

An evaluation of potential longer term effects of one time applications of Spanish River Carbonatite on soil quality and crop growth in the Sudbury area

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Concern for the potential detrimental effects of the excessive use of chemical fertilizers on agricultural lands and the environment has encouraged many farmers to investigate alternative methods to managing and/or improving the fertility of their soils. Spanish River Carbonatite (SRC), an agromineral fertilizer, has been evaluated as one of the alternatives. In the current study, the effects of SRC on both soil quality and longer term crop yield were assessed, with examination of soil chemical properties such as pH, organic matter content, cation exchange capacity and available nutrients. The effects on crop growth parameters such as crop yield and plant nutrient content were also evaluated. Plots on four farms across the Sudbury area were monitored, with six, one-acre plots on each farm. Three plots had SRC applied in the fall and spring of 2001 and 2002 respectively. In summer of 2007 the soil and crop samples were

collected and analyzed. The soil chemistry data allowed comparison of control and SRC applied plots sampled both before (2001) and post-SRC application (2007), and between control and treatment plots in 2007, several years after the initial application. The different crop samples (hay and barley depending on the individual farm) were only compared between control and test plots for the 2007 crop year. Examination of the soil chemistry results indicated no consistent long-term effect from SRC application at 1 ton per acre for any measured soil chemical property, perhaps a reflection of the only one-time application of the agromineral product. A slight improvement in crop yield of forage and alfalfa was observed on two farms. However, no significant improvement for crop yield was measured for the other two farm sites, and no significant differences in plant nutrient content were measured in the crops from any of the four farm

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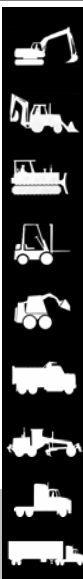
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Farming Energy Crops on Tailings

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Industrial and municipal organic residuals are being utilized to rehabilitate mine tailings to the extent that they can support the growth of biomass and "energy crops" such as canola, corn and switchgrass, which can be harvested to provide feedstock for biofuel processing plants. Experimental ½ hectare plots on mine tailings in Timmins and Copper Cliff were amended with approximately 1 metre (uncompacted) of organic residuals from the pulp and paper industry and corn and canola were planted in early July, 2008. A control site was established in Azilda on agricultural land to compare crop yield and quality between the experimental sites and traditional agricultural land. A third tailings plot in Onaping has been amended with municipal organic residuals and the first crops will be planted in the spring 2009.

The Mining Innovation and Rehabilitation Applied Research Corporation (MIRARCO), owned by Laurentian University, is leading this research in Northern Ontario under the Green Mines Green Energy (GMGE) initiative lead by Natural Resources Canada

(NRCan). The research is primarily supported through mining and pulp and paper industries, municipal, provincial and federal governments, with advisory input from members of the OSCIA Sudbury Chapter.

This research initiative is focused on the potential impact of organic covers on tailings chemistry, tailings groundwater quantity, the quality and quality of biomass produced, overall feasibility (full scale), communications, public education and technology transfer. Because we are in the early stages of this research there is currently insufficient data to elucidate the potential impact of organic covers on these tailings. Field measurements and visual observations indicate crops grown on the experimental plots exceed or produce similar quantities of biomass compared to the agricultural control plot in the Sudbury region. The observed crop quality appears similar at both the experimental and control sites, but analytical results to confirm this have not yet been completed. Full scale farm management feasibility has been proven through tilling and seeding with standard agricultural equipment at

the plot in Copper Cliff, but has so far proven difficult at the Timmins plot. Communications, public education and technology transfer efforts will continue through scientific articles, regional news publications, conference presentations, and meetings with interested groups, and possibly site tours. A more detailed review of this project can be obtained at

http://www.mirarco.org/press/news/GMGE_Canadian_Reclamation08.pdf



Corn field on September 23, 2008 at VALE INCO experimental plot amended with St. Mary's pulp and paper organic residual.

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plot sites. Further work is required to investigate the effectiveness of SRC as a soil amendment, perhaps including

varied applications rates with annual monitoring, and admixtures of SRC with organic residual materials such

as compost or manure to enhance the solubility of the minerals and nutrients within the SRC.

