

Consolidated Actions Update Harvest Fraser Richmond Organics Ltd.



Date: March 30, 2017



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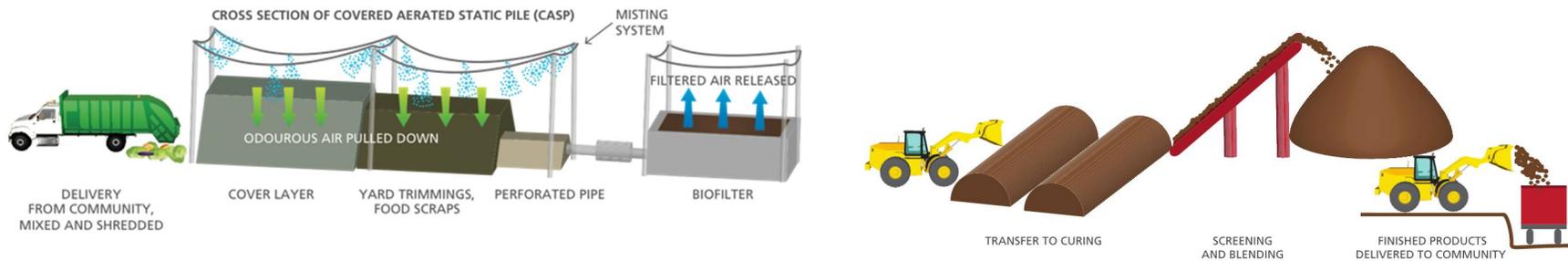
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Material Flow

In order to understand the implications of actions taken to address nuisance issues, it is helpful to note how materials flow through the facility.

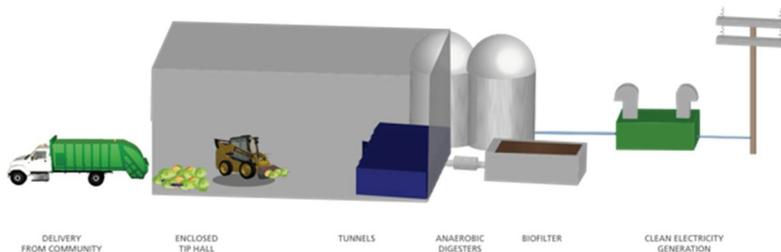
Composting

Composting is a natural process of decomposition whereby organic materials are turned into a dark, nutrient-rich soil amendment. By managing key variables— airflow, moisture, and temperature – we optimize the conditions for the naturally occurring bacteria and organisms to do their work. We use both Covered Aerated Static Pile (CASP) and windrow composting techniques.



Anaerobic Digestion

Anaerobic digestion is a natural process of decomposition in the absence of oxygen. By managing key variables – pH, composition, and temperature – we optimize conditions for anaerobic bacteria to turn sugars, fats and starches into biogas. Biogas is a renewable natural gas, which we can then convert into electricity.

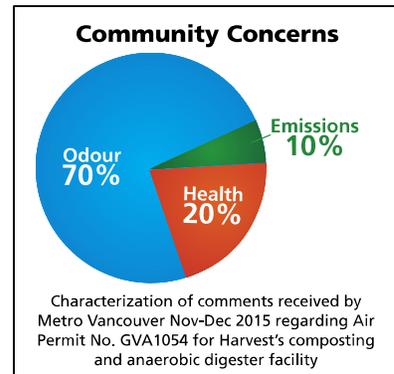


Odour History and Recent Timeline

In late 2015, a series of operational challenges created odours, which led to community relations challenges. Concurrently we were applying for a renewed air permit. During the permit process, many members of the community voiced concerns about odours.

In early 2016 we took action to identify the sources, which included the following:

- a changing mix of feedstock;
- high volumes of feedstocks; and
- aging infrastructure.



We made adjustments to fix the issues. In late 2016 we generated another round of odour events. We responded with additional changes in organic material accepted at the facility, on site processing protocol, and infrastructure improvements.

In addition, in response to concerns and feedback from the community, we put in a series of measures to increase communications and engagement, including public meetings and the formation of the Community Liaison Committee (CLC).

The highest levels of the organization view these challenges as a top priority to address and resolve; CEO Chris Kasper is intimately involved day-to-day operational results and attended two of the public meetings in the community.



Finally, in the interest of transparency we'd like to acknowledge that the following websites contain additional background information:

- From Metro Vancouver: <http://www.metrovancouver.org/services/Permits-regulations-enforcement/harvest-power-richmond/Pages/default.aspx>
- From City of Richmond: <http://www.richmond.ca/sustainability/environment/pollution/air/HarvestPowerodoursues.htm#Update>
- From Harvest Power: <http://www.richmondairpermit.ca>

Actions Taken to Address Issues

Odours

We have taken a series of actions in 2016 and early 2017 to address nuisance issues. The following outline summarizes the actions taken by Harvest, as well as highlights the most recent developments in bold.

Action #1: Stopped Accepting Most Odourous Material

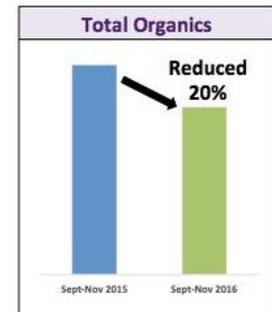
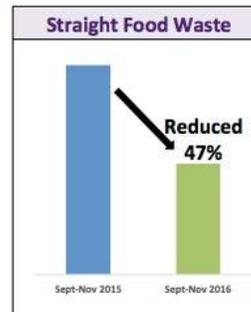
- Beginning in March 2016, we reduced or eliminated some of the most odourous materials coming into our facility including cruise ship waste, sea urchins, fish for human consumption, and chicken hatchery waste.
- A full blanket ban on these materials was implemented in late October 2016.
- In February 2017, we made the decision to stop taking in pure loads of food waste.



NOTE: There have been inaccuracies in media outlets including false claims of human waste and animal bodies at the facility. Harvest has NEVER accepted human waste, dead animals, slaughterhouse waste, manure, hazardous waste, wastewater treatment by-products, tires, solvents, or pesticides.

Action #2: Reduced Volumes of Organics

- In the Fall of 2016 we reduced the volume of material flowing into the facility.
 - We reduced organics volumes; two municipalities diverted their loads away from our facility.
 - We reduced pure commercial food waste loads to the energy garden.
 - We stopped accepting material from outside the region such as Vancouver Island.
- Furthermore, we have recently made the decision to **stop receiving all loads of pure food waste at the facility**. We sent a letter to all relevant commercial customers to inform them of this change.
 - We began the process of suspending receipt of all de-pack materials.
 - We suspended receipt and processing of liquid and solid food waste in the Energy Garden.
- Combined, these actions reduced our volumes significantly.
 - **As of March 10, 2017 no pure food waste is received.**



Action #3: Curtailed Energy Garden Operations

- Beginning October 2016, as a precautionary measure we voluntarily suspended anaerobic digestion (AD) of solid food waste in the Energy Garden.
- As a result of suspending the processing of solid food in the digester, potentially odourous digestate is no longer being produced and applied to the CASP piles. Energy Garden tunnels have been fully empty and no new digestate has been put onto the Covered Aerated Static Piles (CASPs) since Nov 2016.
- **An additional benefit of suspending pure food waste is that we will now utilize the Energy Garden receiving hall to process comingled feedstock to further reduce any odour risk** (the receiving hall is enclosed and under negative pressure and captured odour is treated through a biofilter).
- **We replaced two receiving hall doors with brand-new, automated, high-speed operation doors to enable odours to be retained more readily** (completed nearly a month ahead of permit requirements).
- **We installed pressure gauges in the receiving hall to verify that negative pressure is constantly maintained in that space** (completed over two months ahead of permit requirements).



Action #4: Improved Processing of Inbound Material

- We have implemented a number of key process improvements outlined in our Permit ahead of schedule.
- **A key step has been to utilize additional grinders as needed to allow more timely inbound feedstock processing during seasonal high volume periods.**
- We've reduced the total volume of organics to be processed.
- We've reduced our CASP pile heights ahead of permit requirements, to three meters maximum.
- We continue to focus on inbound material processing and turnaround times. We have increased our staff, including implementing an additional night shift, and are operating 24 hours per day, 5 days per week as of March 15th.
- We are also focused on Quality Assurance and Quality Control.



In sum, improved processing combines a few elements: as we increase mixing of the materials and speed up the turnaround time of placing inbound materials onto the CASP, the potential for odour to be created decreases. Also, less material for the CASPs to process means less volume and strain on our biofilter system.

Action #5: Working with Experts

We have employed external experts to implement mitigation measures and improve the efficiency of our aeration system.

- **CH2M** works closely with communities and private waste facilities to provide customized solutions in composting process, control systems and mechanical design.
- **Engineered Compost Solutions (ECS)** is an engineering and manufacturing firm which provides compost design, technology, and on-going technical support to the composting industry.
- **AMEC and Environmental Odour Consulting (EOC)** continue to provide support with on-site and off-site odour detection, sampling and monitoring.



Action #6: Refurbished CASP System

- We upgraded the existing composting aeration system in the spring and summer of 2016. Activities included:
 - Regrading the piping layout;
 - Replacing damaged underlying pipes; and
 - Modifying size and number of perforations in pipes.
- The purpose of these pipes is to provide air flow through the compost piles to keep the organic material sufficiently oxygenated; better aeration = prevent/reduce odour.
- Maintaining this air flow is integral to avoiding potentially odourous, anaerobic pockets of material.
- In addition, we focused on improving planned/preventative maintenance activities of CASP infrastructure and other equipment.



Action #7: Replaced Biofilter Media

- The biofilters cleanse the air coming from potential odour sources, using bacteria to consume odours.
- In October and November 2016, we replaced the media in two of our biofilters (EG and Screener).
- **The media in one of the CASP biofilters was completely replaced during the week of February 6, 2017 and the second biofilter media was replaced during the first week in March.**



Action #8: Operational Improvements

- Harvest is actively working to improve the aeration performance in the CASP. More frequent pipe inspections and preventative maintenance initiatives have resulted in more timely feedback for maintaining effective operations. We continue to monitor oxygen levels on a regular basis with an ongoing focus on QA/QC.
- Harvest has committed to install two OdoTech electronic monitoring devices with predictive dispersion modelling to assist with ongoing odour monitoring. This is an operational tool – an early warning detection system to allow site staff to proactively take action to address conditions that may result in odour before the odours rise to objectionable levels. We anticipate the system will be fully operational by the end of June 2017.-

Action #9: Accelerated CASP Replacement

In addition to the CASP system refurbishment in 2016, Harvest is working on a program to do a ***complete replacement of the CASP aeration and control system in order to manage odour for long-term benefit of Harvest and the community.*** The existing 20-year old system will be replaced with state-of-the-art technology.

- **We have accelerated pre-construction activities for the CASP Aeration System and Biofilter Replacement Plan which involves a complete overhaul of the main composting infrastructure.**
- Proposals have been received, design workshops have taken place, reference site visits are being scheduled, and we anticipate selecting a vendor for our upgrades in the near future.
- We anticipate submitting a development permit application to the Port within 90 to 120 days.
- A key to advancing this replacement is proper permits and alignment with stakeholders.
 - We are working closely with stakeholders to come to an effective resolution of open air permit issues.
 - Once appeals are addressed, then construction can be accelerated.

Ongoing

- Maintain **lower CASP pile heights** with **reduction in feedstock**, elimination of digestate, and efficient processing of inbound material;
- Continue to **optimize existing aeration system and biofilters**;
- Continue focus on **Quality Assurance & Quality Control**;



- Monitor performance of newly replaced biofilters;
- **Accelerate design/engineering** of new CASP aeration system;
- **Optimize the construction schedule:** to bring the new system on as early as possible drive accelerated results, Phase I, which represents 25% of the facility's capacity, will be constructed in lieu of a pilot; and
- **Continue dialogue with key stakeholders toward resolution of air permit.**



Community Engagement

In response to feedback regarding the need for more communications and engagement, Harvest put in place a number of measures including the following:

- Engagement
 - Public meetings (March 2015, November 2016, December 2016); the last two attended by CEO Chris Kasper;
 - Formation of a Community Liaison Committee at the request of the community (March 2015) which has met in April 2016, June 2016, and September 2016; and
 - Meetings with Metro Vancouver, City of Richmond (elected and staff) local MLAs (John Yap, Linda Reid), local MP (Joe Pescholdo), Richmond Chamber of Commerce, and neighbouring businesses (Adesa, others in the CLC).
- Communications
 - Information update advertisements in the Vancouver Sun, Richmond News and Ming Pao; included publishing CEO apology/responsibility letter;
 - Media relations updates and interviews with the Vancouver Sun, CKNW, CBC, Global News, Richmond News, Ming Pao, Sing Tao; and
 - Regular updates to the richmondairpermit.ca website.



Members of the Community Liaison Committee (CLC) includes residents from South Vancouver, West/Central Richmond, Steveston and East Richmond. Two local businesses are also represented: WA Farms (neighbour to the north) and Adesa.

In summary, we are making best efforts to address all operational issues and be a good neighbour.

Results

Fixing the issues has been a top priority. Part of that process includes monitoring. Every business day, our compliance officer sends a report to senior management and relevant members of the team updating everyone with data.

DAILY we track:

- Odour complaints and wind direction
- Composting Best Management Processes (BMPs), focusing on operational measures
 - What did we move
 - What did we screen
 - What will we have tomorrow

WEEKLY we measure:

- Emissions from our biofilters, including VOCs and Odour
- Biofilter performance

MONTHLY we measure oxygen levels in the CASPs.

