

June 14, 2024 **St Marys Cement Plant** Community Liaison Committee Meeting





Agenda

- **Welcome and Introductions**
- **Complaints 2024 Year to Date**
- ***** Alternative Low Carbon Fuels Update
- **New Stack Analyzer**
- Questions Brought Forward in Advance
- Round Table
- Closing Remarks





Welcome and Introductions

VOTORANTIM A st marys cimentos cement Community Liaison Committee

The next Community Liaison Committee Meeting will be held on June 14th at 10am at the St Marys Municipal Operations Center. Members of the public who wish to observe are welcome to attend.

Residents who wish to speak in front of the Committee may submit a detailed request in writing at least 3 days prior to the meeting in writing to the Committee. The request will be considered by the Committee and approved prior to the meeting. Please submit all requests, questions, and concerns for the meeting to kara.terpstra@vcimentos.com by June 12, 2024.

- Thank you to the Town of St Marys for allowing us to use their Youtube Channel and the Municipal Operations Center
- Welcome back everyone!
- Round Table Introductions
- Did anyone have questions/concerns about the March 8th meeting?





Complaints Received 2024 Year To Date

		Odour*	Mention Health**	Dust	Invalid Dust	Noise/ Blasting
	Total	0	0	6	3	2
	January	0	0	0	0	0
	February	0	0	1	0	2
	March	0	0	1	0	0
	April	0	0	3	2	0
	May	0	0	1	1	0
2024	June MTD	0	0	0	0	0
	July					
	August					
	September					
	October					
	November					
	December					

* Odour complaints reviewed on the next slides

 $\ast\ast$ Complaints which 'Mention Health' are counted when a resident calls with an odour complaint and highlights that they have health concerns. They are not separate complaints received by the plant.





2024 Community Concerns





Dust Complaints

Date	Number of Complaints	Sample Results
April 8	1	No sample taken – insufficient material present and physical characteristics did not appear cementitious
April 12	1	No sample taken - Resident noted general dust concerns and not a specific dust event.
April 23	1	A sample was taken and the sample indicated cementitious material
May 23	1	A sample was taken and the sample did not indicate cementitious





Alternative Low Carbon Fuels







St Marys Cement started using ALCF in the process in May. As of June 10th SMC has used 137 tons of wood and 213 tons of plastic as Alternative Fuels.

ALCF Building





Reworld Kitchener

https://www.reworldwaste.com/

Shelburne

Blue Mountain Plastics



EFS Plastics Listowel

https://www.efs-plastics.ca/



York Wood Missisauga

https://york1.com/contact-us/





SMC has consumed 11 trucks of plastic and 8 trucks of wood Alternative Low Carbon Fuels Year to Date.

https://www150.statcan.gc.ca/n1/daily-quotidien/230309/dq230309e-eng.htm





According to Statistics Canada in 2019 the average Canadian disposed of 105 kg of plastic. Year To

Date the quantity of plastic used as ALCF at SMC is the equivalent of 1972 Canadians' plastic.

https://www150.statcan.gc.ca/n1/daily-quotidien/230309/dq230309e-eng.htm





New Stack Analyzer

- Air Emissions Monitoring
- Regulations
 - Air Permit
 - MSAPR Limit
 - EPS 1 PG 7
- FTIR Analyzer
- Results (MSAPR limits)







Air Emissions Monitoring

What is a Continuous Emissions Monitoring System (CEMS)?

A CEM System is used to continuously measure and monitor gaseous emissions from refineries, power plants, waste incinerators, and other types of industries.

• <u>https://www.youtube.com/watch?v=EFbTQoDtDnA</u> – Stop at 1:23.







Emissions Regulations

Why are CEM Systems required for Industrial Facilities?

- The Cement industry is legally required to monitor levels of these emissions based off various regulations including
 - Site Specific Environmental Compliance Air Permit ECA 0706-CLVLC2, Condition 10
 - The Air Permit States "The company shall ensure that the CEM System continuously monitors the following parameters in the exhaust gas stream from the Cement Kiln Stack;
 - i. Nitrogen Oxides,
 - ii. Sulphur Dioxide, and
 - ii. Opacity
 - Multi Sector Air Pollutant Registry (MSAPR)
 - The Multi Sector Air Pollutant Registry was established as part of the Canadian Environmental Protection Act, for the purpose of protecting the environment and human Health. The Regulation establishes requirements for emission of
 - a) NOx from boilers and heaters in certain regulated facilities in various industrial sectors;
 - b) NOx from stationary spark-ignition engines that combust gaseous fuels in certain regulated facilities in various industrial sectors;
 - c) NOx and SO2 from cement manufacturing facilities





Emissions Regulations

Why are CEM Systems required for Industrial Facilities?

- The set up and verification of CEM system is regulated to ensure facilities are operating the analyzers in a way that is verified, maintained, and reported.
- Environmental Performance Standard 1 Performance Guide 7 outlines the Protocols and Performance Specifications for Continuous Monitoring of Gaseous Emissions from Thermal Power Generation. This includes sections on;

Section 1 and 2	Introduction and Summary of Specifications and Protocols	
Section 3	Design Specification and Test Procedure	Location of the Emissions source, Analyzer Operating Range, Flow Monitoring, Data Calculations, Response time, and Interference.
Section 4	Installation Requirements	Location of Sampling site and Stratification Testing.
Section 5	Test Procedures	Certification of the Analyzer with initial set up, Relative Accuracy Tests, Daily Calibration requirements, Bias Calculations.
Section 6	Quality Assurance and Quality Control	A plan to ensure the maintenance, daily calibrations, manual maintenance procedures, gas bottle checks, preventative maintenance and reactive maintenance procedures, spare parts inventory and inventory procedures, data backup, data approval, quarterly flow and check audits, Relative Accuracy Tests, Annual CEMS audit, and integration of new devices.





Location Selection

What are some of the things to consider for selecting the analyzer location?

• The regulation requires that the monitoring be performed at the point of emission which is the main stack. St Marys Cement has the CEM probe location on the main stack.



CEM Location





Accuracy Testing

How does an industry ensure the readings from the stack are accurate?

- The first method of confirming accuracy is done by connecting certified values gas bottles to the analyzer and using the analyzer to measure the bottles concentration. The results of this test are recorded and retained for the annual CEMS audit.
- The second method of confirming accuracy is done by a third party certified stack testing company who uses a secondary probe to read stack emissions and confirm the readings of the facility's CEM system using real time data. This is called a Relative Accuracy Test Audit. The results of this test are recorded and retained for the annual CEMS audit.





Annual CEMS Audit

How does the MECP know that the facility is completing the requirements of the CEM System?

- Section 6.5.2 OF Environmental Performance Standard 1 Performance Guide 7 requires an independent inspection. It says:
- The CEM system and the QA/QC program must be evaluated by an independent inspector every 12 months ± 1 month. The inspector must review the QA/QC manual, the CEM system operation, reports, and other associated records to determine if the procedures in the QA/QC manual are being followed. The inspector must also note any changes in the system or the procedures since the last yearly evaluation and ensure that these have been included in the QA/QC manual. The inspector must report the findings and observations to the CEM system management and the appropriate agency within 30 days after the evaluation is completed. This report may include recommendations for improvements in the CEM system or its operation.





FTIR Analyzers

How does the facility measure emissions from the main stack?

- There are various manufacturers of CEM Systems and their technologies apply to both process and emission monitoring
- St Marys Cement uses an ABB ACF5000 multi-component continuous emission monitoring system.
- This stands for Advance Cemas Fourier Transform Infra Red.
- https://www.youtube.com/watch?v=YnAGDakunL4





Analyzer Setup





A probe is installed on the main stack at the top of the preheat tower. The probe contains a pump to extract the sample from the stack gas and a particle filter.

Sample Line



The sample line is a bundled coil made up of heat trace lines (to prevent the sample from condensation), the sample gas tube, a blow back tube for the analyzer, a tube for calibration gases, and wires for electronic control.

Analyzer

The FTIR ACF5000 Analyzer is housed inside a cabinet and is located inside a shelter in the preheat tower along with additional auxiliary equipment.



Analyzer Setup





Infra Red Gas Detector

What is Infrared Gas Detection?

• Infrared spectrometry measures the interaction between matter (molecules) and infrared radiation.

What is Infrared Radiation?

- Infrared radiation is electromagnetic radiation (light) with a longer wavelength than visible light. Infrared radiation falls between visible light and microwaves.
- For Reference- A microwave operates by creating waves in the 2.5giga Hertz wavelength. Visible light is 400 to 700 terra hertz.





Infra Red Spectrometry

How do we measure the interaction between the matter (molecules) and the infrared radiation?

- With a microwave 2.5hZ is known to trigger vibration of the water molecules. The vibration of these molecules against each other creates heat which is what warms food.
- With infrared spectrometry a different wavelength is used to trigger the specifically known compounds required for analysis NOx, SO2,
 CO2 in a similar way. Not vibrating but absorbed by the molecule causing variation in wavelength strength.
- As per the diagram, the Infrared source emits the light through a gas chamber and the molecules in the chamber react to the infrared light. The light is then picked up by detectors which detect shifts in the infrared signals to determine gaseous concentrations.





Fourier Transform

How does the detector convert infrared absorption readings to output results?

- The analyzer detector continuously receives data from the infrared absorption detector and needs to sort through it to figure out at what rate the molecules are reacting which can be used to determine their concentration.
- The analyzer uses Fourier Transform (FT) to determine the inputs. Fourier Transform is a calculus methodology where the results of an equation are input into the Fourier transform and then Fourier transform calculations are performed to determine the input.
- We know what the outputs are based off of; we have NOx, SO2, and CO2. The Analyzer manufacturer takes known high and low concentrations of these compounds to commission the analyzer and set up a baseline data that can be used for setting up the transform.
- A practical example of this in real life would be if you visit a smoothie bar and try their "smoothie of the day" without knowing what is in it or how it was made. If I asked you to make me the smoothie without knowing what was in it you would smell it, taste it, look a the colour, look around the room and see various fruits available to you. In time and with practice you could make it yourself and tell me what was in the smoothie, and with practice you would be able to do it quickly.

$$F(k) = \mathcal{F}_x [f(x)](k)$$
$$= \int_{-\infty}^{\infty} f(x) e^{-2\pi i k x} dx$$



St Marys Cement Measurements

What are the limits for Multi Sector Air Pollutants?









Questions Brought Forward in Advance

None



Round Table





For any Questions or Concerns related to St Marys Cement Plant Operations please contact

Kara Pelissero – Environmental Manager at 519-284-1020 x 235 or at <u>kara.pelissero@vcimentos.com</u>

