenic Carbon indicates that a material is entirely sourced from plants or animal by-products and 0 % Biogenic Carbon indicates that a material did not contain any carbon from plants or animal by-products. A value in between represents a mixture of natural and fossil sources.

The analytical measurement is cited as “percent modern carbon (pMC)”. This is the percentage of C14 measured in the sample relative to a modern reference standard (NIST 4990C). The % Biogenic Carbon content is calculated from pMC by applying a small adjustment factor for C14 in carbon dioxide in air today. It is important to note is that all internationally recognized standards using C14 assume that the plant or biomass feedstocks were obtained from natural environments.

Reported results are accredited to ISO/IEC 17025:2017 PJLA #59423 standards and all chemistry was performed here in our laboratory and counted in our own accelerators in Miami, Florida.

The international standard method utilized for this analysis is cited under Summary of Results. The standard version used is the latest available as of the date reported (unless otherwise noted). The report also indicates if the result is relative to total carbon (TC) or only total organic carbon (TOC). When interpreting the results, please consider any communications you may have had with us regarding the analysis. If you have any questions, please contact us. We welcome your inquiries.

Sincerely,

Liliana Durham
Laboratory Management Group / AMS Instrumentation Manager

Beta Analytic, Inc.
4985 SW 74th Court
Miami, FL 33155 USA
Tel: (305) 667-5167
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

Summary of Results - % Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Validation:

Certificate Number:
EACF6781C850C902A804FF9F532B6418

To validate report, scan this QR code on a mobile device or go to https://verify.betalabservices.com and enter the requested information.

Submitter	Mike Pryde
Company	St. Marys Cement (Canada) - Ontario - Bowmanville Plant
Received Date	January 13, 2025
Report Date	January 21, 2025
Sample Code	Woodbridge - WD - 0125

Result

100% Biogenic Carbon Content (as a fraction of total carbon)

Laboratory Number	Beta-729867
Percent modern carbon (pMC)	116.92 +/- 0.23 pMC
Atmospheric adjustment factor (REF)	99.4; = pMC/[1/(99.4/112)]

Labeling COC


VOC (1mm x 1mm scale)


3103.6mg analyzed (1mm x 1mm scale)

Disclosures: All analytical work is performed by BETA Analytic's professional staff, in its laboratories on our AMS, IRMS, CRDS and GC instruments. No subcontractors are ever used. We are a tracer-free 14C facility that does not accept or analyze materials that might contain artificial 14C (from biomedical, environmental, or other studies). Quality Assurance is maintained through our ongoing ISO/IEC 17025:2017 Laboratory Testing Accreditation, and verified by Quality Assurance Reports, posted to the web-library along with this report.

The published report is final and non-modifiable.

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Precision on the RESULT is cited as +/- 3% (absolute). The cited precision on the analytical measure (pMC) is 1 sigma (1 relative standard deviation). The reported result only applies to the analyzed material. The accuracy of the RESULT relies on the measured carbon in the analyzed material having been in recent equilibrium with CO2 in the air and/or from fossil carbon (more than 45,000 years old) such as petroleum or coal. The RESULT only applies to relative carbon content, not to relative mass content. The RESULT is calculated by adjusting pMC by the applicable "Atmospheric adjustment factor (REF)" cited in this report.

Beta Analytic, Inc.
4985 SW 74th Court
Miami, FL 33155 USA
Tel: (305) 667-5167
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

Summary of Results - % Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Validation:

Certificate Number:
EACF6781C850C902A804FF9F532B6418

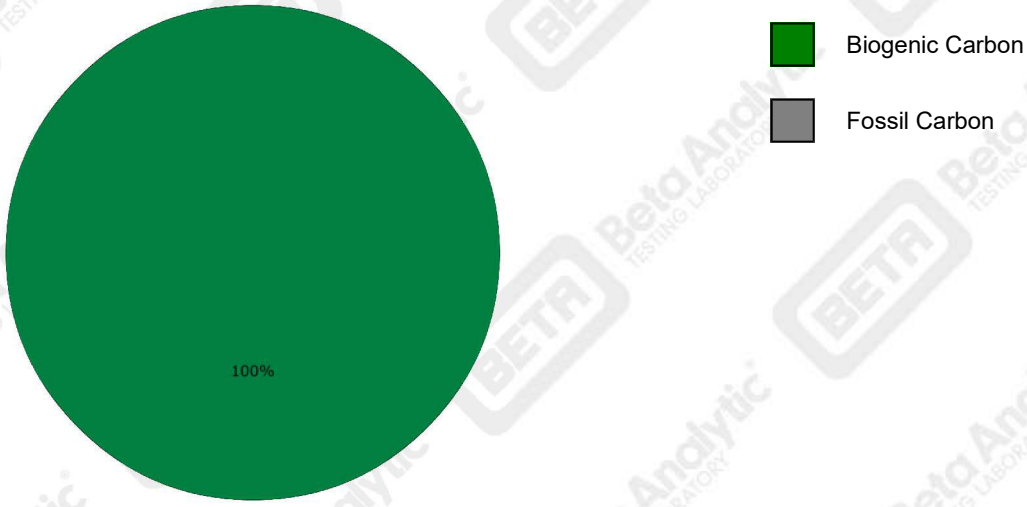
To validate report, scan this QR code on a mobile device or go to https://verify.betalabservices.com and enter the requested information.

Submitter	Mike Pryde
Company	St. Marys Cement (Canada) - Ontario - Bowmanville Plant
Received Date	January 13, 2025
Report Date	January 21, 2025
Sample Code	Woodbridge - WD - 0125

Result

100% Biogenic Carbon Content (as a fraction of total carbon)

Laboratory Number	Beta-729867
Percent modern carbon (pMC)	116.92 +/- 0.23 pMC
Atmospheric adjustment factor (REF)	99.4; = pMC/[1/(99.4/112)]



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% Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Explanation of Results

The result was obtained using the radiocarbon isotope (also known as Carbon-14, C14 or 14C), a naturally occurring isotope of carbon that is radioactive and decays in such a way that there is none left after about 45,000 years following the death of a plant or animal. Its most common use is radiocarbon dating by archaeologists. An industrial application was also developed to determine if consumer products and CO2 emissions were sourced from plants/biomass or from materials such as petroleum or coal (fossil-ba sed). By 2003 there was growing demand for a standardized methodology for applying Carbon -14 testing within the regulatory environment. The first of these standards was ASTM D6866-04, which was written with the assistance of Beta Analytic. Since ASTM was largely viewed as a US standard, European stakeholders soon began demanding an equivalent CEN standard while global stakeholders called for ISO standardization.

The analytical procedures for measuring radiocarbon content using the different standards are identical. The only difference is the reporting format. Results are usually reported using the standardized terminology “% biobased carbon”. Only ASTM D6866 uses the term “% biogenic carbon” when the result represents all carbon present (Total Carbon) rather than just the organic carbon (Total Organic Carbon). The terms “% biobased carbon” and “% biogenic carbon” are now the standard units in regulatory and industrial applications, replacing obscure units of measure historically reported by radiocarbon dating laboratories e.g. disintegra tions per minute per gram (dpm/g) or radiocarbon age.

The result was obtained by measuring the ratio of radiocarbon in the material relative to a National Institute of Standards and Technology (NIST) modern reference standard (SRM 4990C). This ratio was calculated as a percentage and is reported as percent modern carbon (pMC). The value obtained relative to the NIST standard is normalized to the year 1950 AD so an adjustment was required to calculate a carbon source value relative to today. This factor is listed on the report sheet as the terminology “REF”.

Interpretation and application of the results is straightforward. A value of 100% biobased or biogenic carbon would indicate that 100% of the carbon came from plants or animal by-products (biomass) living in the natural environment and a value of 0% would mean that all of the carbon was derived from petrochemicals, coal and other fossil sources. A value between 0-100% would indicate a mixture. The higher the value, the greater the proportion of naturally sourced components in the material.

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ISO/IEC 17025:2017-Accredited Testing Laboratory

Quality Assurance Report

This report provides the results of reference materials used to validate radiocarbon analyses prior to reporting. Known-value reference materials were analyzed quasi-simultaneously with the unknowns. Results are reported as expected values vs measured values. Reported values are calculated relative to NIST SRM-4990C and corrected for isotopic fractionation. Results are reported using the direct analytical measure percent modern carbon (pMC) with one relative standard deviation. Agreement between expected and measured values is taken as being within 2 sigma agreement (error x 2) to account for total laboratory error.

Report Date January 21, 2025

Submitter Mike Pryde

QA MEASUREMENTS

Reference 1	
Expected Value	129.41 +/- 0.06 pMC
Measured Value	129.39 +/- 0.32 pMC
Agreement	Accepted
Reference 2	
Expected Value	0.44 +/- 0.04 pMC
Measured Value	0.44 +/- 0.04 pMC
Agreement	Accepted
Reference 3	
Expected Value	95.86 +/- 0.37 pMC
Measured Value	96.21 +/- 0.24 pMC
Agreement	Accepted

Comment All measurements passed acceptance tests.

Validation 

Date January 21, 2025

Beta Analytic, Inc.
4985 SW 74th Court
Miami, FL 33155 USA
Tel: (305) 667-5167
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

January 21, 2025

Mike Pryde
St. Marys Cement (Canada) - Ontario - Bowmanville Plant
410 Bowmanville Avenue
Bowmanville, Ontario (ON) L1C 7B5
Canada

Dear Mike Pryde,

Please find enclosed your radiocarbon (C14) report for the material recently submitted. The result is reported as “% Biogenic Carbon”. This indicates the percentage carbon from “renewable” (biomass or animal by-product) sources versus petroleum (or otherwise fossil) sources . For reference, 100 % Biogenic Carbon indicates that a material is entirely sourced from plants or animal by-products and 0 % Biogenic Carbon indicates that a material did not contain any carbon from plants or animal by-products. A value in between represents a mixture of natural and fossil sources.

The analytical measurement is cited as “percent modern carbon (pMC)”. This is the percentage of C14 measured in the sample relative to a modern reference standard (NIST 4990C). The % Biogenic Carbon content is calculated from pMC by applying a small adjustment factor for C14 in carbon dioxide in air today. It is important to note is that all internationally recognized standards using C14 assume that the plant or biomass feedstocks were obtained from natural environments.

Reported results are accredited to ISO/IEC 17025:2017 PJLA #59423 standards and all chemistry was performed here in our laboratory and counted in our own accelerators in Miami, Florida.

The international standard method utilized for this analysis is cited under Summary of Results. The standard version used is the latest available as of the date reported (unless otherwise noted). The report also indicates if the result is relative to total carbon (TC) or only total organic carbon (TOC). When interpreting the results, please consider any communications you may have had with us regarding the analysis. If you have any questions, please contact us. We welcome your inquiries.

Sincerely,

Liliana Durham
Laboratory Management Group / AMS Instrumentation Manager

Beta Analytic, Inc.
4985 SW 74th Court
Miami, FL 33155 USA
Tel: (305) 667-5167
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

Summary of Results - % Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Validation:

Certificate Number:
E578C637FA9F0C03C524B5B13F02FD2A

To validate report, scan this QR code on a mobile device or go to https://verify.betalabservices.com and enter the requested information.

Submitter	Mike Pryde
Company	St. Marys Cement (Canada) - Ontario - Bowmanville Plant
Received Date	January 13, 2025
Report Date	January 21, 2025
Sample Code	Re-World - PL - 0125

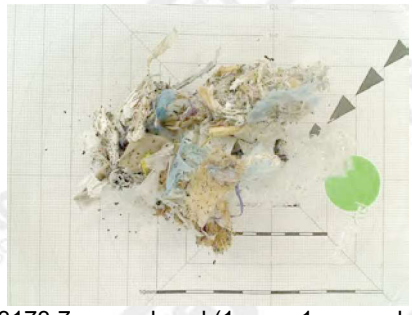
Result

47% Biogenic Carbon Content (as a fraction of total carbon)

Laboratory Number	Beta-729865
Percent modern carbon (pMC)	46.98 +/- 0.15 pMC
Atmospheric adjustment factor (REF)	99.4; = pMC/0.994

Labeling COC


VOC (1mm x 1mm scale)


3173.7mg analyzed (1mm x 1mm scale)

Disclosures: All analytical work is performed by BETA Analytic's professional staff, in its laboratories on our AMS, IRMS, CRDS and GC instruments. No subcontractors are ever used. We are a tracer-free 14C facility that does not accept or analyze materials that might contain artificial 14C (from biomedical, environmental, or other studies). Quality Assurance is maintained through our ongoing ISO/IEC 17025:2017 Laboratory Testing Accreditation, and verified by Quality Assurance Reports, posted to the web-library along with this report.

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Summary of Results - % Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

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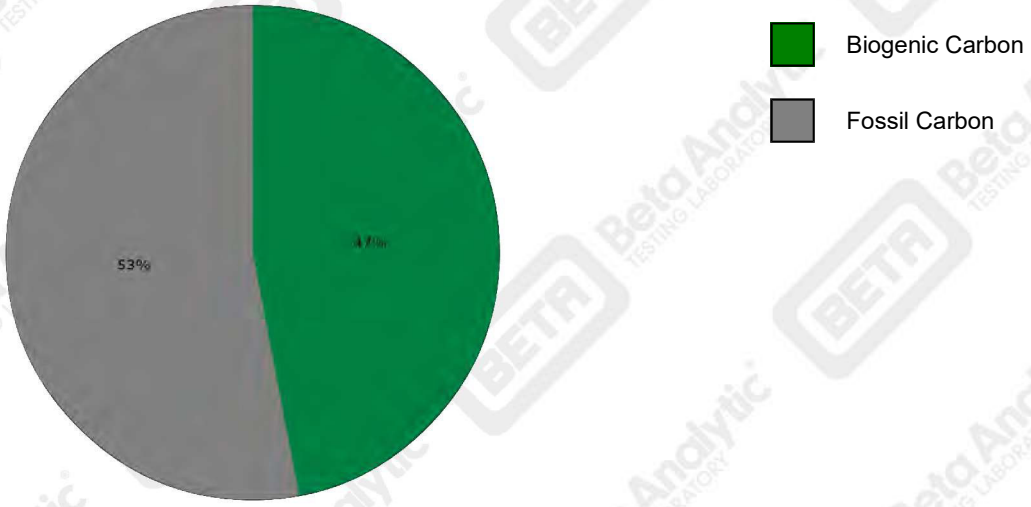

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% Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Explanation of Results

The result was obtained using the radiocarbon isotope (also known as Carbon-14, C14 or 14C), a naturally occurring isotope of carbon that is radioactive and decays in such a way that there is none left after about 45,000 years following the death of a plant or animal. Its most common use is radiocarbon dating by archaeologists. An industrial application was also developed to determine if consumer products and CO2 emissions were sourced from plants/biomass or from materials such as petroleum or coal (fossil-ba sed). By 2003 there was growing demand for a standardized methodology for applying Carbon -14 testing within the regulatory environment. The first of these standards was ASTM D6866-04, which was written with the assistance of Beta Analytic. Since ASTM was largely viewed as a US standard, European stakeholders soon began demanding an equivalent CEN standard while global stakeholders called for ISO standardization.

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Report Date January 21, 2025

Submitter Mike Pryde

QA MEASUREMENTS

Reference 1	
Expected Value	129.41 +/- 0.06 pMC
Measured Value	129.39 +/- 0.32 pMC
Agreement	Accepted
Reference 2	
Expected Value	0.44 +/- 0.04 pMC
Measured Value	0.44 +/- 0.04 pMC
Agreement	Accepted
Reference 3	
Expected Value	95.86 +/- 0.37 pMC
Measured Value	96.21 +/- 0.24 pMC
Agreement	Accepted

Comment All measurements passed acceptance tests.

Validation 

Date January 21, 2025

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4985 SW 74th Court
Miami, FL 33155 USA
Tel: (305) 667-5167
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

January 21, 2025

Mike Pryde
St. Marys Cement (Canada) - Ontario - Bowmanville Plant
410 Bowmanville Avenue
Bowmanville, Ontario (ON) L1C 7B5
Canada

Dear Mike Pryde,

Please find enclosed your radiocarbon (C14) report for the material recently submitted. The result is reported as “% Biogenic Carbon”. This indicates the percentage carbon from “renewable” (biomass or animal by-product) sources versus petroleum (or otherwise fossil) sources . For reference, 100 % Biogenic Carbon indicates that a material is entirely sourced from plants or animal by-products and 0 % Biogenic Carbon indicates that a material did not contain any carbon from plants or animal by-products. A value in between represents a mixture of natural and fossil sources.

The analytical measurement is cited as “percent modern carbon (pMC)”. This is the percentage of C14 measured in the sample relative to a modern reference standard (NIST 4990C). The % Biogenic Carbon content is calculated from pMC by applying a small adjustment factor for C14 in carbon dioxide in air today. It is important to note is that all internationally recognized standards using C14 assume that the plant or biomass feedstocks were obtained from natural environments.

Reported results are accredited to ISO/IEC 17025:2017 PJLA #59423 standards and all chemistry was performed here in our laboratory and counted in our own accelerators in Miami, Florida.

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Sincerely,

John Enriquez
Laboratory Management Group / AMS Chemistry Manager

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4985 SW 74th Court
Miami, FL 33155 USA
Tel: (305) 667-5167
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

Summary of Results - % Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Validation:

Certificate Number:
3C52A78374405FDDE8BA0D9A92ACCF64

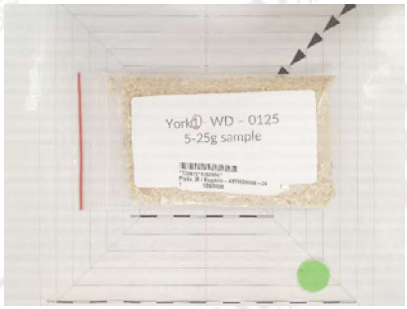
To validate report, scan this QR code on a mobile device or go to https://verify.betalabservices.com and enter the requested information.

Submitter	Mike Pryde
Company	St. Marys Cement (Canada) - Ontario - Bowmanville Plant
Received Date	January 13, 2025
Report Date	January 21, 2025
Sample Code	York1 - WD - 0125

Result

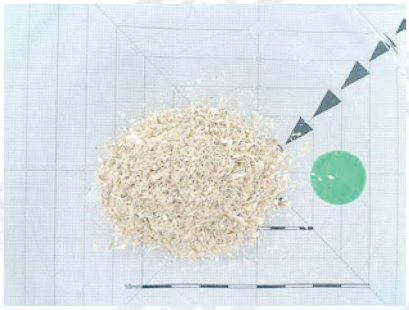
100% Biogenic Carbon Content (as a fraction of total carbon)

Laboratory Number	Beta-729870
Percent modern carbon (pMC)	112.51 +/- 0.21 pMC
Atmospheric adjustment factor (REF)	99.4; = pMC/[1/(99.4/112)]



Labeling COC


VOC (1mm x 1mm scale)


3116.0mg analyzed (1mm x 1mm scale)

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Summary of Results - % Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Validation:

Certificate Number:
3C52A78374405FDDE8BA0D9A92ACCF64

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Submitter	Mike Pryde
Company	St. Marys Cement (Canada) - Ontario - Bowmanville Plant
Received Date	January 13, 2025
Report Date	January 21, 2025
Sample Code	York1 - WD - 0125

Result

100% Biogenic Carbon Content (as a fraction of total carbon)

Laboratory Number	Beta-729870
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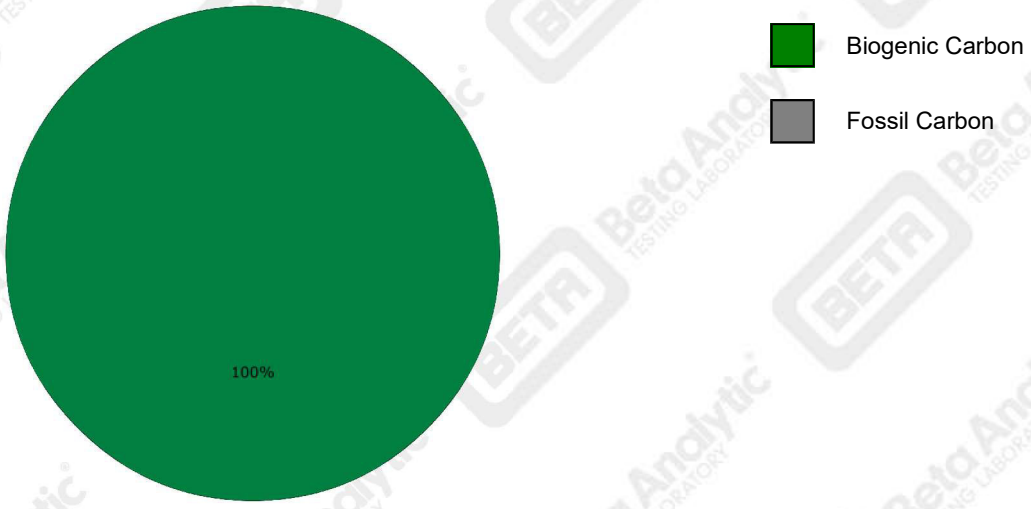
Atmospheric adjustment factor (REF)	99.4; = pMC/[1/(99.4/112)]



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% Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Explanation of Results

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ISO/IEC 17025:2017-Accredited Testing Laboratory

Quality Assurance Report

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Report Date January 21, 2025

Submitter Mike Pryde

QA MEASUREMENTS

Reference 1	
Expected Value	129.41 +/- 0.06 pMC
Measured Value	129.39 +/- 0.16 pMC
Agreement	Accepted
Reference 2	
Expected Value	0.44 +/- 0.04 pMC
Measured Value	0.44 +/- 0.04 pMC
Agreement	Accepted
Reference 3	
Expected Value	95.86 +/- 0.37 pMC
Measured Value	96.21 +/- 0.24 pMC
Agreement	Accepted

Comment All measurements passed acceptance tests.

Validation 

Date January 21, 2025

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ISO/IEC 17025:2017-Accredited Testing Laboratory

January 21, 2025

Mike Pryde
St. Marys Cement (Canada) - Ontario - Bowmanville Plant
410 Bowmanville Avenue
Bowmanville, Ontario (ON) L1C 7B5
Canada

Dear Mike Pryde,

Please find enclosed your radiocarbon (C14) report for the material recently submitted. The result is reported as “% Biogenic Carbon”. This indicates the percentage carbon from “renewable” (biomass or animal by-product) sources versus petroleum (or otherwise fossil) sources . For reference, 100 % Biogenic Carbon indicates that a material is entirely sourced from plants or animal by-products and 0 % Biogenic Carbon indicates that a material did not contain any carbon from plants or animal by-products. A value in between represents a mixture of natural and fossil sources.

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Reported results are accredited to ISO/IEC 17025:2017 PJLA #59423 standards and all chemistry was performed here in our laboratory and counted in our own accelerators in Miami, Florida.

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John Enriquez
Laboratory Management Group / AMS Chemistry Manager

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info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

Summary of Results - % Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Validation:

Certificate Number:
EF041C58754568D84B5EE6AFF8A09AEC

To validate report, scan this QR code on a mobile device or go to https://verify.betalabservices.com and enter the requested information.

Submitter	Mike Pryde
Company	St. Marys Cement (Canada) - Ontario - Bowmanville Plant
Received Date	January 13, 2025
Report Date	January 21, 2025
Sample Code	GFL - WD - 0125

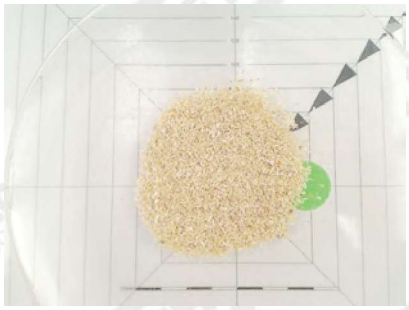
Result

98% Biogenic Carbon Content (as a fraction of total carbon)

Laboratory Number	Beta-729869
Percent modern carbon (pMC)	110.80 +/- 0.21 pMC
Atmospheric adjustment factor (REF)	99.4; = pMC/[1/(99.4/112)]

Labeling COC


VOC (1mm x 1mm scale)


3136.5mg analyzed (1mm x 1mm scale)

Disclosures: All analytical work is performed by BETA Analytic's professional staff, in its laboratories on our AMS, IRMS, CRDS and GC instruments. No subcontractors are ever used. We are a tracer-free 14C facility that does not accept or analyze materials that might contain artificial 14C (from biomedical, environmental, or other studies). Quality Assurance is maintained through our ongoing ISO/IEC 17025:2017 Laboratory Testing Accreditation, and verified by Quality Assurance Reports, posted to the web-library along with this report.

The published report is final and non-modifiable.

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Precision on the RESULT is cited as +/- 3% (absolute). The cited precision on the analytical measure (pMC) is 1 sigma (1 relative standard deviation). The reported result only applies to the analyzed material. The accuracy of the RESULT relies on the measured carbon in the analyzed material having been in recent equilibrium with CO2 in the air and/or from fossil carbon (more than 45,000 years old) such as petroleum or coal. The RESULT only applies to relative carbon content, not to relative mass content. The RESULT is calculated by adjusting pMC by the applicable "Atmospheric adjustment factor (REF)" cited in this report.

Beta Analytic, Inc.
4985 SW 74th Court
Miami, FL 33155 USA
Tel: (305) 667-5167
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

Summary of Results - % Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Validation:

Certificate Number:
EF041C58754568D84B5EE6AFF8A09AEC

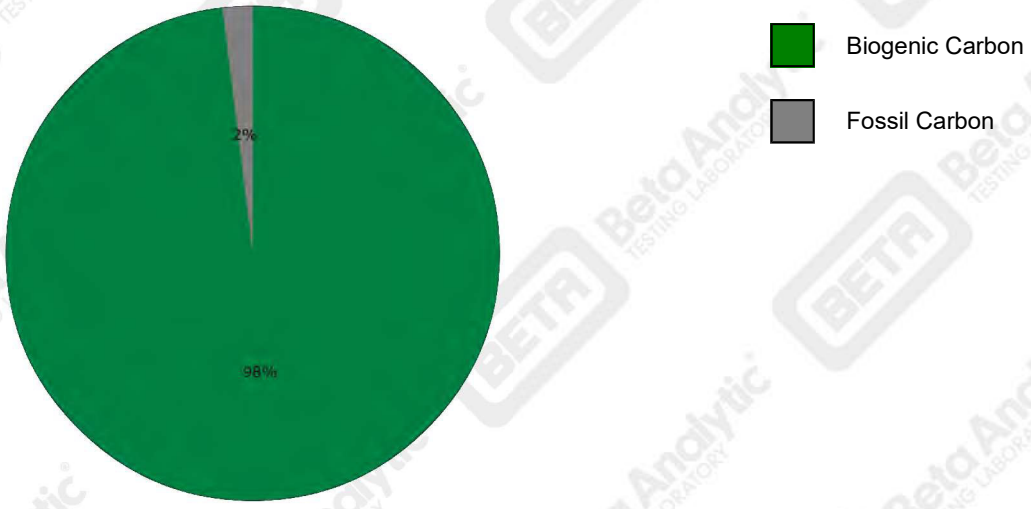
To validate report, scan this QR code on a mobile device or go to https://verify.betalabservices.com and enter the requested information.

Submitter	Mike Pryde
Company	St. Marys Cement (Canada) - Ontario - Bowmanville Plant
Received Date	January 13, 2025
Report Date	January 21, 2025
Sample Code	GFL - WD - 0125

Result

98% Biogenic Carbon Content (as a fraction of total carbon)

Laboratory Number	Beta-729869
Percent modern carbon (pMC)	110.80 +/- 0.21 pMC
Atmospheric adjustment factor (REF)	99.4; = pMC/[1/(99.4/112)]



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% Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Explanation of Results

The result was obtained using the radiocarbon isotope (also known as Carbon-14, C14 or 14C), a naturally occurring isotope of carbon that is radioactive and decays in such a way that there is none left after about 45,000 years following the death of a plant or animal. Its most common use is radiocarbon dating by archaeologists. An industrial application was also developed to determine if consumer products and CO2 emissions were sourced from plants/biomass or from materials such as petroleum or coal (fossil-ba sed). By 2003 there was growing demand for a standardized methodology for applying Carbon -14 testing within the regulatory environment. The first of these standards was ASTM D6866-04, which was written with the assistance of Beta Analytic. Since ASTM was largely viewed as a US standard, European stakeholders soon began demanding an equivalent CEN standard while global stakeholders called for ISO standardization.

The analytical procedures for measuring radiocarbon content using the different standards are identical. The only difference is the reporting format. Results are usually reported using the standardized terminology “% biobased carbon”. Only ASTM D6866 uses the term “% biogenic carbon” when the result represents all carbon present (Total Carbon) rather than just the organic carbon (Total Organic Carbon). The terms “% biobased carbon” and “% biogenic carbon” are now the standard units in regulatory and industrial applications, replacing obscure units of measure historically reported by radiocarbon dating laboratories e.g. disintegra tions per minute per gram (dpm/g) or radiocarbon age.

The result was obtained by measuring the ratio of radiocarbon in the material relative to a National Institute of Standards and Technology (NIST) modern reference standard (SRM 4990C). This ratio was calculated as a percentage and is reported as percent modern carbon (pMC). The value obtained relative to the NIST standard is normalized to the year 1950 AD so an adjustment was required to calculate a carbon source value relative to today. This factor is listed on the report sheet as the terminology “REF”.

Interpretation and application of the results is straightforward. A value of 100% biobased or biogenic carbon would indicate that 100% of the carbon came from plants or animal by-products (biomass) living in the natural environment and a value of 0% would mean that all of the carbon was derived from petrochemicals, coal and other fossil sources. A value between 0-100% would indicate a mixture. The higher the value, the greater the proportion of naturally sourced components in the material.

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Quality Assurance Report

This report provides the results of reference materials used to validate radiocarbon analyses prior to reporting. Known-value reference materials were analyzed quasi-simultaneously with the unknowns. Results are reported as expected values vs measured values. Reported values are calculated relative to NIST SRM-4990C and corrected for isotopic fractionation. Results are reported using the direct analytical measure percent modern carbon (pMC) with one relative standard deviation. Agreement between expected and measured values is taken as being within 2 sigma agreement (error x 2) to account for total laboratory error.

Report Date January 21, 2025

Submitter Mike Pryde

QA MEASUREMENTS

Reference 1	
Expected Value	129.41 +/- 0.06 pMC
Measured Value	129.39 +/- 0.16 pMC
Agreement	Accepted
Reference 2	
Expected Value	0.44 +/- 0.04 pMC
Measured Value	0.44 +/- 0.04 pMC
Agreement	Accepted
Reference 3	
Expected Value	95.86 +/- 0.37 pMC
Measured Value	96.21 +/- 0.24 pMC
Agreement	Accepted

Comment All measurements passed acceptance tests.

Validation 

Date January 21, 2025

Beta Analytic, Inc.
4985 SW 74th Court
Miami, FL 33155 USA
Tel: (305) 667-5167
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

January 21, 2025

Mike Pryde
St. Marys Cement (Canada) - Ontario - Bowmanville Plant
410 Bowmanville Avenue
Bowmanville, Ontario (ON) L1C 7B5
Canada

Dear Mike Pryde,

Please find enclosed your radiocarbon (C14) report for the material recently submitted. The result is reported as “% Biogenic Carbon”. This indicates the percentage carbon from “renewable” (biomass or animal by-product) sources versus petroleum (or otherwise fossil) sources . For reference, 100 % Biogenic Carbon indicates that a material is entirely sourced from plants or animal by-products and 0 % Biogenic Carbon indicates that a material did not contain any carbon from plants or animal by-products. A value in between represents a mixture of natural and fossil sources.

The analytical measurement is cited as “percent modern carbon (pMC)”. This is the percentage of C14 measured in the sample relative to a modern reference standard (NIST 4990C). The % Biogenic Carbon content is calculated from pMC by applying a small adjustment factor for C14 in carbon dioxide in air today. It is important to note is that all internationally recognized standards using C14 assume that the plant or biomass feedstocks were obtained from natural environments.

Reported results are accredited to ISO/IEC 17025:2017 PJLA #59423 standards and all chemistry was performed here in our laboratory and counted in our own accelerators in Miami, Florida.

The international standard method utilized for this analysis is cited under Summary of Results. The standard version used is the latest available as of the date reported (unless otherwise noted). The report also indicates if the result is relative to total carbon (TC) or only total organic carbon (TOC). When interpreting the results, please consider any communications you may have had with us regarding the analysis. If you have any questions, please contact us. We welcome your inquiries.

Sincerely,

John Enriquez
Laboratory Management Group / AMS Chemistry Manager

Beta Analytic, Inc.
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Miami, FL 33155 USA
Tel: (305) 667-5167
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

Summary of Results - % Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Validation:

Certificate Number:
1F8BD7326B36C31D69C079E782B90F8D

To validate report, scan this QR code on a mobile device or go to https://verify.betalabservices.com and enter the requested information.

Submitter	Mike Pryde
Company	St. Marys Cement (Canada) - Ontario - Bowmanville Plant
Received Date	January 13, 2025
Report Date	January 21, 2025
Sample Code	Sol - WD - 0125

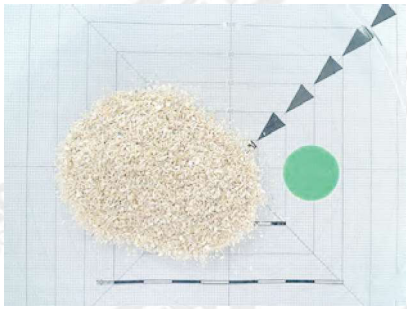
Result

100% Biogenic Carbon Content (as a fraction of total carbon)

Laboratory Number	Beta-729866
Percent modern carbon (pMC)	114.98 +/- 0.20 pMC
Atmospheric adjustment factor (REF)	99.4; = pMC/[1/(99.4/112)]

Labeling COC


VOC (1mm x 1mm scale)


3449.3mg analyzed (1mm x 1mm scale)

Disclosures: All analytical work is performed by BETA Analytic's professional staff, in its laboratories on our AMS, IRMS, CRDS and GC instruments. No subcontractors are ever used. We are a tracer-free 14C facility that does not accept or analyze materials that might contain artificial 14C (from biomedical, environmental, or other studies). Quality Assurance is maintained through our ongoing ISO/IEC 17025:2017 Laboratory Testing Accreditation, and verified by Quality Assurance Reports, posted to the web-library along with this report.

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Summary of Results - % Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Validation:

Certificate Number:
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Received Date	January 13, 2025
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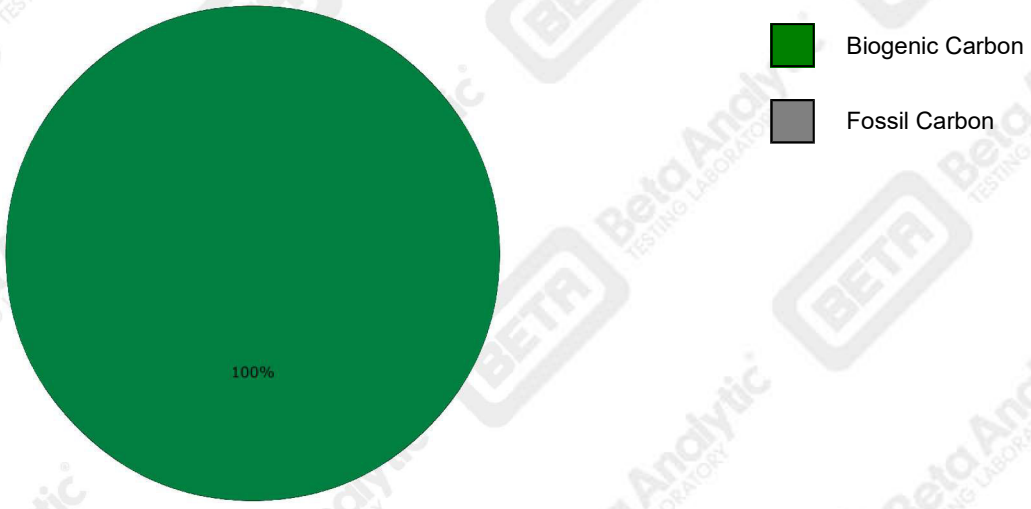

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% Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Explanation of Results

The result was obtained using the radiocarbon isotope (also known as Carbon-14, C14 or 14C), a naturally occurring isotope of carbon that is radioactive and decays in such a way that there is none left after about 45,000 years following the death of a plant or animal. Its most common use is radiocarbon dating by archaeologists. An industrial application was also developed to determine if consumer products and CO2 emissions were sourced from plants/biomass or from materials such as petroleum or coal (fossil-ba sed). By 2003 there was growing demand for a standardized methodology for applying Carbon -14 testing within the regulatory environment. The first of these standards was ASTM D6866-04, which was written with the assistance of Beta Analytic. Since ASTM was largely viewed as a US standard, European stakeholders soon began demanding an equivalent CEN standard while global stakeholders called for ISO standardization.

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Quality Assurance Report

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Report Date January 21, 2025

Submitter Mike Pryde

QA MEASUREMENTS

Reference 1	
Expected Value	129.41 +/- 0.06 pMC
Measured Value	129.39 +/- 0.16 pMC
Agreement	Accepted
Reference 2	
Expected Value	0.44 +/- 0.04 pMC
Measured Value	0.44 +/- 0.04 pMC
Agreement	Accepted
Reference 3	
Expected Value	95.86 +/- 0.37 pMC
Measured Value	96.21 +/- 0.24 pMC
Agreement	Accepted

Comment All measurements passed acceptance tests.

Validation 

Date January 21, 2025

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4985 SW 74th Court
Miami, FL 33155 USA
Tel: (305) 667-5167
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

January 21, 2025

Mike Pryde
St. Marys Cement (Canada) - Ontario - Bowmanville Plant
410 Bowmanville Avenue
Bowmanville, Ontario (ON) L1C 7B5
Canada

Dear Mike Pryde,

Please find enclosed your radiocarbon (C14) report for the material recently submitted. The result is reported as “% Biogenic Carbon”. This indicates the percentage carbon from “renewable” (biomass or animal by-product) sources versus petroleum (or otherwise fossil) sources . For reference, 100 % Biogenic Carbon indicates that a material is entirely sourced from plants or animal by-products and 0 % Biogenic Carbon indicates that a material did not contain any carbon from plants or animal by-products. A value in between represents a mixture of natural and fossil sources.

The analytical measurement is cited as “percent modern carbon (pMC)”. This is the percentage of C14 measured in the sample relative to a modern reference standard (NIST 4990C). The % Biogenic Carbon content is calculated from pMC by applying a small adjustment factor for C14 in carbon dioxide in air today. It is important to note is that all internationally recognized standards using C14 assume that the plant or biomass feedstocks were obtained from natural environments.

Reported results are accredited to ISO/IEC 17025:2017 PJLA #59423 standards and all chemistry was performed here in our laboratory and counted in our own accelerators in Miami, Florida.

The international standard method utilized for this analysis is cited under Summary of Results. The standard version used is the latest available as of the date reported (unless otherwise noted). The report also indicates if the result is relative to total carbon (TC) or only total organic carbon (TOC). When interpreting the results, please consider any communications you may have had with us regarding the analysis. If you have any questions, please contact us. We welcome your inquiries.

Sincerely,

John Enriquez
Laboratory Management Group / AMS Chemistry Manager

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Tel: (305) 667-5167
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ISO/IEC 17025:2017-Accredited Testing Laboratory

Summary of Results - % Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Validation:

Certificate Number:
AF915DC0127AF3CC22B5E6EC8F238A59

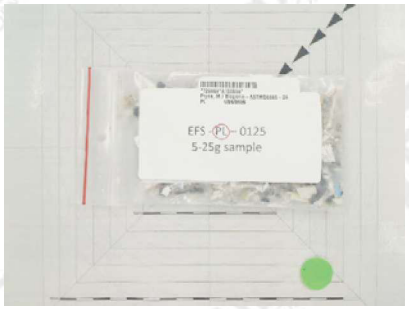
To validate report, scan this QR code on a mobile device or go to https://verify.betalabservices.com and enter the requested information.

Submitter	Mike Pryde
Company	St. Marys Cement (Canada) - Ontario - Bowmanville Plant
Received Date	January 13, 2025
Report Date	January 21, 2025
Sample Code	EFS - PL - 0125

Result

7% Biogenic Carbon Content (as a fraction of total carbon)

Laboratory Number	Beta-729864
Percent modern carbon (pMC)	6.70 +/- 0.06 pMC
Atmospheric adjustment factor (REF)	99.4; = pMC/0.994



Labeling COC


VOC (1mm x 1mm scale)


3193.9mg analyzed (1mm x 1mm scale)

Disclosures: All analytical work is performed by BETA Analytic's professional staff, in its laboratories on our AMS, IRMS, CRDS and GC instruments. No subcontractors are ever used. We are a tracer-free 14C facility that does not accept or analyze materials that might contain artificial 14C (from biomedical, environmental, or other studies). Quality Assurance is maintained through our ongoing ISO/IEC 17025:2017 Laboratory Testing Accreditation, and verified by Quality Assurance Reports, posted to the web-library along with this report.

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Summary of Results - % Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

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Submitter	Mike Pryde
Company	St. Marys Cement (Canada) - Ontario - Bowmanville Plant
Received Date	January 13, 2025
Report Date	January 21, 2025
Sample Code	EFS - PL - 0125

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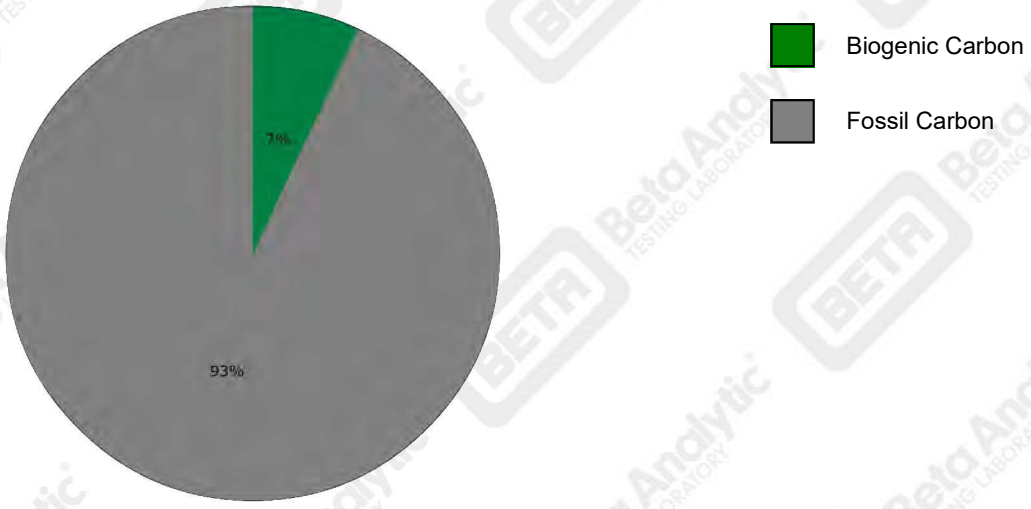

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% Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Explanation of Results

The result was obtained using the radiocarbon isotope (also known as Carbon-14, C14 or 14C), a naturally occurring isotope of carbon that is radioactive and decays in such a way that there is none left after about 45,000 years following the death of a plant or animal. Its most common use is radiocarbon dating by archaeologists. An industrial application was also developed to determine if consumer products and CO2 emissions were sourced from plants/biomass or from materials such as petroleum or coal (fossil-ba sed). By 2003 there was growing demand for a standardized methodology for applying Carbon -14 testing within the regulatory environment. The first of these standards was ASTM D6866-04, which was written with the assistance of Beta Analytic. Since ASTM was largely viewed as a US standard, European stakeholders soon began demanding an equivalent CEN standard while global stakeholders called for ISO standardization.

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Quality Assurance Report

This report provides the results of reference materials used to validate radiocarbon analyses prior to reporting. Known-value reference materials were analyzed quasi-simultaneously with the unknowns. Results are reported as expected values vs measured values. Reported values are calculated relative to NIST SRM-4990C and corrected for isotopic fractionation. Results are reported using the direct analytical measure percent modern carbon (pMC) with one relative standard deviation. Agreement between expected and measured values is taken as being within 2 sigma agreement (error x 2) to account for total laboratory error.

Report Date January 21, 2025

Submitter Mike Pryde

QA MEASUREMENTS

Reference 1	
Expected Value	129.41 +/- 0.06 pMC
Measured Value	129.39 +/- 0.16 pMC
Agreement	Accepted
Reference 2	
Expected Value	0.44 +/- 0.04 pMC
Measured Value	0.44 +/- 0.04 pMC
Agreement	Accepted
Reference 3	
Expected Value	95.86 +/- 0.37 pMC
Measured Value	96.21 +/- 0.24 pMC
Agreement	Accepted

Comment All measurements passed acceptance tests.

Validation 

Date January 21, 2025

Beta Analytic, Inc.
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January 21, 2025

Mike Pryde
St. Marys Cement (Canada) - Ontario - Bowmanville Plant
410 Bowmanville Avenue
Bowmanville, Ontario (ON) L1C 7B5
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Dear Mike Pryde,

Please find enclosed your radiocarbon (C14) report for the material recently submitted. The result is reported as “% Biogenic Carbon”. This indicates the percentage carbon from “renewable” (biomass or animal by-product) sources versus petroleum (or otherwise fossil) sources . For reference, 100 % Biogenic Carbon indicates that a material is entirely sourced from plants or animal by-products and 0 % Biogenic Carbon indicates that a material did not contain any carbon from plants or animal by-products. A value in between represents a mixture of natural and fossil sources.

The analytical measurement is cited as “percent modern carbon (pMC)”. This is the percentage of C14 measured in the sample relative to a modern reference standard (NIST 4990C). The % Biogenic Carbon content is calculated from pMC by applying a small adjustment factor for C14 in carbon dioxide in air today. It is important to note is that all internationally recognized standards using C14 assume that the plant or biomass feedstocks were obtained from natural environments.

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John Enriquez
Laboratory Management Group / AMS Chemistry Manager

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4985 SW 74th Court
Miami, FL 33155 USA
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ISO/IEC 17025:2017-Accredited Testing Laboratory

Summary of Results - % Biogenic Carbon Content ASTM D6866-24 Method B (AMS) TC

Validation:

Certificate Number:
F6BBA1B7F21C8B0CA84CAB22C5D9C3BC

To validate report, scan this QR code on a mobile device or go to https://verify.betalabservices.com and enter the requested information.

Submitter	Mike Pryde
Company	St. Marys Cement (Canada) - Ontario - Bowmanville Plant
Received Date	January 13, 2025
Report Date	January 21, 2025
Sample Code	Evolve - NY-0125

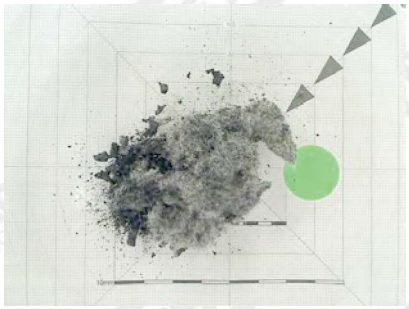
Result

29% Biogenic Carbon Content (as a fraction of total carbon)

Laboratory Number	Beta-729863
Percent modern carbon (pMC)	28.34 +/- 0.10 pMC
Atmospheric adjustment factor (REF)	99.4; = pMC/0.994

Labeling COC


VOC (1mm x 1mm scale)


2531.1mg analyzed (1mm x 1mm scale)

Disclosures: All analytical work is performed by BETA Analytic's professional staff, in its laboratories on our AMS, IRMS, CRDS and GC instruments. No subcontractors are ever used. We are a tracer-free 14C facility that does not accept or analyze materials that might contain artificial 14C (from biomedical, environmental, or other studies). Quality Assurance is maintained through our ongoing ISO/IEC 17025:2017 Laboratory Testing Accreditation, and verified by Quality Assurance Reports, posted to the web-library along with this report.

The published report is final and non-modifiable.

This report has been built with the information provided on the online form by the client. If different reporting information is required, a new sample analysis must be performed, with a new online form filled out to include exactly the information requested on the form.

Precision on the RESULT is cited as +/- 3% (absolute). The cited precision on the analytical measure (pMC) is 1 sigma (1 relative standard deviation). The reported result only applies to the analyzed material. The accuracy of the RESULT relies on the measured carbon in the analyzed material having been in recent equilibrium with CO2 in the air and/or from fossil carbon (more than 45,000 years old) such as petroleum or coal. The RESULT only applies to relative carbon content, not to relative mass content. The RESULT is calculated by adjusting pMC by the applicable "Atmospheric adjustment factor (REF)" cited in this report.

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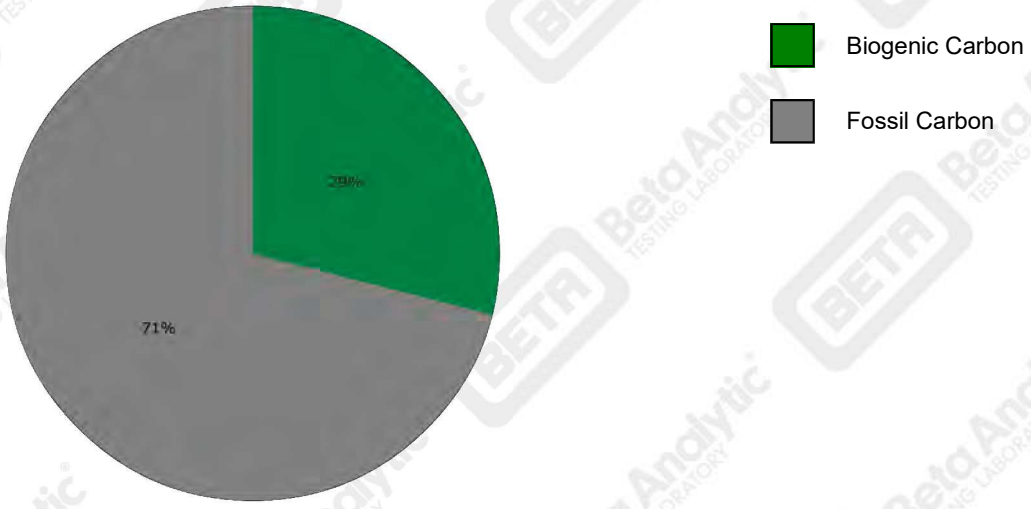

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Explanation of Results

The result was obtained using the radiocarbon isotope (also known as Carbon-14, C14 or 14C), a naturally occurring isotope of carbon that is radioactive and decays in such a way that there is none left after about 45,000 years following the death of a plant or animal. Its most common use is radiocarbon dating by archaeologists. An industrial application was also developed to determine if consumer products and CO2 emissions were sourced from plants/biomass or from materials such as petroleum or coal (fossil-ba sed). By 2003 there was growing demand for a standardized methodology for applying Carbon -14 testing within the regulatory environment. The first of these standards was ASTM D6866-04, which was written with the assistance of Beta Analytic. Since ASTM was largely viewed as a US standard, European stakeholders soon began demanding an equivalent CEN standard while global stakeholders called for ISO standardization.

The analytical procedures for measuring radiocarbon content using the different standards are identical. The only difference is the reporting format. Results are usually reported using the standardized terminology “% biobased carbon”. Only ASTM D6866 uses the term “% biogenic carbon” when the result represents all carbon present (Total Carbon) rather than just the organic carbon (Total Organic Carbon). The terms “% biobased carbon” and “% biogenic carbon” are now the standard units in regulatory and industrial applications, replacing obscure units of measure historically reported by radiocarbon dating laboratories e.g. disintegra tions per minute per gram (dpm/g) or radiocarbon age.

The result was obtained by measuring the ratio of radiocarbon in the material relative to a National Institute of Standards and Technology (NIST) modern reference standard (SRM 4990C). This ratio was calculated as a percentage and is reported as percent modern carbon (pMC). The value obtained relative to the NIST standard is normalized to the year 1950 AD so an adjustment was required to calculate a carbon source value relative to today. This factor is listed on the report sheet as the terminology “REF”.

Interpretation and application of the results is straightforward. A value of 100% biobased or biogenic carbon would indicate that 100% of the carbon came from plants or animal by-products (biomass) living in the natural environment and a value of 0% would mean that all of the carbon was derived from petrochemicals, coal and other fossil sources. A value between 0-100% would indicate a mixture. The higher the value, the greater the proportion of naturally sourced components in the material.

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Quality Assurance Report

This report provides the results of reference materials used to validate radiocarbon analyses prior to reporting. Known-value reference materials were analyzed quasi-simultaneously with the unknowns. Results are reported as expected values vs measured values. Reported values are calculated relative to NIST SRM-4990C and corrected for isotopic fractionation. Results are reported using the direct analytical measure percent modern carbon (pMC) with one relative standard deviation. Agreement between expected and measured values is taken as being within 2 sigma agreement (error x 2) to account for total laboratory error.

Report Date January 21, 2025

Submitter Mike Pryde

QA MEASUREMENTS

Reference 1	
Expected Value	129.41 +/- 0.06 pMC
Measured Value	129.39 +/- 0.16 pMC
Agreement	Accepted
Reference 2	
Expected Value	0.44 +/- 0.04 pMC
Measured Value	0.44 +/- 0.04 pMC
Agreement	Accepted
Reference 3	
Expected Value	95.86 +/- 0.37 pMC
Measured Value	96.21 +/- 0.24 pMC
Agreement	Accepted

Comment All measurements passed acceptance tests.

Validation 

Date January 21, 2025

SECTION G

This Section addresses Condition 16.1g) of the ECA described as below:

“A summary of dates, duration and reasons for any operational events including but not limited to events described in condition 8.7 of this Approval that may have negatively impacted the quality of the environment and corrective measures taken to address these impacts,”

St. Marys Cement - Bowmanville Plant
ECA Condition 16.1g: Reportable Operational Events - 2024
(ECA #0550-CEAHMA)

Date of Reportable Event	MECP Event ID	Report Filed to	Details of Event	Investigation	Final Response Given
1/10/2024	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	Valve closed on ammonia delivery system resulted in stoppage of ammonia delivery to system, causing increase in NOx emissions.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
1/10/2024	N/A	MECP District	The SO_2 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	Valve closed during PLC system failure resulting in stoppage of scrubbing media to adsorption tank, causing increase in SO_2 concentrations.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
1/14/2024	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	Plant compressed air system pressure decreased, affecting the atomization of ammonia for NOx reduction.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
1/16/2024	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	Valve closed on ammonia delivery system resulted in stoppage of ammonia delivery to system, causing increase in NOx emissions.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
1/22/2024	1-4LT6ZM	Spill Action Centre/MECP District	Reportable dust event at coal mill at 6:10am. Issue was addressed and dust dropped at 6:43am. SAC was called at 6:42am.	Faulty vault was in open position. Dust emission stopped after valve was manually closed.	Reported the event and resolution to SAC. Emailed MECP District Office.
2/12/2024	1-4ND1L7	Spill Action Centre/MECP District	Fire in compressor building. SAC was called at 10:30am.	Compressor belt caught fire. Fire department responded.	No further action is required.
3/31/2024	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	Deficiencies during inconsistent NOx emissions resulted in an excessive NOx emission. Additional ammonia injection points were installed (kiln riser, north calciner, south calciner) to allow for better distribution through the system.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
4/1/2024	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	Changes to gas concentrations resulting from varying air flow, potentially from drop in plant pressure. SMC evaluating NOx mass rate as indicator of ammonia reaction efficiency and process set point for NOx control. Additional ammonia injection points were installed (kiln riser, north calciner, south calciner) to allow for better distribution through the system.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
4/2/2024	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	Changes to gas concentrations resulting from varying air flow, potentially from drop in plant pressure. SMC evaluating NOx mass rate as indicator of ammonia reaction efficiency and process set point for NOx control. Additional ammonia injection points were installed (kiln riser, north calciner, south calciner) to allow for better distribution through the system.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
4/3/2024	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	Changes to gas concentrations resulting from varying air flow, potentially from drop in plant pressure. SMC evaluating NOx mass rate as indicator of ammonia reaction efficiency and process set point for NOx control. Additional ammonia injection points were installed (kiln riser, north calciner, south calciner) to allow for better distribution through the system.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
4/14/2024	N/A	MECP District	The opacity reading for the Finish Mill 1 stack exceeded the 6-minute rolling average of 20%.	Finsh Mill 1 was shut down and repairs to the baghouse were completed	No further action is required.
4/15/2024	N/A	MECP District	The SO_2 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	Malfunction with scrubber system limiting limestone powder flow. SMC repaired leak on Lime Silo 1 high pressure line and clear Lime Silo 2 blower blockage.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
4/18/2024	1-5WIGW7	Spill Action Centre/MECP District	Reportable dust event due to a faulty pressure transmitter at Kiln Feed Baghouse.	Faulty pressure transmitter on Kiln Feed Baghouse triggered an interlock and reduced fan speed, allowing dust to emit via the inlet pipe. Fan speed was adjusted manually and emissions stopped. Larger transmitter installed.	Reported the event and resolution to SAC. Emailed MECP District Office.
4/20/2024	N/A	MECP District	The opacity reading for the Finish Mill 1 stack exceeded the 6-minute rolling average of 20%.	Finish Mill 1 exceedance of 20% limit for 6 mins. Mill was shut down after the event.	No further action is required.
4/24/2024	N/A	MECP District	The SO_2 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	Scrubber rotary air lock gear sheared, causing the feed bin to malfunction. SMC repaired the feeding system.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
5/1/2024 & 5/2/2024	N/A	MECP District	The SO_2 1-Hr POI limit (B1 and URT) was potentially exceeded based on the model concept limit.	Wet scrubber system pump was unavailable when required for operation. SMC replaced the pump as needed and was unlocked for operation.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
5/3/2024	N/A	MECP District	The SO_2 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	Wet scrubber automated system to allow pump flow faulted.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
5/8/2024	6L7XCC	Spill Action Centre/MECP District	Dyed diesel spill	The compressor diesel pump did not lock, causing a spill of approximately 50L. The area was cleaned quickly and the diesel fuel did not reach any waterways.	Reported the spill event and resolution to SAC. Emailed MECP District Office.
5/9/2024	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	The ammonia flow automated system required an adjustment to account for additional injection locations installed.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
5/10/2024	1-6N9958	Spill Action Centre/MECP District	Reportable dust event at the Raw Mill (ATOX).	The raw mill (ATOX) went down, causing some equipment areas to have positive pressure. No complaints were received.	Reported the dust event and resolution to SAC. Emailed MECP District Office.
5/13/2024 & 5/14/2025	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	The emission was due to a failure of the ammonia pump. Pump was repaired and back in service.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
5/22/2024 & 5/23/2025	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	The plant compressed air system failed, affecting the atomization of ammonia for NOx reduction.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
5/28/2024	N/A	MECP District	The SO_2 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	The main plant transformer went down and valves were closed to ensure the wet scrubber did not enter unstable conditions. Manual valves were quickly opened to reduce emissions	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
6/1/2024	N/A	MECP District	Reportable PM10 exceedance at SMC ambient monitor SMC2.	Elevated readings at SMC2 was likely caused by onsite dust emissions being blown with high wind conditions.	Quarry dust suppression operations were reviewed (modified/increased as needed).
6/9/2024	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	Event due to plant compressed air pressure dropping below the interlock level, turning off the ammonia system.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
6/10/2024	1-7IVEER	Spill Action Centre/MECP District	Spill of heat exchanger oil from into plant oil water separator.	Release due to a failure of the heat exchanger, contaminating the cooling water with oil. Oil water separator and associated manholes were thoroughly cleaned. Discharge water safety booms were installed to contain the release.	Reported the spill event and resolution to SAC. Emailed MECP District Office.
6/11/2024	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	The ammonia injection system went into fault and ammonia injection was temporarily stopped.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
6/11/2024	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	The ammonia injection system was not efficient to reduce NOx emissions. Equipment was inspected and repaired to ensure effective operation of the system.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
6/13/2024	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	The ammonia supply was depleted, and logistical delays for new delivery were experienced.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.

St. Marys Cement - Bowmanville Plant
ECA Condition 16.1g: Reportable Operational Events - 2024
(ECA #0550-CEAHMA)

Date of Reportable Event	MECP Event ID	Report Filed to	Details of Event	Investigation	Final Response Given
6/20/2024	N/A	MECP District	The SO_2 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	Wet scrubber equipment reliability resulted in a higher SO2 concentration.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
6/21/2024	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	During operational changes to the kiln, NOx emissions spiked. The ammonia injection was not able to quickly control the emission.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
6/21/2024	1-8AFF15	Spill Action Centre/MECP District	A dust spill from the Kiln Feed Baghouse occurred.	The dust spill was a result of the kiln feed baghouse failing to maintain negative pressure.	Review of the process pressure was completed in order to optimize negative pressure within the equipment.
6/27/2024	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	NOx fluctuations occoured, and ammonia injection was unable to quickly reduce the emissions. The system programming was optimized to effectively maintain substantial flow rates.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
6/30/2024 & 07/02/2024	N/A	MECP District	The NOx 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	The ammonia injection system supply was depleted and the plant experienced logistical delays with new deliveries.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
7/2/2024	N/A	MECP District	The SO_2 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	The SO2 controller went into fault. When the controller became available, the wet scrubber could not quickly control SO2 emissions. Procedures were modified to reduce downtime of the controller.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
7/4/2024	N/A	MECP District	The SO_2 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	An inconsistency with limestone reagent to the wet scrubber occurred due to equipment issues with the injection system. The systems were repaired and further evaluated.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
7/5/2024	N/A	MECP District	The SO_2 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	Wet scrubber system valves were faulty, not allowing proper flow of limestone reagent.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
7/9/2024	N/A	MECP District	The SO_2 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	Wet scrubber system valves were faulty, not allowing proper flow of limestone reagent.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
July 13, 2024	N/A	MECP District	The SO_2 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	The rotary airlock valve for limestone reagent transport failed and fresh limestone slurry was not available to dose the wet scrubber.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
July 31, 2024	N/A	MECP District	The opacity reading for the cooler stack exceeded the 6-minute rolling average of 20%.	This was caused by a failed bagfilter. Baghouse was isolated promptly, and maintenance replaced damaged bag filters. Maintenance procedures based on opacity alarms with the plant were reviewed.	No further action is required.
September 16, 2024	1-AUEAD5	Spill Action Centre/MECP District	A dust spill from the Kiln Feed Baghouse occurred, although it did not leave the site.	The Kiln Feed Baghouse pulsing system lost power, creating a high differential pressure condition which shut down the kiln. When the kiln operation suspended, the equipment system conditions went into positive pressure and created a dust emission. The dust emission did not leave site, and meteorological data indicates that it could not have impacted the community.	Reported the event and resolution to SAC. Emailed MECP District Office.
October 5, 2024	N/A	MECP District	The SO_2 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	The limestone reagent transport system and redundant equipment failed. Equipement was immediately rushed into replace the damaged equipment. Procedural elements and redundant equipment reliability were reviewed and modified.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
October 15, 2024	N/A	MECP District	The SO_2 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	The rotary airlock valve for limestone reagent transport failed and fresh limestone slurry was not available to dose the wet scrubber. A redundant rotary airlock system was installed for quick operation if the primary rotary airlock fails.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
October 24, 2024	N/A	MECP District	The SO_2 1-Hr POI limit (B1) was potentially exceeded based on the model concept limit.	Slurry recirculating pumps were not operating due to start-up faults when the kiln process went online.	The site continues to work with MECP on implementing the abatement action plan updates to address each issue.
October 29, 2024	N/A	MECP District	A dust release occurred from the kiln feed baghouse system.	The kiln feed baghouse system had operational faults, causing issues in maintaining negative pressure. The emission did not leave the property and was quickly resolved.	No further action is required.
November 14, 2024	1-D6A1XL	Spill Action Centre/MECP District	A raw material transport truck was offloading material, and rolled onto its side causing a diesel fuel and hydraulic oil spill.	The material transport truck accident occurred due to an operational error with unloading. The spill was quickly controlled and immediately cleaned up. Contractor procedures were evaluated to ensure safe unloading of material.	Reported the spill event and resolution to SAC. Emailed MECP District Office.
November 27, 2024	1-DYAKPI	Spill Action Centre/MECP District	A coal dust emission occurred due to operational issue with offloading from a vacuum truck.	A vacuum truck operator was offloading fine coal material into the coal hopper and unexpetedly experienced highh winds from the East. The operator immediately stopped the process. The plume was visually observed and settled within the plant area. An inspection off-site in the direction of the wind was completed, and no evidence of impact was found.	Reported the event and resolution to SAC. Emailed MECP District Office.

SECTION H

This Section addresses Condition 16.1h) of the ECA described as below:

"Details of environmental complaints including a summary of complaints received, causes of complaints and action taken to avoid the recurrence of similar incidents, as described in condition 14 of this Approval."

St Marys Cement, Bowmanville Plant

ECA Condition 16. 1h: Community Concerns Log - 2024

(ECA #0550-CEAHMA)

Date of Complaint	Nature of Complaint	Summary of Complaint	Response Actions Taken and Conclusions
7/14/2024	Black Smoke	MECP Received a compliant related to black smoke from the facility between 5-6pm, which is visible from the 401 highway and inquired if this was a result of system upset or other issues that may change the appearance of the plume around that time.	No system upsets that would change the colour of the plume occurred during this period. Particulate, NOx and SO2 levels were all well within limits . Colour change in plume is likely a result of the location of the sun, air moisture and low cloud cover. Responded to MECP on June 17, 2024 with an explanation and photos of the plume in the morning.
9/19/2024	Dirt	Received a complaint regarding dirt clumps landing on Bowmanville resident property, 5.5km from the plant site. The resident described the dirt clumps as "clumps of brown dirt fall apart when handled".	MECP was notified of the complant. Reviewed plant operations and local events external to the plant to identify the cause of identified sample. Reviewed the data and both of the SMC MET stations that indicated that winds were blowing from the North to the South, at speeds less than 10KM/Hr from 09/17/2024 8PM to 09/18/2024 8AM, the suspected timeframe of dust/soil impact. With this information, dust/soil was not attributed to the SMC operations. Met with the community member the week after to collect some samples to analyze and identify the material properties. The analysis concluded that the material was not attributable to the plant, as the meteorological factors, distance of travel, and material analysis indicate that this did not originate from the plant. MECP agreed with the conclusion provided.
11/19/2024	Noise/Vibrations	A complaint was received that the November 19th blast had a perceived impact on a community member's house, due to loud vibrations and noise.	MECP was notified of the complaint. After examining the data from the blast, the ground or air vibrations induced by the blasting operations at the quarry did not exceed the provincial guideline limits of 12.5mm/s and 128dBL, respectively, and that the blast was similar to other blasts that occurred beforehand. No further action is required.
12/18/2024	Noise/Vibrations	A complaint was received that the December 18th blast had a perceived impact on a community member's house, due to loud vibrations and noise. A community group indicated that they had received a few complaints in regards to this specific event.	MECP was notified of the complaint. After examining the data from the blast, the ground or air vibrations induced by the blasting operations at the quarry did not exceed the provincial guideline limits of 12.5mm/s and 128dBL, respectively. Review of the blasting plan, meterological conditions and video did not identify any abnormal qualities for the blast. Additionally, a technical report was completed by WSP, and shared with the community and MECP which concluded the same. No further action is required.