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Lafarge Bath Plant

concrete connection

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Building better cities™

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New Plant Manager

Welcome Scarth MacDonnell!

Meet our new Plant Manager, Scarth MacDonnell — though, new is a bit of a misnomer. McDonnell's very first day with Lafarge was in June of 1986 as a summer student at the Bath plant. He has since travelled the world working with Lafarge, living everywhere from London, Montreal, and France, to New York, South Carolina, and Nova Scotia.

"It will be almost 30 years to the day I'm returning to the Bath Plant," said Macdonnell "this time as Plant Manager."

While MacDonnell was a Materials Engineering student at McMaster University, he had a number of summer work experiences. His time at Lafarge "cemented" his desire to work in the industry.

"Working at the Bath plant I was able to make a difference and see immediate results from my work, it was a really positive, powerful experience for a university student."

After graduation, MacDonnell had opportunities in the automotive and steel industries, but he was set on cement. "I started with Lafarge right out of school and have been with them ever since."

MacDonnell is happy to be returning to the Bath Plant. It's a homecoming both personally and professionally. "I was born and raised in Kingston, my mom still lives here, and I'll be living near good friends again" he said. "Professionally, I have great memories of working with the team at the Bath plant. I know the plant has lots of opportunities and has done a lot of interesting things since I was there 17 years ago. I look forward to helping Bath achieve its potential. They have great people."

Amherst Island Dry Stone Festival

Amherst Island has the largest concentration of historic Irish drystone walls known in Canada, some of which are over 200 years old. Settlers from the Ards Penninsula, now in Northern Ireland, began building the walls in the 19th century.

In September of 2015, Lafarge was a proud sponsor of Dry Stone Canada and the Dry Stone Walling Association of Ireland who hosted the first-ever Irish-Canadian International Dry Stone Festival on Amherst Island. Over a 3 day period, more than 1,200 people came to celebrate the island's important place in Canadian heritage.

30 dry stone walling workshop participants, and more than 40 professional wallers joined forces to create new, legacy structures to commemorate the existing walls on the island. The wallers came from Ireland, Scotland, the UK, Canada, and the United States - the Queen's own waller from Balmoral was among them.

The legacy structures included a 100-foot"sampler wall" showcasing a variety of traditional Irish dry stone techniques. "We ended up with a wall that was close to 100 feet in length" said Andrea Cross, an Amherst Island resident and member of Dry Stone Canada. "When you look down the wall you can see the variety in style and stone" she added.

Certain stones were laid by people of significance in the Irish and Canadian communities. A time capsule was laid by the Canadian Ambassador to Ireland, Dr. Ray Bassett, and renowned author, Jane Urquhart, placed a stone carved with the words "remember them." Additionally, there is a stone carved with the name "Crowe", the last name of one of the original Irish settlers on Amherst Island.

Participants also built an ocular dry stone wall, embedded with a Celtic cross. The cross had an opening that aligned with the setting sun on the last day of the event. The sun beam projected onto another wall, carved with a Claddagh, representing the Irish-Canadian connection. "It was a very moving experience for many people" said Cross. "Sophie Kiwala, the MPP for Kingston and the Islands was so taken by the event that she spoke about it in legislature."

Other events included dry stone walling workshops, a children's "spud walling" workshop which used potatoes as stones, Irish dancing, historic tours, and stone carving demonstrations. "We are very grateful to Lafarge for their support," said Cross "it made a big difference in what we were able to do and how we were able to treat our VIP guests.

For her work in making the festival a reality, Andrea Cross was awarded the Lieutenant Governor's Ontario Heritage Award for Excellence in Conservation. The award is administered by the Ontario Heritage Trust, an agency of the Government of Ontario dedicated to identifying, preserving, protecting, and promoting Ontario's heritage.

In partnership with Queen's University,
Lafarge is working to answer a burning question:

Are there efficient low-carbon alternatives to traditional coal fuel?

The global cement industry is a significant producer of greenhouse gasses, most notably carbon dioxide and nitrous oxides. Under the Cement 2020 program, Lafarge aims to make our Bath, Ontario plant amongst the most sustainable plants in Canada - if not the most sustainable. One of our biggest challenges is replacing traditional fossil fuels, like coal, with cleaner, low-carbon fuels

Lafarge is working closely with Principal Investigator, Dr. Darko Matovic, and his team at Queen's University to address the low-carbon challenge.

"There are 3 main components to the research" said Dr. Matovic.

"First, the team needs to identify possible lower fuels. We are recently explored the use of construction and demolition waste, discarded asphalt shingles, railway ties, and other biomass."

Second, we must assess the life cycle of the new fuels including extraction, production, processing, and transportation, and accurately calculate their total emissions. "This is especially important when emissions regulations are being imposed" added Dr. Matovic.

Finally, we must find the best way to combust these new fuels in order to keep emissions low and energy efficiency high. "Cement kilns must operate at a very high temperature in order to be effective. Mixing low-carbon fuels and traditional fuels presents challenges in maintaining the right firing pattern" said Dr. Matovic. "We are working to develop recommendations for changes in burner design and the combustion process. This would allow us to substitute 30% of traditional fuels with low-carbon fuels and more in the future."

Not only will the use of low-carbon fuels have a positive impact on the environment, it will provide economic benefits for the province and local communities. "The use of low-carbon fuels will reduce the carbon emissions from producing cement, so Ontario can maintain its position as an international competitor" said Robert Cumming, Manager of Environmental and Public Affairs at Lafarge. "It will also create local jobs by replacing imported fuels with locally produced fuel."

Dr. Matovic applauds Lafarge for being a true partner and research collaborator in the quest for efficient low-carbon fuels. "We are working with Lafarge as they are making decisions about the future. Most often, industrial partners have already made decisions and only want an academic partner to rubber stamp their project. Lafarge has consulted with us every step of the way. It benefits everyone when we're involved at the concept stage."

This partnership with researchers at Queen's University will elevate the Lafarge Bath plant to a new level. Everything we learn can be applied to Lafarge plants all over the world, making the results far reaching.

Life Cycle Assessment (LCA) system boundary

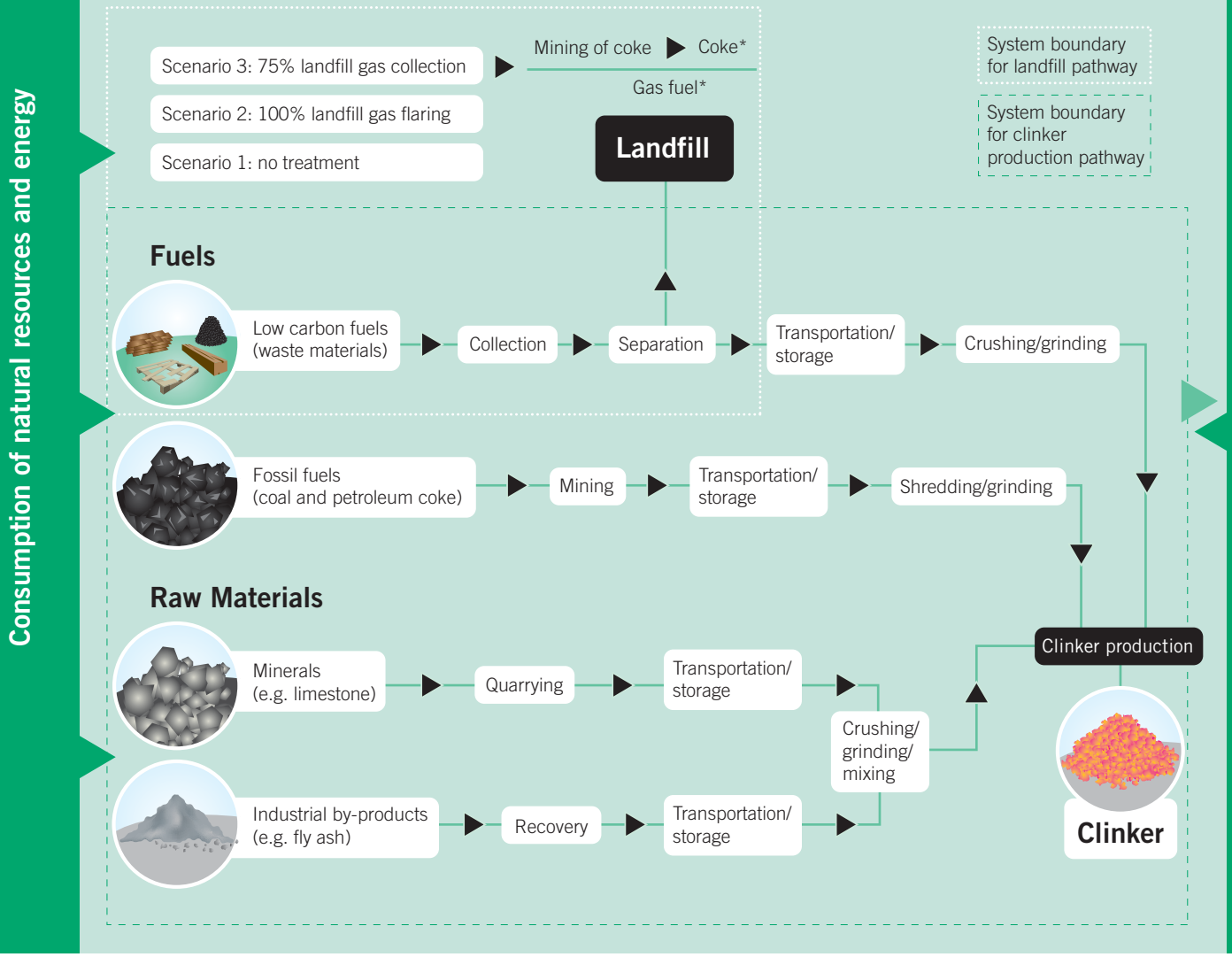


Diagram 1 (Above)
Comments from Queen's Research Team

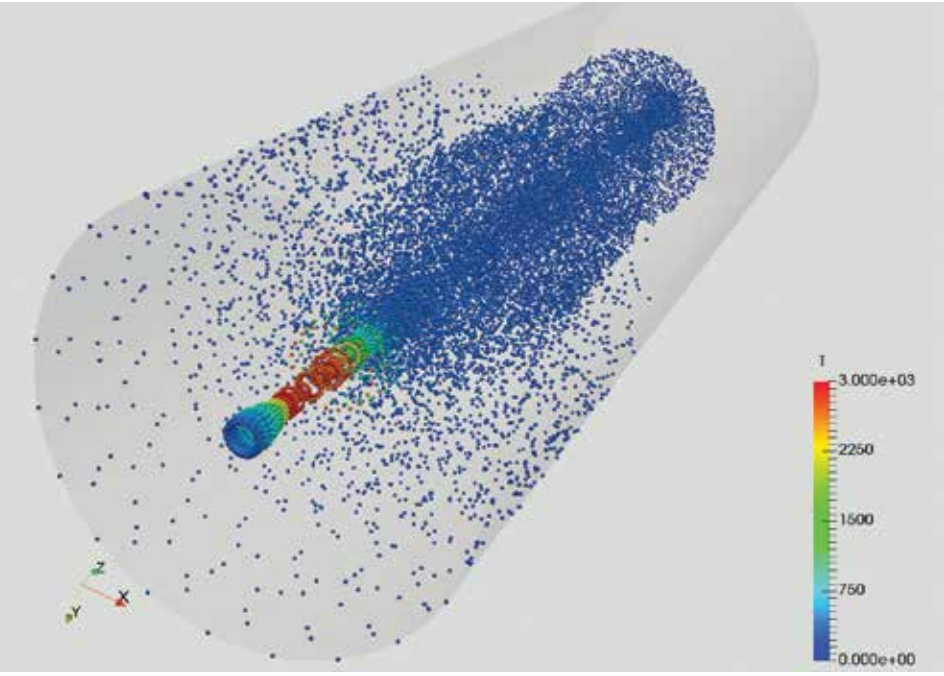
"The functional unit is the production of 1 tonne of clinker. The system boundary includes a clinker production pathway (in the green box) and a landfill pathway with three disposal scenarios (in red box). The clinker production pathway is "cradle-to-gate", covering processes from fuels and raw materials acquisition to the manufacturing of clinker. This system boundary does not include the packing process of the final cement product, the use phase, and the end-of-life recycling of the used ceramic products. Upstream environmental burdens and resources used in the processing and transportation of raw materials and fuels are included. As for the landfill pathway, three scenarios are investigated: Scenario 1, all landfill gases (LFGs) are emitted to air; Scenario 2, all LFGs are flared to convert methane to carbon dioxide; and Scenario 3, 75% of the LFGs are collected as a gas fuel with the rest 25% emitted."

Comments from Queen's Research Team

"Burner modelling is done using advanced numerical modelling methods that combine models for gas flow and coal, LCF fuel and clinker making material as particles interacting with the gas as they fly in the kiln. This interaction includes chemical reaction, radiation, mass exchange (degassing the particles), combustion, heat exchange and momentum exchange. In the process, the clinker making material gradually moves from the kiln far end towards the kiln head where the burner is located and where the temperature is the highest (about 10 m from the burner front end).

The figure shows fuel particles as they leave the burner (the small ring at the left end), accelerate and burn afterwards. The colour of the particles indicates particle temperature. The particle size in the picture is greatly exaggerated to make them visible, but this is done only for display purposes, during the post-processing of results. Internally, the model deals with particles in their real size which is ~1000 times smaller. Unlike the real kiln situation, where the kiln is preheated to the working temperature using natural gas, and particles are introduced in the hot atmosphere, the test shown in the figure simulates a transient problem, where the particles are introduced in the cold ambient, hence their temperature returns to lower values once they have burned. Tests like this allow for extended scenarios simulating fuel behaviour without the need to do that in the real system.

Simple fluid flow problems, such as aerodynamic drag, pressure loss in pipes, even shock waves in supersonic flows can be done on a scaled down model and the results can be reliably scaled up to the real size object (e.g. an aircraft). Contrary to that, complex physical systems, like cement kilns, cannot be modelled on a scaled down model, since each of the physical processes involved has their own characteristic scales (e.g. chemical, radiation, flow and two-phase scales are all different). In the past, this resulted in slow progress in kiln process improvement, based mostly on trial and error – an expensive and risky proposition for the facilities of the cement kiln size. It is only recently, in the last 10-15 years that the numerical modelling tools have advanced to the level of sophistication and accuracy necessary to provide reliable outcomes to different modification ideas without the need for extensive testing on real systems. In the modelling process for Lafarge Bath LCF program, we are employing the latest, state of the art tools available in the numerical modelling toolbox, and we have developed strategy for further advancement of these tools."



You're invited to a Public Meeting

Lafarge is hosting a Public Meeting to introduce LCF Project 2, review the Environmental Screening Process, and identify potential environmental effects (including benefits) to be assessed. Representatives from Lafarge, Cement 2020 research partners, and technical experts will be in attendance to discuss Project 2 and answer your questions. Lafarge will also be available to discuss the proposed fuels for the Pilot Study amendment. Further information is provided at **www.cement2020.org.**

Location
Loyalist Golf & Country Club,
1 Loyalist Boulevard
Bath, ON, K0H 1G0

Date & Time
July 12, 2016, | 7:00 - 9:00 pm

Industrial Neighbours Working Together

Bath is a very welcoming community. In that spirit, it was important to Lafarge to help our newest industrial neighbour get settled in.

Some of you may have noticed some new activities at Lafarge's dock and new radar speed signs along Highway 33. On several recent occasions we opened our dock facilities to the construction team for the Lennox Generating Station. In partnership with TransCanada and Mammoet, Lafarge offloaded large equipment for the Generating Station including heat recovery steam generator components, condensers and combustion turbine generators. Some of the components were so large, they were brought in by the large ocean-going vessel, BBC Palau, which has two cranes on board, each with a lifting capacity of 450 tonnes.

"By sharing our dock facility, Lafarge prevented a massive amount of equipment from being transported on local highways." says Walter Nuvoloni, Operational Procurement Manager at Lafarge.

Because of Lafarge's participation in the project, the Napanee Generating Plant avoided road closures, movement of phone and electric lines, and other disruptive measures. TransCanada and Mammoet were able to unload with minimal impact to local residents, keeping at least one lane open at all times.

"The project would have been much more disruptive without our involvement because the Generating Plant's construction facility does not have a suitable shoreline for unloading of equipment" added Nuvoloni. The other collaborative project was the installation of new radar speed signs. Both Companies have clear rules given to all of our hauling partners to ensure that speeds are kept low and that they support our good neighbour efforts. By working together with TransCanada, Napanee OPP, L&A County and Loyalist Township we were able to add these new signs to our Traffic program. These signs remind all of us to slow down as we enter the Village. The data will also be shared with the OPP to help focus enforcement efforts and further improve the safety of our community for our families.

Lafarge North America, Bath Plant is committed to being an environmentally responsible organization.

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