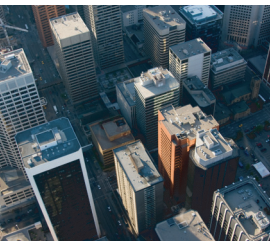

Lystek

Nothing wasted.
Everything to gain.

Update from the Director of Business Development

Welcome to 2013! This issue marks the first anniversary of our newsletter, which has proven to be very popular in our efforts to provide the community with general information, articles and regular updates on the Southgate OMRC. We'd like to thank everyone that has reached out over the past year to express their appreciation and support for our project and our ongoing efforts to maintain open dialogue.

Today, let's take a little time to explore and discuss what drives, excites and motivates us. Clearly, human beings are interesting and complex, with many, different and varied points of view and approaches to challenges and situations. Personally, I have always been drawn to people and organizations with a positive orientation. I find it uplifting to be surrounded by affirmative and encouraging individuals…those that believe anything is possible. People like this are action-driven and solutions-oriented. They see life as the proverbial "half empty glass", with plenty of room for contribution, growth and improvement. They make things happen because they do not simply accept the "status quo". Rather, they are catalysts for change, always seeking, and finding, ways to challenge and advance. Of course, some people find this easy to do, while others do not.

It has been said that if we constantly tend to think, or speak, critically about others, there is something going on within us that needs to be examined. There is some aspect of our own self that we find unacceptable. However, it is not always easy to look in the mirror. Unfortunately, no matter how hard we try, none of us is perfect. It is much easier to turn your attention outward and find fault, as opposed to looking within.

While offering constructive feedback is certainly acceptable, continually pointing out perceived flaws is counter-productive. Often, our criticism is based on the fact that the "others" are doing something differently than we would. So, it becomes uncomfortable for us. We end up feeling the need to point out the "defects" in their approach, rationalizing that we are just trying to help.

This path rarely works because the unspoken message is, "You are wrong and I am right". We are all guilty of this, but, if we are truthful, we will admit that it never works. Nobody wants to be constantly evaluated and judged, but that is how it comes across. When this happens, we get defensive and walls go up. This makes it difficult to impossible to connect with any degree of success.

So, for 2013, try surrounding yourself with people and organizations that are positive and comfortable in their convictions. This way, you will feel less threatened or offended by human imperfections. This will also help you develop a better understanding and appreciation for the challenges others are trying to address. The end result will be a strong desire to be part of the solution, rather than a finder of problems.

Kevin Litwiller, BBA

Mr. Litwiller is a career Marketing, Communications and Business Development professional. He has held several, senior-level positions, both corporately and within start-up, business environments. Prior to Lystek, Kevin was responsible for Marketing and Business Development for a national software and professional services firm in the municipal waste management sector. A proud father and husband with two young daughters, he is committed to pursuits that help improve the world they will inherit.

Public Advisory Committee - Update

The Public Advisory Committee (PAC) met on January 24th to once again tour the progress of the biosolids processing facility (also known as the Southgate OMRC). A second order of business for the PAC was to develop the Terms-of-Reference required by the Ministry of Environment's (MOE) Environmental Compliance Approval (ECA).

Construction of the OMRC has taken great strides under the guidance of Guy Treadwell, Senior Project Manager for the facility. The installation of the boilers to produce steam for the reactors, the two reactors themselves and the extensive duct work to move air throughout the building and into the bio-filters are nearing completion. Electricity is connected to the building and the control systems for the automation of the facility are also installed. Offices, lunch room and washrooms are dry-walled and this allowed the PAC to understand how the operation will be managed on a day-to-day basis. The next step is natural gas hook-up to create heat in the facility and then the water can be safely operated without risk of freezing.

The PAC was able to understand the importance of the commissioning of the facility and the multitude of steps required to test the instrumentation and each component before the facility is fully operational.

Terms-of-Reference:

Using Terms developed for the Clean Harbours facility near Sarnia and the health and environmental soil studies in Sudbury as a reference, the PAC has developed a Terms-of-Reference for the Southgate OMRC, Public Advisory Committee. The new Terms, when complete, will be available on the Southgate and Lystek websites in February.

The MOE has approved the continuance of the current PAC. However, the PAC would like to advertise for two additional participants to increase the number of members from four to six. We welcome any residents of Southgate or a resident of Melancthon who lives within 5 km of the OMRC. Additionally, the PAC encourages all community members to attend the PAC meetings and direct any questions or comments they may have to the Chair. PAC meetings will be held every other month, for a total of six meetings per year.

Response to EBR Comments:

Based on the public's concerns made through the EBR website, the MOE has reviewed Lystek's application and requested several important steps in their approval. Truck traffic will be restricted as follows; the hours for shipping and receiving of materials are 6:00 am to 6:00 pm – Monday to Friday and 7:00 am to 12:00 pm on Saturday. Three additional sites for ground water monitoring were requested. This creates a set of 6 locations on site where ground water quality will be monitored. A third area of public concern was the shipment of materials through Dundalk. The ECA states that alternate truck routes to the OMRC, rather than Main Street through Dundalk, are used as road conditions allow. Materials must be shipped in sealed tankers or vehicles covered with a sealed tarp.

The PAC would like to remind residents to direct any new questions, in writing, related to the Southgate OMRC to: Stephen Redmond at *stevered@isp.ca*. PAC meeting minutes are available for viewing and downloading at *www.town.southgate.on.ca* or *www.lystek.com*

We'd love to hear from you! Contact us:
T. 226.444.0186 or E. info@lystek.com

Plant Nutrition and the Role of Biosolids

Our world population is growing rapidly. It is expected to rise from over 7 billion today to 10 billion by 2050. To support that increase it is estimated that food productivity on current agricultural land has to double, even though current trends indicate declines in crop yields due to depletion of soil nutrients and organic matter, soil erosion and other factors. This article discusses the topic of plant nutrition, particularly as it relates to the beneficial impacts of returning the organic nutrients contained in biosolids to agricultural land as part of the global challenge to sustain the world's food supply.

Plants require twenty separate nutrients to support growth. These nutrients play different and varying roles within the plant. Some are components of plant structure, such as the contents of plant cell walls or the starches or oily components of cell storage bodies, or the high nitrogen contents of plant proteins. Nutrients also play a diverse range of complex, specialized biochemical and physiological roles needed for plant growth and development. As in other biological organisms, including animals and humans, deficiencies in plant nutrition are often evident through undesirable physiological changes that typically result in diminished product yields and/or reduced product quality in agriculture and food production processes.

Three of the twenty nutrients required by plants, carbon, hydrogen and oxygen, may be supplied directly from air or water. Another seven of the required nutrients, termed macronutrients, contribute between 0.2-4% to plant dry weight, and need to be supplied to plants via soil in higher concentrations through soil fertilization. In contrast, as the name suggests, micronutrients are present in plants at much lower concentrations. Depending on the particular component, their dry weight in plants are in the range 5-200 parts per million.

Macronutrients include the well-known, predominant chemical fertilizer components, nitrogen (N), phosphorus (P) and potassium (K). These nutrients are also present in high concentrations in organic fertilizers such as biosolids. The other macronutrients required by plants are calcium (Ca), sulphur (S), magnesium (Mg) and silicon (Si). Essential plant micronutrients include boron (B), chlorine (Cl), manganese (Mn), iron (Fe), zinc (Zn), copper (Cu), molybdenum (Mo), nickel (Ni), selenium (Se) and sodium (Na).

Traditionally, chemical fertilizers have been routinely used to restore soil N, P and K levels, which become depleted through intensive farming and harvesting of crop plants. However, there are very real challenges in maintaining an over-reliance on chemical fertilizers due to depleting global resources. This will contribute to the ever-increasing cost of food production and sustainability. Intensive farming using chemical fertilizers can also lead to reduced organic carbon content of soils. This in turn leads to degradation of soil structure, reduction in water retention, soil erosion and reduced carbon sequestration (the process of capture and long term storage of carbon dioxide). All of these factors can contribute to increased greenhouse gas emissions and global warming.

While soils have typically contained adequate amounts of the other macro- and micro-nutrients required for plant growth, research has shown that plant uptake of some of these essential nutrients, through intensive agriculture over time, can lead to nutrient deficiencies and diminished crop yields. The reduced organic content of these soils have also been shown to have a negative impact on plant growth.

Properly treated biosolids can supply the macro and micro-nutrients required for plant growth. In addition to substantially reducing overall fertilizer costs to farmers, application of bio-based fertilizers to agricultural land enhances soil structure with the associated environmental benefits of reducing soil erosion and greenhouse gas emissions. Bio-based fertilizers can also increase the organic carbon content of soil, which, in turn, is beneficial to plant growth as this promotes the uptake of nutrients by plant roots. Returning the nutrients in biosolids and other organic resources to agricultural land can help halt current trends in soil degradation and contribute to sustainable, global food production for future generations.

Owen P Ward BSc, PhD.

Dr. Ward is a founder of Lystek and a co-inventor of its technology. Dr. Ward is a Professor at University of Waterloo. He is a former president of the Canadian Society of Microbiologists and a former director of the US based Society of Industrial Microbiology.

Dundalk, ON. Construction Update

- Guy Treadwell, C.E.T., Senior Project Manager

It's been a couple months since we provided an update on the construction status of the Southgate OMRC. Hope everybody had a great Holiday Season! I'm looking forward to getting to know more people in the community in 2013. The building is now complete and work is ongoing with a number of trades. We currently have approximately twenty full-time people working within the building at any given time completing mechanical, plumbing, electrical, HVAC and interior finishes, such as drywall and painting. We will be commissioning the facility over the next few weeks. This is a complex operation that involves comprehensive planning and scheduling to ensure all the individual components required to make the site operate as designed are ready and fully tested.

There are several utilities that will work together to operate the building as designed, licensed and approved. For example we must confirm that we have the proper electrical current and signal/communications wiring to all of the operating devices so that each device is confirmed linked the computerized operating systems. The fans that move the air through the building and ultimately to the biofilter all need to be confirmed operational in the designed range. The pumps that move our feedstock materials need to be confirmed operational and in the designed range. The same system checks need to be confirmed for the product mixers and the pumps which move the final fertilizer product to the storage reservoirs.

There are two separated heating systems at the OMRC. There is a boiler system which maintains the temperature (70-80 degrees C) in the product mixers in order to kill pathogens and renders the final product inert so that it is no longer biologically active; and there is a building heating system which maintains a constant operating temperature within for workers and to properly treat and de-odorize the air before it is released. These heating systems are also tied into the central computerized operating system for the facility and will be continuously monitored and controlled to ensure the desired operating status is achieved and maintained.

All of the above activities and components play a part in the successful commissioning of an advanced process that is much more complex than a simple "depot" or transfer station. Rather, this is a sophisticated, state-of-the-art, operation which will transform approved, organic feedstock into a safe, highly desired, environmentally friendly, CFIA registered fertilizer product.

Guy Treadwell, C.E.T.

Guy has over 20 years of experience in the field of environmental engineering with international experience. His responsibilities have included the successful management of a wide range of municipal and private infrastructure projects for water and wastewater plants, solid waste and clean water delivery systems. Guy is proud to have worked on a number of international projects to clean up (remediate) sites that were environmentally impacted.