St Marys Cement in the Community

- We have been here and committed to the community since 1912
- Source of direct and indirect employment
- We employ 3rd, 4th and even 5th generation residents of St. Marys.
- We are recognized as great corporate citizens.
- But… we are also seen as the big stack in town.

Community Liaison Committee

St Marys Cement
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Committee Objectives

The objectives of the Committee are as follows:

- Keep the community informed about the operations of the Facility in relation to the potential impacts on the community;
- Keep SMC informed of any community concerns about the operations of the Facility;
- Serve as a forum for SMC to disseminate and exchange information with the community related to operations of the Facility;
- Monitor SMC's complaint response program and make recommendations to SMC with respect to this program. This monitoring will be a standard agenda item.

The Committee will share information and discuss issues of mutual interest and issues of concern to residents related to the Facility. The discussions will focus on finding viable solutions to problems, which recognize the interests of both SMC and the residents. Respectful challenges and constructive discussions are encouraged.

Members of the CLC at the September 7 CLC Meeting

May 15th Public Meeting

Format of the Community Liaison Committee

- Meetings are held Quarterly and are open to the public with date, time and place of each meeting published in advance.
- Public observers who wish to discuss the content of the meeting may do so by expressing their thoughts with a member of the Committee.
- The Committee is comprised of:
  - Three members from the SMC Facility management team;
  - Three to six members from the community of the Town of St. Marys, ON;
  - Three members of the elected Town council and/or Town staff members (with at least one member from each of the elected Town council and Town staff);
  - Government Agency Observer Representatives who may attend, at their discretion, to act as representatives of their respective agency and expert resources in public policy and environmental conservation.

Terms of Reference

*"St. Marys Cement Inc. (Canada) ("**SMC**") and the residents of the Town of St. Marys, Ontario have had a long and successful relationship. Since the founding of SMC in 1912, SMC has been involved in the St. Marys community, responding to residents' concerns, contributing to town-wide initiatives, and supporting local businesses. SMC is constantly striving to strengthen its ties and improve its local relationships by continuing to foster communication between itself, the Town, and the community. The impacts from the Company's quarry operation in close proximity to residents, and the operation of the cement plant have been a source of concern for some residents.*

*In 2017, SMC formed a Community Liaison Committee (the "**Committee**") to work together with community members to resolve issues arising from the daily operation of the SMC cement plant in St. Marys (the "**Facility**"). The Committee provides a forum for open communication between SMC and the local community residents to address concerns and share information with respect to the operation of the Facility."*

The purpose of the Committee is to maintain and improve relationships between SMC and the local community by providing a forum for constructive and open dialogue to occur between the local community, SMC, and the Town of St. Marys.

St Marys Cement- Production Process

St Marys Cement

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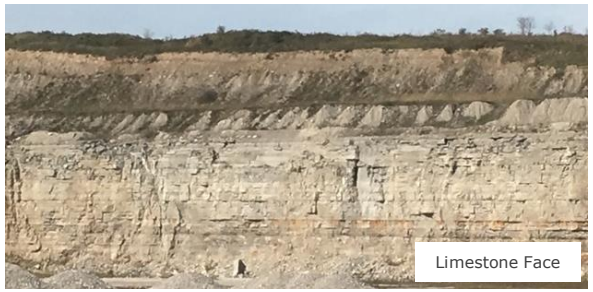
Raw Material Processing

- Limestone is blasted from the face of the Thomas St. Quarry.
- Blasts occur 1-2x per week based on production needs.



Limestone Face

- Limestone is combined with other raw materials to get the chemical composition required for clinker production.
- Full analysis is completed on the limestone and the other recycled raw materials feedstock to verify that they meet production requirements.

Clinker Process

- Raw material mixture is fed counter-flow through a preheater tower into a rotary kiln which transforms the mixture into clinker. The counter-flow system promotes energy efficiency and reduces some air emissions by "scrubbing effect" of the raw feed.

Cement Kiln Flame

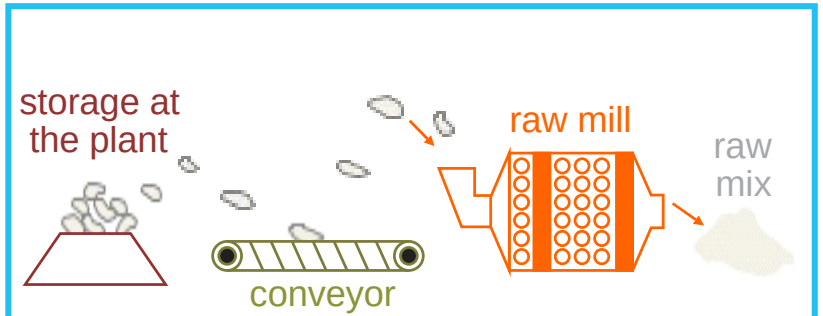
- The primary reaction in the rotary kiln is the conversion of calcium carbonate ($CaCO_3$) to Calcium Oxide (CaO) under very high temperatures (over 1600 ℃).
- Trace metals contained in the raw materials are retained in the clinker resulting in very low metal air emissions.

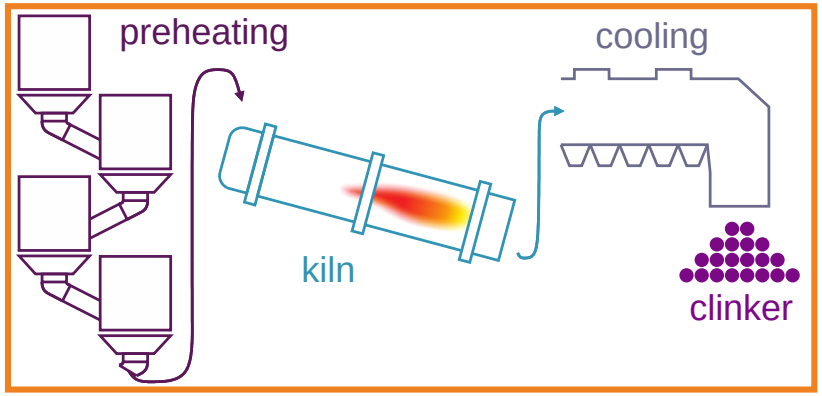
Clinker to Cement

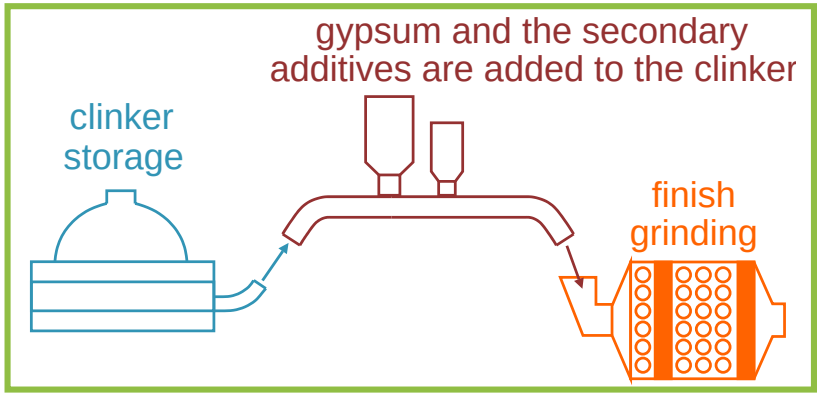
- The clinker is cooled and combined with gypsum in a grinding mill to make cement.
- SMC manufactures 8 different types of cement, which a range of strengths and set times.

Pyramid Centre in St. Marys

- Cement is packaged in bags which can be purchased individually at hardware stores, or shipped in bulk trucks for large projects (e.g. the Pyramid Centre in St. Marys).
- Cement is essential to our way of life and key to the construction of durable infrastructure around us including buildings, bridges, and roads.







Petroleum Coke

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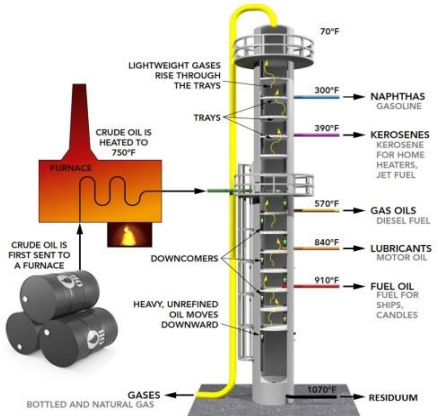
What is Petcoke?

- Petroleum coke (petcoke) is produced in the oil refining industry.
  - Crude oil is extracted from the ground and processed in an oil refinery.
  - Products from the oil refining industry include gasoline used in vehicles, home heating, diesel fuels used in heavy machinery, lubricants for motors, and heavy fuels such as petcoke which are used in industrial processes such as cement manufacturing.



Distillation Column as Part of Oil Refining Process

- Increased need for gasoline worldwide has lead to an increased production of petcoke.
- Canada currently has abundant petroleum coke stockpiles.

Petcoke's Composition and Properties

- Petroleum Coke Composition
  - Specific specific chemical composition of Petcoke depends on the composition of the petroleum feedstock used in refining.
  - Petcoke is primarily carbon based but other elements, such as nitrogen, sulphur, nickel are also captured within Petcoke's carbon matrix.

Raw Petroleum Coke

- Petroleum Coke Properties
  - Physical qualities exist well outside the ambient range- it does not readily melt, dissolve, or boil.
  - Petcoke is essentially inert and does not readily react. Petcoke is not biodegradable, nor does it bio-accumulate substances into its structure.

Why Use Petcoke?

1. Consistent composition and heat value (heat generated from combustion of fuel).
   - Petcoke has a high heat value, meaning less fuel is required to run the kiln.
2. The potential emissions released.
   - Raw materials counter flow in respect to the hot kiln gases resulting in some of the elements which would have been emitted into the air being captured in the cement.
   - Extremely high temperatures and complete combustion eliminate some of the organic materials found in fuel.
3. Potential to adversely affect humans and the environment.
   - Petcoke also has little to no heavy metal concentration, and meets MOECC requirements regarding trace elements and leachates.
4. Resulting cement quality.
   - Extensive use in the cement industry also means that the effects of Petcoke on the cement, the plant, and the environment, are well known.
5. Physical state and properties of the fuel.
   - Stable physical and chemical properties mean that the storage and handling of Petcoke is safe.
6. Economic availability.
   - Increased fossil fuel consumption worldwide means a safe use for petcoke is needed. The combustion of petcoke in the cement manufacturing process is an alternative to stockpiling in a landfill.

Emissions from Petcoke

- Petcoke has been used at St Marys Cement intermittently for over 35 years.
- We do regular testing of the petcoke used on site.
- Petcoke onsite is coated with surfactant which decreases the chances of particles becoming airborne.
- MECP has requirements for monitoring combustion emissions from cement plants.

St Marys Cement Continuous Stack Emissions Monitoring

- Our Continuous Emissions Monitoring system collects close to 70,000 points of data every day to ensure we are meeting MOECC requirements for air emissions.
- Petcoke Health Effects from Emissions
  - The MECP regulations for emissions from combustion processes are established using limits put in place by the Ministry of Health
  - These regulatory requirements ensure the cement plant is within our limits at all times.
  - Working directly with petcoke on a daily basis you can come in contact with PM 2.5 dust via inhalation or skin contact.

Low Carbon Alternative Fuels and Recycled Raw Materials

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Benefits of Low Carbon Alternative Fuels

- Provides a viable use for a material that is currently being landfilled
- Reduces St. Marys Cement's reliance on non-renewable fossil fuels
- Reduces greenhouse gas emissions

Low Carbon Alternative Fuel Testing

St. Marys Cement completed an Alternative Fuels Demonstration Project in 2011. This study concluded there were no statistically significant changes in stack emissions or ambient air quality when alternative fuels were used.

This is consistent with many environmental and public health authorities' findings that the co-processing of alternative fuels in cement manufacturing does not increase risk to the environment, or public health.

Since the demonstration project in 2011, St. Marys Cement has not been using alternative low carbon fuels.

Process of Fuel Injection

The alternative fuel would be inserted into a pneumatic solid fuel delivery system, which would feed directly into the kiln burner, operating at over 1600°C.

The fuel delivery system would be interlocked with the plant control system. The operator would be able to set the feed rate for the alternative fuel, based on the system's performance.


Clean Wood


Wood waste


Low Carbon Alternative Fuel


Post-Composting Plastic Polymers

Examples of Low Carbon Alternative Fuels

St. Marys Cement has identified the following low carbon alternative fuels for potential use at their facilities:

- Clean wood/wood waste as defined in O.Reg. 347/90, meaning waste:
  - Wood products including tree trunks, tree branches, leaves and brush that is not contaminated. (From which easily removable hardware, fittings and attachments, unless they are predominately wood or cellulose, have been removed).
- Low carbon alternative fuels meaning:
  - Woody biomass consisting of mainly wood chips with some fragments of plastic, shingles, laminate, surface coatings, construction and demolition waste.
  - Less than 10% to be non-woody material and less than 5% to be treated wood.
- Post-Composting Plastic Polymers and Woody Residuals

These materials must meet stringent quality standards including heat calorific value, water content, ash, halogen, sulphur & heavy metals content.

Circular Economy
Low Carbon Alternative Fuels / Recycled Materials

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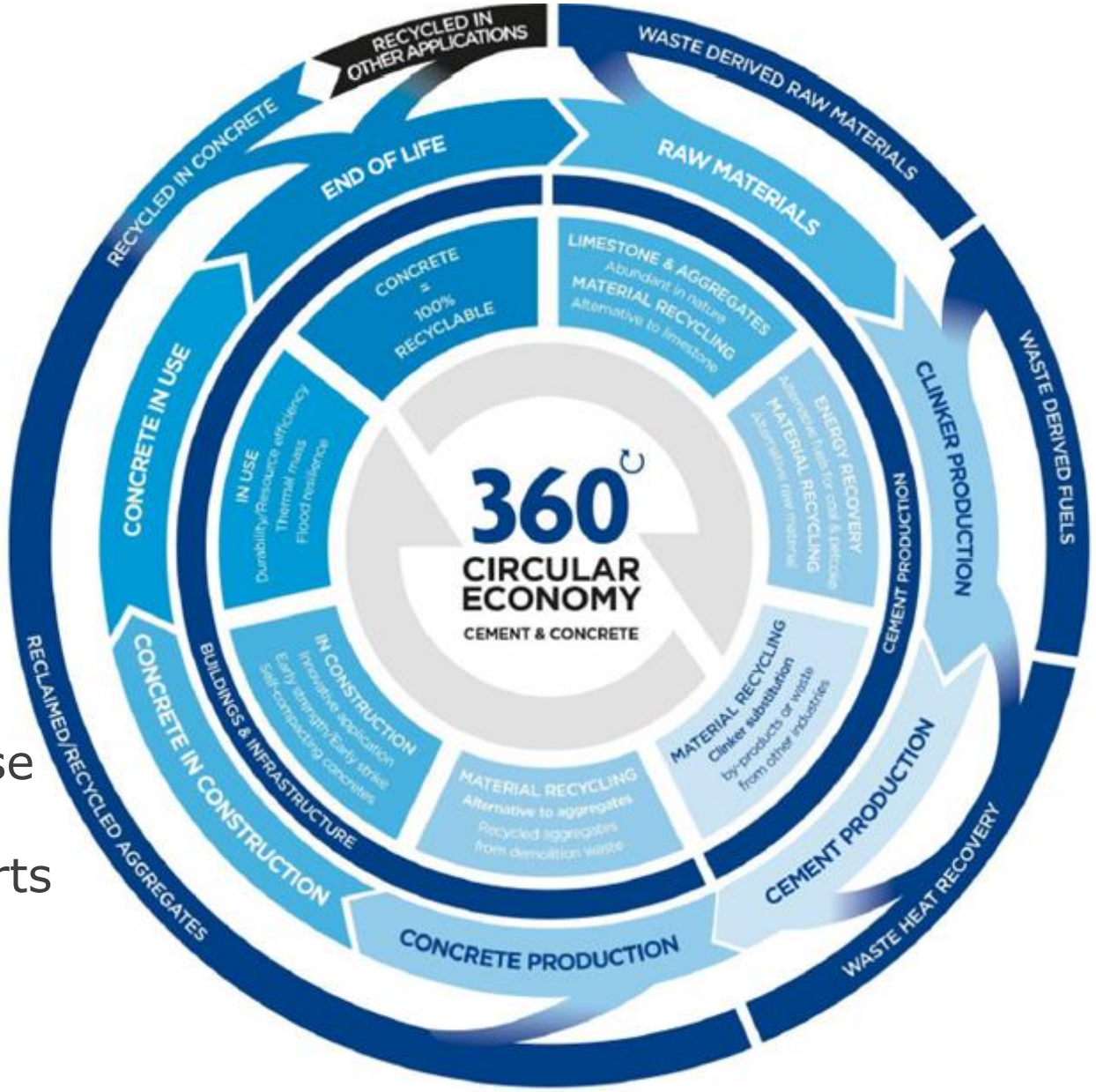
- Design to avoid resource use
- Design for longevity
- Design for reuse
- Design for material recovery



The strategy of the cement industry to use low carbon alternative fuels and to use recycled materials in their process supports the model of Circular Economy

Air Emissions and Dispersion Modelling

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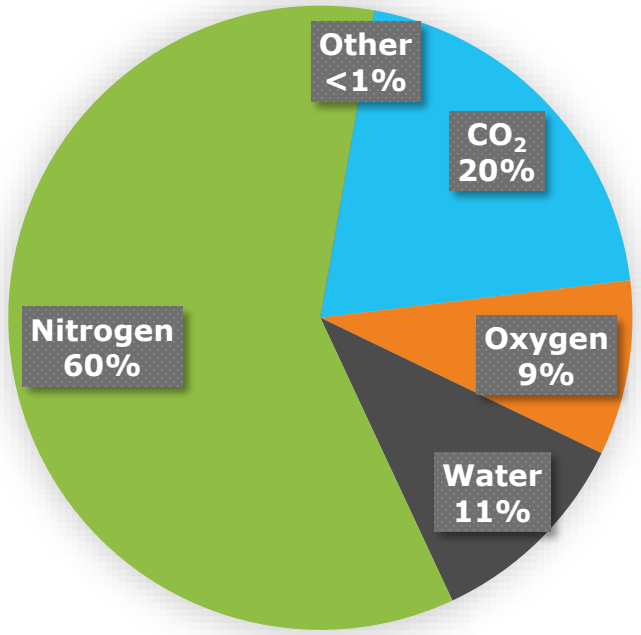
Compliance with the Ministry of the Environment, Conservation and Parks' Regulatory Air Limits

The Ministry has developed Province-wide Point of Impingement (POI) limits to protect human health and the environment.

The modelled maximum POI concentrations from St. Marys Cement, based on maximum operating scenarios, are below these limits. Prior to implementing any changes at the facility, modelling is performed to confirm air compliance.



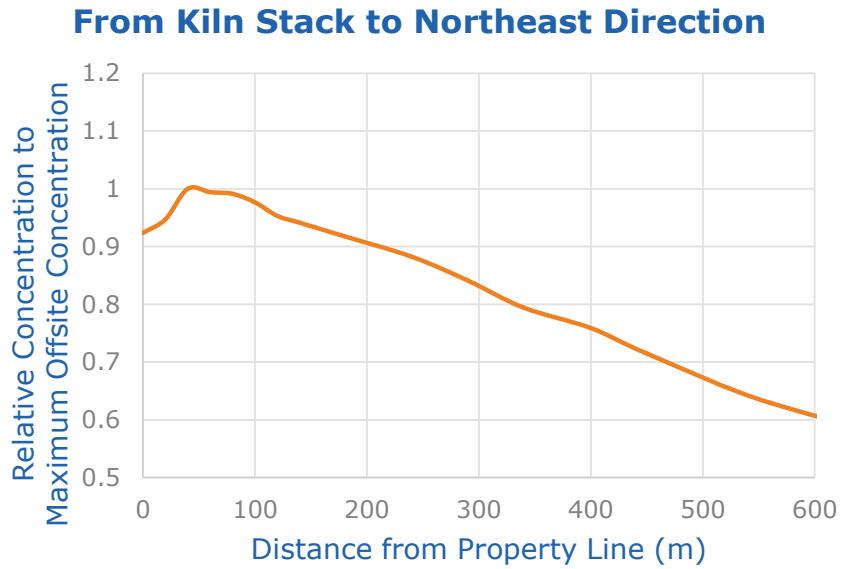
*Trace amounts including:
Carbon Monoxide
Nitrogen Oxides
Sulphur Dioxide
Other Sulphur Compounds
Volatile Organic Compounds
Hydrochloric Acid
Particulates
Ammonia
Metals
Polycyclic Aromatic Hydrocarbons
Dioxins & Furans

The majority of kiln stack emissions are ambient air, carbon dioxide and water vapour.

Emission Modelling and Dispersion

Modelled offsite maximum concentration resulting from the kiln stack reduces rapidly with distance.

Purpose of the stack is to promote dispersion. This is influenced by height, velocity and temperature.



Additional Regulatory Reporting Requirements

St. Marys Cement submits several air quality-related annual reports to the provincial and federal government, including:

- O.Reg. 194/05 (SO_2 & NO_X)
- O.Reg. 390/18 Greenhouse Gas (GHG) Reporting
- Ontario Toxics Reduction Program
- National Pollutant Release Inventory (NPRI)
- Federal GHG Reporting Program (GHGRP)

Nuisance Odour Abatement – Material Substitution

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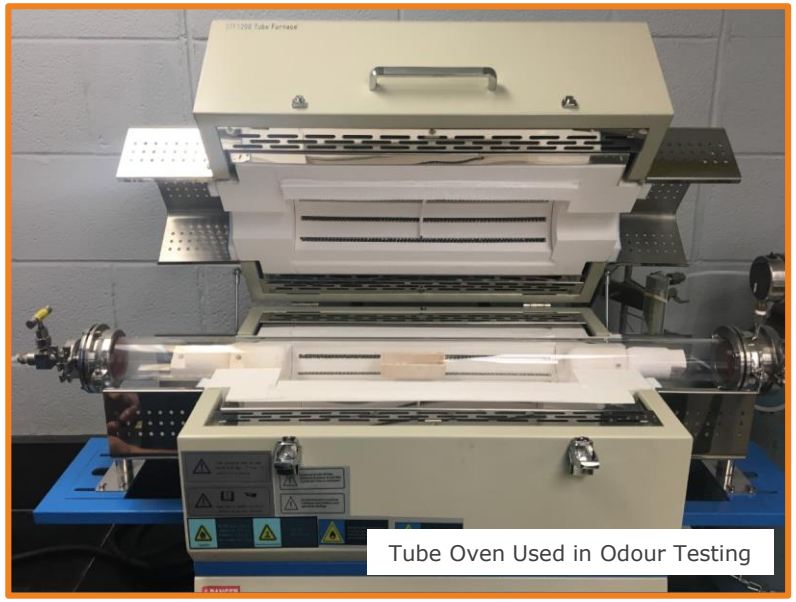
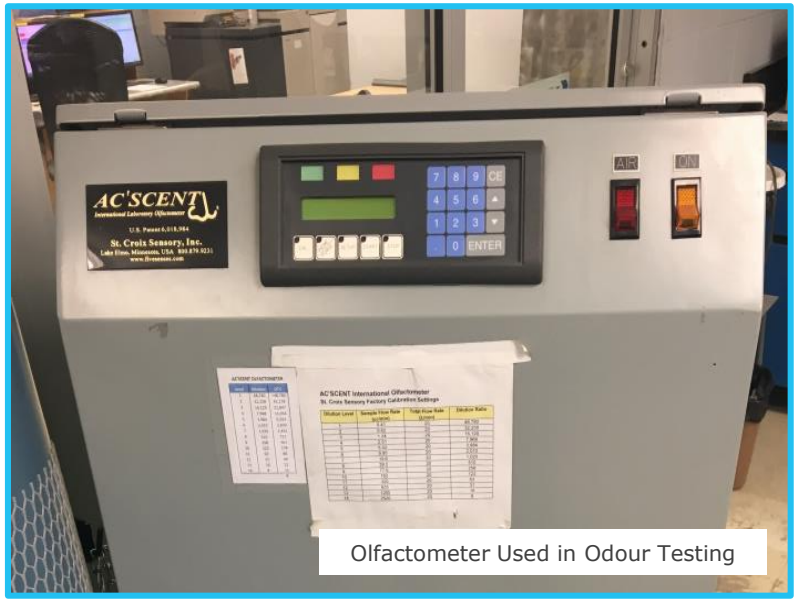
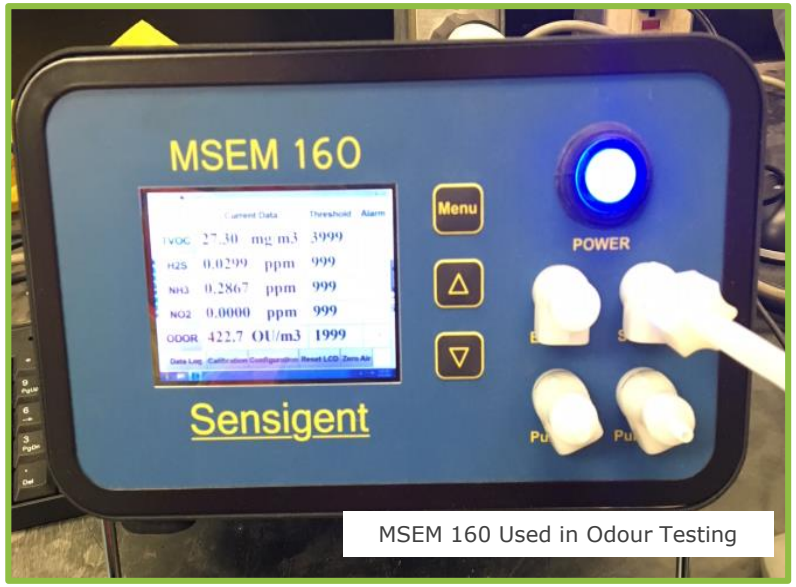

Tube Oven Used in Odour Testing

Lab Odour Testing

- SMC has completed lab-scale testing for determining odour contribution of our raw materials
- Samples were heated in a tube oven, similar to the cement process, and the gases emitted from each sample were captured
- Gas samples were analyzed in both an electronic odour analyzer (MSEM) and a sensory olfactometer



Olfactometer Used in Odour Testing



MSEM 160 Used in Odour Testing

Lab Testing Results

- SMC analyzed numerous samples including raw materials, limestone samples, petcoke, and kiln feed mixtures
- Samples of limestone consistently tested higher in odour units than other samples
- Analysis of limestone showed odour concentrations are random at different depths
- Since limestone makes up 75-80% of our raw material mixture, it cannot be eliminated or substituted
- As a result of this testing, SMC is now focusing odour abatement efforts on improving dispersion

Odour

Depth/Rank	
6-12	2
12-18	9
18-24	8
33-36	1
42-45	6
45-48	4
51-54	3
54-57	5
57-60	7

Limestone Odour Graph

Nuisance Odour Abatement – Improving Dispersion

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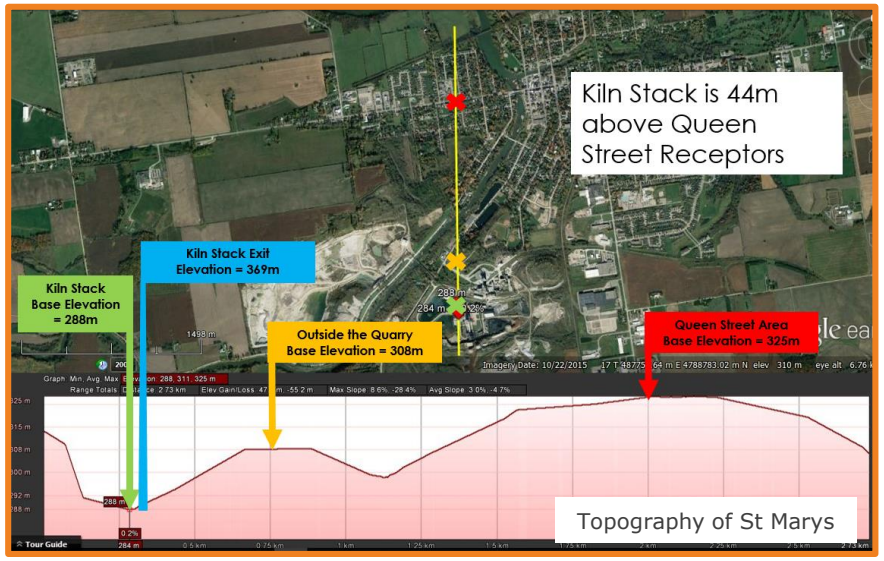
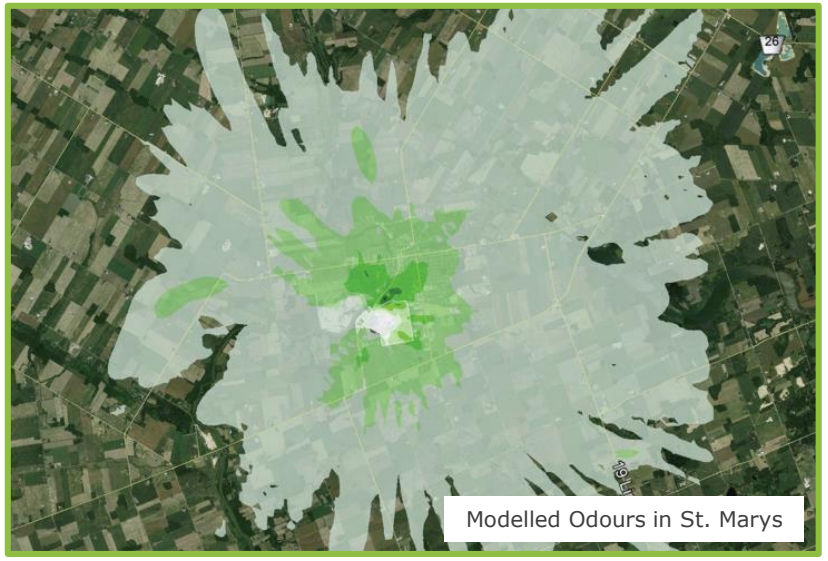
Improving Dispersion

- SMC used a complex long-range transport air dispersion computer program (CALPUFF) to model odours from the plant
- CALPUFF considers local weather data, local topography, local land use data and measured odour emissions from the stack to predict and model odours in the community
- The model was validated for accuracy using ambient field measurements
- The validated model was then used to predict the change in community odours as a result of increasing the stack height and/or increasing the stack flow rate
- The results from this extensive modelling program identified two options to mitigate community odours:
  - The optimum stack height extension alone
  - The optimum combination of a stack height extension and stack flow rate increase
- Engineering feasibility studies to be completed in 2019
- Determine and refine the best option are scheduled to be completed by 2020

Field Validation Using a Portable Olfactometer



Topography of St Marys



Modelled Odours in St. Marys

St Marys Cement Plant Stack

Noise Abatement and Fugitive Dust Management

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Noise Abatement

From the results of our most recent noise audit, St Marys Cement (SMC) has developed a detailed ten-year noise reduction plan, including:

- 2019 –Installation of sound deadening roller doors and enhanced foam insulation cladding in buildings
- 2021- Silencer on the fan of the main stack
- 2025 – Silencers and enclosures at various locations throughout the plant
- 2027 – Additional silencers and enclosures, and noise mitigation for the conveyor

Fugitive Dust Management

Fugitive dust is a nuisance concern. SMC has developed and implemented a comprehensive fugitive dust management plan to minimize offsite fugitive dust impacts. This is a living document that is regularly reviewed by SMC/MECP and updated to continuously improve fugitive dust management.

SMC understands that sometimes fugitive dust from the site can settle on nearby vehicles. Other local sources of fugitive dust include construction activities, road sweeping, and agricultural operations.

When we receive a concern about fugitive dust in the community:

1. A sample of dust is collected.
2. The sample is sent for lab analysis to determine if the dust may have originated from the cement plant.
3. In most cases the analysis is completed with one business day.
4. If the analysis determines that dust may have originated from the plant, SMC will have your car cleaned.
5. SMC reviews the sample results, wind and weather conditions, and other potential sources of dust in the area at the time, to help us find a long term solution.

For any concerns about St Marys Cement Plant contact:

Kara Terpstra - Environmental Coordinator
519-284-1020 x 235
kara.terpstra@vcimentos.com