October 29, 2021

To: The Ontario Ministry of the Environment, Conservation and Parks

Re: ERO Posting 019-4320 – Proposal for an Amendment to ECA (Air & Noise) No. 6729-BYRJEP issued to St. Marys Canada Inc. to Install an "Ultimate Cell Continuous Combustion Unit (UC3) as part of the Cement Kiln at their Bowmanville Plant

Dear Ministry Staff,

This submission contains my comments on this proposal which are based on the very limited supporting information that was provided on the website and on additional supporting information that was obtained subsequent to an email request to the Ministry after which a time limited (5 day) link was given to a 283-page information package containing various documents.

I am a resident of Clarington and I have actively followed the burning of waste materials ("alternative fuels") at St. Marys. I also have been/am a member/alternate member of the two waste advisory committees associated with the Durham-York incinerator.

According to both the Ministry's ERO posting, and the information supplied by St. Marys, the purpose of the UC3 unit is to optimize the combustion environment in the cement kiln by creating an oxygen rich environment. St. Marys asserts that the installation of the UC3 system is not expected to increase air emissions from the facility for the maximum emissions scenarios.[1]

This proposal to amend their ECA, however raises many concerns, and comes less than six (6) months after St. Marys received approval to amend their ECA to expand the use of alternative "low-carbon" waste fuels and more than quadruple the tonnage of alternative waste fuels they were permitted to burn.[2]

In their previous application to burn 400 tonnes/day of waste fuels, St. Marys did not discuss the need to install a UC3 device to be able to burn that amount of waste. This raises questions and concerns not only with this proposal to install the UC3 unit, but also with their previous application and with the subsequent approval issued by MECP on March 31 2021. It also raises concerns about the adequacy of the requirements in Regulation 79/15.

I am concerned that this latest St Marys' application amounts to a "bait and switch". There is obviously some uncertainty about the adequacy of their prior application and subsequent Approval given this new request for an amendment so soon after.

[1] BCX Environmental Consulting Letter to MECP dated August 12, 2021 page 1, found on page 1 of the 283 page supporting information package

[2] ECA 6729-BYRJEP, online: https://www.accessenvironment.ene.gov.on.ca/instruments/0051-BN9Q3S-13.pdf.

Concerns with Need to Install UC3 and Change Given Prior Application and Approval

St. Marys states the UC3 system will integrate an electrolyte production unit that will produce hydrogen (H_2) and oxygen (O_2), which will enter the kiln where the thermal energy present will transform these gases into highly reactive hydroxy (OH) radicals. Those radicals will react with carbon monoxide (CO) in the kiln to promote complete combustion and generate heat to improve the combustion efficiency of the fuels (conventional/ALCF waste fuels).[3]

St. Marys asserts that this technology will also promote complete combustion of the low carbon alternative waste fuels and **provide assurance that alternative fuels can be consistently fed and combusted at the maximum rate**.[4] (emphasis added)

This puts to question why this UC3 unit was not part of their original application and the March 31st 2021 approval to burn at that maximum rate and whether sufficient heat is being generated by the alternative waste fuels when substituted at or near the maximum rate.

St. Marys claims high temperatures, long residence times and the oxidizing atmosphere in the kiln ensures complete combustion and destruction of the organic components of the fuels,[5] so why the need for the UC3 unit? St. Marys was not transparent in their prior application that they might need such a device when increasing to 400 tonnes/day nor have they been transparent in this application to install it about why it is needed, nor about what they have observed/monitored/anticipate that is driving this application for an amendment.

In short, there is inconsistent and missing information.

High temperature and complete combustion are important and directly affect emissions, including carbon monoxide and other toxic pollutants including dioxins/furans.

Things can "go wrong" at cement kilns burning alternative waste fuels. An incident in 2014 at an Austrian cement kiln provides such an example. The kiln burned industrial waste contaminated with highly toxic hexachlorobenzene (HCB) polluting the surrounding community and which was caught by environmental monitoring and biomonitoring. There were multiple failures including that the kiln was not burning high enough to destroy the HCB.[6]

In their previous application, and now with the UC3 application, St Marys claims that they have conservatively considered the "Maximum Emissions Scenario".

The following comments register concerns about whether the Maximum Emissions Scenario and related assumptions are conservative and adequately represent the worst case.

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[3] Emission Summary and Dispersion Modelling Report (ESDM Report), St. Marys Cement Inc., BCX Environmental Consulting, August 2021, page 5

[4] Ibid, page 5

[5] Ibid, Section 1.4.3.6, page 4

[6] Reuters Special Report: TRASH AND BURN-Big Brands Stoke Cement Kilns With Plastic Waste as Recycling Falters, Issued October 28, 2021; https://www.reuters.com/investigates/special-report/environment-plastic-cement

The emission rates used by St. Marys in their March 2020 and August 2021 ESDM use demonstration source testing results where the alternative fuels were burned at rates less than the maximum rate of 400 tonnes/day. The LCF source test (October 2018) burned 96 tonnes/day and the ALCF trial (December 2018) burned 287 tonnes/day.[7]

The ESDM consultants then prorated (scaled up) those emission rates, for some, but not all, of the contaminants to *estimate* what emissions would be at 400 tonnes/day,[8] but that is not necessarily a conservative assumption, given that there may be other operational factors that may come into play and affect emissions when burning the maximum tonnage (400 tonnes/day) of waste materials. Perhaps this is the reason why St Marys needs a UC3 unit to be installed in the kiln?

In addition, some very important pollutants were not prorated, including particulate matter (PM) and sulphur dioxide, both of which had higher emissions when the ALCF fuels were burned.[9] Choosing not to prorate all emissions was not a conservative decision.

There must be some assumptions that were faulty in the prior application, otherwise why would the proponents request to install this device shortly after receiving approval? Faulty assumptions would have resulted in faulty estimations and misinformation that would have affected the approval decision and the conditions set in the ECA, including monitoring requirements.

Concerns Regarding Carbon Dioxide Emissions and Claims of Greenhouse Gas Reduction

St. Marys asserts that the installation of the UC3 unit will not change the carbon dioxide emissions intensity report.

With respect to carbon dioxide emissions however, the maximum emissions scenario for that greenhouse gas is truly unknown.

In their application to increase burning waste materials to 400 tonnes/day, St. Marys only tested samples representing two fuels blends which contained only some of the permitted wastes.

As St. Marys' ECA allows for uncountable blends, of various ratios, from a long list of permitted wastes, the waste blend that has the maximum carbon intensity is unknown. There has been no information provided to support that the waste fuel blends that were tested represent a worst case maximum carbon content fuel blend and worst case heat value combination that represents maximum CO2 emissions.

St Marys' UC3 application relies on their earlier Carbon Dioxide Emission Intensity Report. That Report and also Regulation 79/15 requirements, however, are also in question now that we know

[7] Ibid, page 13 and BCX Environmental Consulting, Emission Summary and Dispersion Modelling Report in Support of an Alternative Low-Carbon Fuel Application under Ontario Regulation 79/15 (March 2020) at p 101 (Appendix F, Calculation Sheet 1 – Kiln Stack Emissions)

[8] ESDM Report, August 2021, page 13

[9] BCX Environmental Consulting, Emission Summary and Dispersion Modelling Report in Support of an Alternative Low-Carbon Fuel Application (March 2020), Appendix F, Calculation Sheet 1 – Kiln Stack Emissions.

there is a need to install a UC3 unit to increase combustion to burn waste fuels at the maximum rate.

Regulation 79/15 requires that the waste fuel blends have a high heat value of 10,000 MJ/tonne and St Marys' Carbon Dioxide Emission Intensity Report met those Regulation 79/15 requirements. However, it is now apparent in St Marys application to install the UC3 unit to increase combustion, those requirements were insufficient for complete combustion at the maximum amount they have been permitted to burn (400 tonnes/day).

In addition, according to Reuters, the U.S. Environmental Protection Agency (EPA) has stated there is no significant climate benefit with kilns burning alternative fuels and that the practice can create toxic emissions that must be monitored.[10]

All of this does not add up. There needs to be a fulsome investigation into why this unit is needed and whether the original application was sound.

Concerns with Lack of Supporting Information to Support Claims

St. Marys did not provide the equations for the chemical reactions that will occur with the introduction of the UC3 unit.

According to various sources[11], the reactions can ultimately be represented by:

$CO_2 + 2O_2 + hv \rightarrow CO_2 + O_3$

The results are carbon dioxide (CO_2) emissions and ozone which has other climate change implications that were not discussed nor assessed.

St. Marys relies on the manufacturer report UTiS supplied to support their assertion that the UC3 installation would not affect emissions and that it is an "environmentally insignificant amendment" and therefore "exempt from EBR requirements".[12]

Appendix C Contains the "UC3 Emissions Data" which is a 7-page Document authored by UC3 manufacturer. This document contains many anecdotal comments, but lacks supporting scientific evidence/information and underlying documents to support its assertions.

It provides no information to verify claims for no impact on emissions for metals, dioxins/furans. Section 3.2 contains only two paragraphsa.

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[10] Reuters Special Report: TRASH AND BURN-Big Brands Stoke Cement Kilns With Plastic Waste as Recycling Falters, Issued October 28, 2021; https://www.reuters.com/investigates/special-report/environment-plastic-cement

[11] https://en.wikipedia.org/wiki/Carbon_monoxide; also https://www.atmosp.physics.utoronto.ca/people/loic/chemistry.html#2.4%20Oxidation%20of%20Carbon

[12] BCX Environmental Consulting Letter to MECP dated August 12, 2021 page 1, found on page 1 of the 283 page supporting information package

UTiS Claims CO, NOx, SO2 emissions areareduced, but again, very limited data is provided and what is therea is not referenced, and no underlying documents are provided so the claims are unverifiable and untraceable.

In short there is insufficient information provided on emissions as well as flammability hazards to support this application.