NICK PORA
porafamily@rogers.com

6899 Sparkling Lake Way
Greely, ON, K4P 1R7
613.797.4671

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In November and December of 2017, I was hired on as an Operations Consultant at SusGlobal Energy Belleville Ltd. ("SusGlobal Belleville") in Belleville, Ontario. I was at the site two days per week during that time. I became very familiar with the site and worked with the staff to improve and standardize operations and process all incoming material in a more efficient manner.

On December 18th, 2017, Gerald Hamaliuk, SusGlobal Belleville's Chief Executive Officer, asked me to look at a series of photographs that were taken in September 2017 when SusGlobal Belleville took possession of the Astoria Organic Matters property in Belleville. These photographs were of the incoming material (biosolids, paper sludge, manure, food waste) inventory that was in the tipping building at that time. In those pictures, it was quite easy to determine inventory levels in association to landmarks within the tipping building (stair-ladder, side concrete block-walls, spans/supports of the building fabric, and the metal push-wall within the tipping building) as well as the established dimensions of the building. At that time, Gerald asked me to estimate the inventory of materials in the tipping building.

I was able to determine the following:

- Each span/support of the building fabric measured approximately 3.35 meters. There was material in inventory covering 16 spans. Therefore 16 spans x 3.35 meters = 53.6 meters
- The width of the tipping building is 24.4 meters.
- I used a height of 2 meters based on the fact that the side concrete block-walls are 1.5 meters high and the metal push-wall is 3 meters high. I feel that 2 meters high is a fair representation of the height of those piles.
- Therefore, my estimation of the amount of inventory in the tipping building is:

53.6m x 24.4m x 2m = 2,615.68 cubic meters.

Cubic meters and tons do not denote the same physical property – cubic meters measure volume and metric tonnes measure mass. However, you can determine the amount of space a specific material fills by using the mass per volume of the substance, known as the density. The bulk density of the biosolids is 0.8 metric tonne per cubic meter. Therefore, we can calculate the following tonnage of biosolids in inventory:

2,615.68 cubic meters x 0.8 metric tonnes per cubic meter = 2,092.54 metric tonnes

In addition, based on the DHL Material Report from April 13 to September 14, 2017, I was able to conclude the following:

- Biosolids received: 1,606.37 tonnes
- Manure received: 10.52 tonnes
- Paper sludge received: 3,334.88 tonnes

- Total organic waste received: 4,951.77 tonnes.

4,951.77 tonnes divided by 23 weeks = 215.29 tonnes of organic waste received per week.

Based on Astoria's stated mix ratio, 3:1 (Leaf and Yard Waste : Biosolids), and total tonnage per windrow of 500 tonnes at 1 windrow per week, I arrive at the following calculation:

3:1 equals 375 tonnes of leaf and yard waste to 125 tonnes of biosolids. 1 windrow is made per week over the 23 week period.

215 tonnes biosolids – 125 tonnes biosolids = 90 tonnes extra biosolids per week

90 tonnes x 23 weeks = 2,070 tonnes of biosolids in inventory in the Tipping Building.

This is almost the exact same number that I calculated based on the September photographs I was shown.

As a result, I am confident in these estimates.

While I was visiting the SusGlobal Belleville site in Belleville, they would make 1 new windrow each week. They would accumulate the biosolids for that week and begin to mix the biosolids with the leaf and yard waste and store that mixed material at one end of the tipping building behind the metal push-wall. The leaf and yard waste was stored outside in front of the tipping building as their ECA allows for outside storage of leaf and yard waste. They would only bring the leaf and yard waste inside when they were making a fresh mix. The mix they were utilizing, while I was there, was a 2:1 mix of Leaf and Yard Waste to Biosolids. They would fill a fresh windrow each week and monitor the temperatures and oxygen levels accordingly and maintain the proper composting parameters as per their ECA. Once the compost was filled into a windrow, it was covered with a Gore cover and remained in Stage 1 for approximately 21 days. After Stage 1, the windrow was transferred to another aerated area and remained covered in Stage 2 for approximately 10 days. Finally, after Stage 2, the material was transferred to another aerated windrow where it remained for 10 days before being moved to the outdoor concrete storage pad for further processing (screening). The total number of days for all 3 stages was approximately 41. During the composting process, temperatures were maintained well above the ECA and composting requirements and a pathogen kill was clearly evident based on the temperature profiles provided on the Gore computer system.

I would like to add that the change from producing Category “A” compost to Non-Agricultural Source Materials Plan (“NASM”) compost will be a real challenge for SusGlobal Belleville as they had to adjust to processing so much inventoried biosolids. In my experience, I've seen how difficult it is to market and sell NASM material and this will be an upcoming challenge in terms of customers, but also in terms of outside storage space being over capacity at times. This will put pressure on them with the Ministry of the Environment and Climate Change regarding outside storage volumes in the future.

Nick Pora