



# Alternative Fuel Demonstration Project: St. Marys Plant

## FREQUENTLY ASKED QUESTIONS & COMMENTS

(Based on discussions at the August 27<sup>th</sup> Public Information Session and Comments received to-date)

### 1. The combustion of the alternative fuel will result in the release of toxic contaminants into the environment, including heavy metals.

*St. Marys cement does not anticipate any material change in emissions above the existing emissions from the facility during the short demonstration project. Similar alternative fuels have been used successfully in other jurisdictions without significant changes in air emissions. For example, a recent European study entitled, THE SUSTAINABLE USE OF ALTERNATIVE RESOURCES IN THE EUROPEAN CEMENT INDUSTRY, discusses the effects of burning alternative fuels (including similar plastics) and examined emissions data from about 100 cement kilns over three years, concluding that “emissions from cement plants depend largely on the type of process and raw materials used, and that no significant changes in pollutant emissions have been observed in the use of alternative fuels”.*

*The primary purpose of this short demonstration project is to use the alternative fuel in the cement kiln and to measure air emissions in the stack and off-site to see if there are any differences in air emissions when this fuel is used.*

*Ontario regulations impose concentration-based Point of Impingement (POI) limits (limits for off-site concentrations) for contaminants. Baseline stack emissions were measured earlier this year at the St. Marys plant. Modeling of the stack emissions based on recent test data determined that the maximum off-site concentrations of trace metals and organic chemicals in the air were significantly below the POI limits for the facility. The off-site concentrations were typically less than 1% of the POI limits.*

*As the concentration of trace metals in the alternative fuels is comparable to conventional fuels, and the overall mass of metals in the system is dominated by the raw materials (which makes up more than 90% of the total mass) trace metals are expected to remain at current low levels. As noted in the response below, it is not anticipated that the use of these alternative fuels would have any effect on the emissions of organic chemicals. The purpose of this limited duration test is to confirm St. Marys expectations by providing real data on alternative fuels use at the facility. St. Marys will consider this site-specific information to determine if it will apply for approval to use this alternative fuel on a longer term basis.*

**2. Won't all the metals in the alternative fuel go up the stack and be emitted?**

*Trace metals are only present in very low concentrations in both the raw materials (e.g. limestone) and in the fuels (both conventional fuels and the proposed alternative fuel). The demonstration test will replace a maximum of 30% of the conventional fuel with alternative fuel. In total, the alternative fuel would make up around 2 % of the total mass of materials used.*

*Over 99% of the trace metals from both raw materials and fuels are safely bound in the cement clinker during the cement making process. Less than 1% of the trace metals are emitted. This results in very low emission rates for trace metals, and off-site concentrations that are typically less than 1% of the POI limits.*

**3. The burning of chlorinated wastes such as plastics present a greater risk of dioxin and furan formation and emissions of organic compounds.**

*Organic compounds (e.g. volatile organics, plastics) in the materials entering the cement manufacturing process are destroyed by the very high kiln temperatures and reduced to their basic elements and free radicals. These basic building blocks react very quickly to form CO, CO<sub>2</sub>, H<sub>2</sub>O, HCl etc. It is true that very small amounts of these products under certain operating conditions (e.g. specific temperatures) may further react to form new organic molecules which can sometimes include PAH's and dioxins and furans.*

*Organic compounds could be formed during the cement making process using conventional fuels, because chlorides are present in the raw materials (e.g. limestone) used to make cement. As such, St. Marys already very carefully monitors and controls process conditions to limit the formation of organic molecules.*

*In the alternative fuel, total chlorides are present at higher levels than in conventional fuels and in the raw materials. However, as indicated above, the total mass of chlorides in the system is actually dominated by the raw materials, not the alternative fuel. St. Marys will, therefore, continue to carefully operate and monitor its process during this short-term test to limit the formation of new organics.*

*It is worth noting that the concentration of chlorides in the alternative fuel is well below the levels permitted in alternative fuels in many other countries that have set regulatory limits for the use of alternative fuels.*

*The stack monitoring program during the demonstration, will monitor for a range of organic compounds (PAH, Dioxins and Furans, VOCs) to verify the emissions of these parameters.*

**4. Will the use of the alternative fuels result in higher acid gas emissions (including HCl)?**

*No, higher acid gas emissions (such as SO<sub>x</sub>, NO<sub>x</sub> and HCl) are not expected. Overall, the proposed alternative fuel has less sulphur (S) and more chlorine (Cl) than conventional fuels, however, overall it is a small contributor (around 0.3% of total Chlorides and Sulphur) to the total amount of these materials in the cement making process in comparison to the conventional fuels and raw materials. The existing air pollution control equipment and the operating controls for the facility used to control these gases are effective and state of the*

*art and the St. Marys cement plant is well within regulatory requirements. The St. Marys plant for example has one of the lowest SOx emissions per tonne of cement produced in all of Canada. It is anticipated that there may actually be a decrease in SOx emissions based on the use of the alternative fuel as this type of emission reduction has been demonstrated by other cement plants using similar materials in other jurisdictions.*

- 5. During stack testing of alternative fuel, St. Marys could do things to make emissions and combustion look good that they might not do with full scale use. A 'third party' like the MOE should conduct the stack tests or observe the work.**

*St. Marys has prepared a Pre-Test Plan (PTP) that will be submitted to the Ontario Ministry of the Environment, Standards Development Branch. The Ministry will review the PTP to ensure that the most appropriate methods are being used for collecting and analyzing samples, and may visit the site to observe the testing and verify that the sample collection is being performed correctly. Part of the test protocol is to demonstrate normal operating conditions. St. Marys will do this by providing operating records from before the testing period, during the demonstration period and following the demonstration as required.*

*The operating conditions for the demonstration must be representative of the conditions during normal operations. This is the only way that St. Marys will have assurance that the facility can use the alternative fuel successfully. It is also the only way that the MOE and our stakeholders will accept the results of the demonstration as being representative of the air emissions if the company were to seek to use this material in the long-term at the St. Marys plant.*

- 6. Does the St. Marys cement plant have the pollution control technology in place to capture new (additional) pollutants that could be emitted from the combustion of alternative fuel?**

*With the St. Marys plant, emissions of acid gases like NOx and SOx are controlled by the raw material mill that acts like a scrubber as the limestone in the system is an alkali. The St. Marys plant also uses a system called an SNCR for additional control of acid gases. The bag-house acts like a series of large vacuum cleaner bags to remove particles from the flue gas/process air. This removes the majority of particulate as well as the majority of trace metals in the flue gas/process air as these metals have a tendency to condense on to these particles. The St. Marys cement plant controls the emissions of organic chemicals through the careful monitoring and control of the process conditions to limit the formation of such organic molecules.*

*The existing air pollution control equipment and the operating controls for the facility are effective and state of the art and the St. Marys cement plant operates well within regulatory requirements. The purpose of the short-term demonstration is to verify the environmental feasibility of using alternative fuels to substitute for a portion of the petroleum coke used at the plant.*

**7. Explain the presence of the visible plume that is sometimes observed at the plant.**

*The plume from the St. Marys plant can be visible when there is a significant temperature difference between the air flow from the stack and the surrounding ambient air and depending on the wind conditions. The visible plume is largely moisture condensing in the air based on temperature differences. Significant temperature differences can occur in the morning, during the winter and with certain weather conditions. When there is turbulent wind the plume is broken up quickly, but when you have a very stable air pattern, it can take a lot longer to disperse and the plume can be visible.*

**8. Explain the Point of Impingement (POI) information. What does the provided summary mean?**

*The Point of Impingement (POI) is the location where the maximum concentrations of an emission from a facility would expect to be measured. The POI is determined by taking emissions data from a facility (such as the stack emissions from the St. Marys Plant) and conditions related to the stack such as stack height, along with meteorological information, and running this through a computer model.*

*The summary table presented at the information session, provided an overview of some of the results of air dispersion modelling for the St. Marys Plant. It indicates the percentage of the St. Marys facility's emissions of the Ministry of the Environment's Point-Of-Impingement (POI) limits (off-site limits for the amount of a contaminant in the air). These results were based on recent stack testing completed when the plant was run with conventional fuel. This data shows that when the plant is run with conventional fuel, off-site concentrations of most parameters are well below the limits and in general less than 1% of the MOE POI limits. No material changes are anticipated in the plant emissions during the short-term demonstration test, as explained above.*

**9. Where is the POI (where does the maximum concentration land)?**

*The point of impingement (POI) where you would find the maximum modeled concentrations in the air of emissions originating from the stack is usually located either to the west or the north-east of the plant based on prevailing wind conditions. To the west of the plant, the maximum concentration (POI) would be at St. Marys property line (24hour POI limit). The maximum concentration (POI) for the 1 hour limit for SOx is to the north-east of the plant.*

**10. Will sampling be completed during the study and to what extent?**

*St. Marys has prepared a Pre-Test Plan (PTP) that will be submitted to the Ontario Ministry of the Environment, Standards Development Branch. The following sampling is identified in the PTP and would be undertaken during the demonstration:*

- *Source sampling (sampling of emissions within the stack) will be undertaken for a week prior to the demonstration to collect baseline information, and would be undertaken for three days while the alternative fuel is used to substitute for up to 30% of the conventional fuel in the kiln.*

- *Ambient air sampling (sampling of air in locations around the cement plant) for parameters such as particulate, metals, dioxins and furans and VOCs will take place under both baseline conditions and during the entire period of time that the demonstration will take place.*
- *Three times daily the raw material (limestone), conventional fuel (coal or pet coke) and the alternative fuel will also be sampled and tested.*

**11. What are the major emissions from the stack?**

*The major emissions from the stack at the St. Marys Plant are particulate matter and nitrogen oxides. The emissions from the stack including these parameters are well within regulatory limits.*

**12. What type of fuel is St. Mary's planning to test?**

*The alternative fuel that will be tested during the demonstration is post-composting residual plastic film. This material consists of plastic bags and plastic film removed from compost by the Orgaworld composting plant near London.*

*Testing of the alternative fuel indicates that the levels of chlorides, trace metals and other parameters are well within the regulatory limits imposed on alternative fuel in other jurisdictions. The demonstration will provide real information about the use of this material to partially substitute for conventional fuel.*

**13. Is the design of the St. Marys plant capable of burning the type of alternative fuel that you are testing in the demonstration?**

*The St. Marys plant can use alternative fuel with only a minor modification to the fuel feeding system. The mobile fuel feeding system that will be used for the demonstration is similar to those used elsewhere in the world for these types of materials. There are many cement plants world-wide that successfully use similar alternative fuel. The alternative fuel has been carefully chosen for the demonstration as it has good potential to be used as a fuel in the cement kiln, and as this provides a viable use for post composting residuals which otherwise would be landfilled.*

*The purpose of the demonstration is to confirm the suitability of the fuel and to verify the environmental feasibility of using this material as fuel. During the demonstration the alternative fuel will be added and the quantity increased in a slow and controlled manner to maintain proper operating conditions. Careful monitoring of the operating conditions during the demonstration will allow St. Marys to make any necessary system adjustments to maintain the stability of the system.*

*St. Marys will be required to meet all regulatory requirements at all times during the demonstration.*

**14. Will the use of the alternative fuels actually reduce the quantity of fossil fuels needed at the plant?**

*Yes, the use of the proposed alternative fuel will reduce the consumption of fossil fuels during the demonstration as it would be used to provide up to 30% of the energy requirements for the cement making process. The proposed alternative fuel has a heating value that is very similar (slightly higher) than the pet coke currently used at the plant.*

**15. Will hazardous and/or radioactive materials be present in the alternative fuel from the compost plant?**

*There are a number of levels of screening/inspections that will take place to avoid contamination of the materials from the compost plant and to ensure that the alternative fuel from the plant meets St. Marys' specifications. Firstly, when the compost materials are collected and hauled to transfer facilities, the material is screened as the compost plant cannot receive loads of material that may be contaminated. The transfer facilities that handle the majority of the materials processed at the plant are equipped with radiation detectors that the trucks drive through that are used to screen incoming and outgoing loads of material. When the materials are received at the composting plant, they are inspected again to ensure that they meet the conditions set out in the MOE Certificate of Approval for the compost facility. At the end of the composting process, the finished compost is run through screening equipment to remove the film plastic and the film plastic will be processed to meet St. Marys' requirements. The compost plant will be required to test the alternative fuel to demonstrate that it will meet St. Marys' specifications. Lastly incoming loads of material arriving at the plant will be visually inspected and further samples will be taken for testing.*

**16. The haul and storage of the alternative fuel on the site for the demonstration could cause traffic, odour and litter problems at the plant.**

*The alternative fuel will be hauled to the site via transfer trailer on a 'just in time basis' as the maximum total amount of materials in the building at the site would be in the order of to 24 hours-worth of alternative fuel. In the order of 1 to 2 truckloads a day of fuel would be delivered during the demonstration which is a small fraction (around 1%) of the current truck traffic to and from the site. As a result, the potential for an increase in traffic risks is minimal. The transfer trailers will back into the temporary storage building to deliver their load. The alternative fuel will be fed into a closed conveyor/fuel delivery system and will not be exposed to the elements at any time during storage or feed to the plant.*

*In regards to odour and litter, the temporary storage building will be kept under slight negative pressure, and the delivery doors will only be opened for truck deliveries. Both measures will mitigate the potential for odour or litter from the alternative fuels. Air from the building will be used to pneumatically feed the kiln so any odours in the air will be destroyed. Protocols for the management of odour and litter will be included in the design and operations plan for the demonstration.*

**17. Why only this fuel? Why not tires or sewage sludge?**

*For this demonstration St. Marys has decided to focus on residual streams generated by diversion plants, which currently must be disposed via landfill. Using this material as fuel would complement the diversion system in Ontario. While tires are commonly used as fuel in cement kilns in other jurisdictions, there are other methods of diverting these tires from disposal and the Province has recently directed Waste Diversion Ontario to develop a program that will recycle 90 per cent of Ontario's used tires by its fifth year. The use of sewage sludge as a fuel requires specialized equipment and energy to dry the sludge to meet the requirements of the plant and even then the fuel value would be lower than the alternative fuel that will be used for the demonstration. The residues from diversion plants represent a more 'efficient' type of fuel for the demonstration.*

**18. What will happen to fuel that does not undergo full combustion (i.e. what happens to the ash)?**

*The alternative fuel will be co-fired with conventional fuel in the cement kiln. The intense temperature of the flame (1,350 to 1,450°C) and conditions are such that the alternative fuel will immediately combust. The ash or mineral content of the alternative fuel that remains would be incorporated (bound) into the crystalline structure of the cement clinker produced in the kiln.*

**19. What approvals does St. Marys need for the demonstration?**

*St. Marys is only seeking approval for a very time-limited demonstration to use alternative fuel. As such, this project would be exempt from the Environmental Assessment Act. The demonstration project will require a temporary Certificate of Approval (Air) and a temporary Certificate of Approval (Waste).*

**20. Why run the demonstration? Can't you predict the impacts based solely on current operations and waste analysis?**

*Air modeling based on the analysis of the fuels and information on the existing plant operations indicates that it is viable to use alternative fuels and that the emissions would be well within current environmental limits. Furthermore, research has been undertaken in many other jurisdictions regarding the emissions and potential impacts associated with using alternative fuels. However, there are differences from plant to plant, both in plant design and in the composition of the raw materials used to make cement products which could affect operations and air emissions.*

*The purpose of the time limited demonstration project is to gather operational data and site-specific air emission data at the St. Marys cement plant to verify the environmental feasibility of using select alternative fuel. This will provide real, facility-specific information upon which to assess the merits of longer-term use of this fuel.*

**21. Say the demonstration goes ahead as planned – what does that lead to in the future?**

*If the results of the Alternative Fuel Demonstration Project are positive, then St. Marys would consider applying for MOE approval to use this material as a partial substitute for conventional fuel on a regular basis. Regular use of this material or other similar materials as fuel at the plant may require approval under the Environmental Assessment Act, and will require approval under Section 9 of the Environmental Protection Act (EPA) and issuance of an amended Certificate of Approval (Air), and approval under Part V of the EPA.*

**22. Will the proposal result in any significant local or regional human health and environmental impacts?**

*Based on the characteristics of the alternative fuels and review of published studies on the use of similar materials elsewhere in the world, it is not expected that there will be any material change in air emissions associated with the use of the alternative fuels. For some parameters such as SO<sub>x</sub> there may be a decrease in emissions. We also note that the demonstration will take place over a very short period of time, with the alternative fuel being used for a total of approximately 4 days.*

*During the demonstration, stack testing will be undertaken to determine if there are any changes the concentration of emissions when the alternative fuel is used. Ambient Air monitoring will be undertaken during the demonstration while both conventional and alternative fuels are used, to determine if there are any changes in off-site concentrations of various parameters during the demonstration. The results of these tests will be used to determine if there is any change in overall air emissions from the plant associated with the use of the alternative fuel.*

**23. There are concerns regarding dust from current operations. How will this project affect the management of dust impacts from the site?**

*It is not expected that the demonstration will have any effect on dust emissions. The alternative fuel will not be exposed to the elements and it is not expected that the use of the alternative fuel will have any effect on the emissions of particulate from the stack. There will be only a very minimal increase in truck traffic to the site (less than 1%) and thus no increase in dust associated with transport of the materials is expected. In the long-term, the use of alternative fuel may mitigate the potential for some off-site dust migration from the site by reducing the amount of conventional fuel that is stockpiled at the plant.*

**24. What will St. Marys do to control potential odours from the alternative fuel during the demonstration?**

*The potential for odour from the alternative fuel will be reduced by ensuring that the processing of the material by the fuel supplier, such as drying and shredding, will happen off-site.*

*The alternative fuel will be delivered in closed transfer trailers, directly to the temporary storage building. The temporary storage building will be kept under slight negative pressure,*

*and the delivery doors will only be opened for truck deliveries. Air from the building will be used to pneumatically feed the kiln so any odours in the air will be destroyed. These measures will mitigate the potential for any off-site odour impacts from the alternative fuel. An odour management protocol will be included in the design and operations plan for the demonstration.*

**25. Why the rush to undertake the demonstration in December?**

*It has taken a while to confirm the availability of the alternative fuel and the technical feasibility (i.e. supply of the fuel handling equipment) to run the demonstration. St. Marys needs to fit the demonstration into the productions schedule for the cement plant and the best fit would be to run the demonstration in early December. Also, it is preferable to run the stack emissions testing in the fall as winter conditions can make testing more difficult and slower for the testers and testing equipment.*

**26. Why did you have an open house in August – people are on vacation – short notice for session?**

*We know that August isn't the ideal time to consult, but we wanted to get out to the public with the information on the demonstration as soon as we could, so we could hear your comments and be able to acknowledge/address them in this process before we make the applications. We are having a second open house on September 11th, to ensure that we can reach everyone who is interested in the project. We also can be contacted via our 1-888 number, via email and by mail.*