

Residuals Treatment Facility

2023 Annual Report

Operational Certificate ME-109471

Capital Regional District | Parks & Environmental Services, Environmental Protection



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RESIDUALS TREATMENT FACILITY 2023 ANNUAL REPORT

1. INTRODUCTION

The Residuals Treatment Facility (RTF) is owned by the Capital Regional District (CRD) and is operated and maintained under contract until 2040 by Synagro Technologies Inc. The RTF is located 15 km northwest of Victoria, British Columbia (BC) on the northwest corner of the Hartland Landfill (Hartland) property and is authorized to operate through Operational Certificate ME-109471 issued to the CRD by the BC Ministry of Environment and Climate Change Strategy (ENV) on May 29, 2020. The approved operating budget for the RTF is allocated under the Core Area Liquid Waste Management Plan.

The data reported herein is required to meet provincial regulatory requirements per Section 5.1 of the Operational Certificate and includes:

- Quantity of Class A biosolids produced each year (in dry tonnes);
- Quantity of biosolids sent to the cement kiln each year;
- Quantity of biosolids directed to the Hartland Landfill;
- Quantity of biosolids directed to other beneficial use options;
- Evaluation of treatment works performance and any changes;
- Implementation schedule for any alterations to the treatment and disposal works which may impact the discharge under the Operational Certificate;
- Summary and analysis of odour data collected as required by the approved Odour Control and Response Plan;
- Summary and analysis of all complaints received, and
- Summary and analysis of all non-compliance events.

2. SITE AND OPERATIONS OVERVIEW

The RTF is located in the District of Saanich, within the Tod Creek watershed, in the bedrock highlands of the Gowland Range, northwest of Victoria. The Hartland Landfill borders the site to the south and east. Mount Work Regional Park lies to the west of the RTF. Willis Point Road borders the site to the north, continued by the Mount Work Regional Park to the north, and a Department of National Defence rifle range to the northeast. Private residential properties are located about 1.5-2 kilometers away to the east and southeast of the RTF.

The RTF is a component of the Core Area Wastewater Treatment Project and serves the population of the Core Area municipalities (Victoria, Esquimalt, Saanich, Oak Bay, View Royal, Langford and Colwood, as well as the Esquimalt and Songhees First Nations) totaling approximately 343,000 people. The RTF receives Core Area residual solids produced at the McLoughlin Point Wastewater Treatment Plant via the residual solids' conveyance line. Residual solids are treated at the RTF through mesophilic anaerobic digestion, thickening, dewatering and thermal drying to produce pelletized Class A biosolids, as defined by the *BC Organic Matter Recycling Regulation*, with a moisture content of around 5-7%.

Construction of the RTF was completed in September 2020 and the plant achieved operational Project Service Commencement in March 2021. Under normal RTF operations, and in accordance with the CRD's approved Short-Term Biosolids Management Plan (Definitive Plan), the CRD planned to transport biosolids to Lafarge Canada Inc.'s (Lafarge) Richmond Cement Plant to be used as an alternative fuel in their cement kiln. During planned cement-kiln maintenance periods, and in accordance with the CRD's approved Short-term Contingency Plan, the dried Class A biosolids would be beneficially reused at Hartland Landfill as either Biosolids Growing Medium (BGM), or biocover. The province has directed the CRD not to landfill biosolids, however landfilling has been necessary when no beneficial use options are available. In March 2023, CRD land application policy was modified to allow for some types of land application. Out-of-region, non-agricultural land application opportunities are now being pursued due to Hartland Landfill contingency capacity being consumed in 2022/2023 following extended and continuing down time at Lafarge. An alternative contingency option, using biosolids in a quarry reclamation project in Cassidy BC, was

operationalized in June 2023. The proposed long-term use of the CRD’s biosolids is to be determined by June 2024.

3. BIOSOLIDS PRODUCTION AND USE

In 2023, a total of 2,902 dry tonnes of biosolids were produced, 2,763 tonnes as dried Class A biosolids, and 139 tonnes as dewatered non-Class A biosolids containing approximately 25% solids. Table 1 includes a summary of the biosolid end use for 2023.

Table 1 Biosolids Production and Use

Biosolids Type	Produced	End Use		
		Definitive Plan ^b	Alternative Contingency Plan ^c	Hartland Landfill ^d
Dried ^a Class A Dry Tonnes (Wet Tonne Equivalents)	2,763 (2,908)	64 (67)	646 (680)	2,121 (2,233)
Non-Class A Dry Tonnes (Wet Tonne Equivalents)	139 (555)			139 (555)

Notes:

^a Greater than 90% solids, approximately 5% moisture.

^b Used as an alternative fuel at the Lafarge cement manufacturing facility in Richmond, BC.

^c Mixed with sand at Hartland Landfill and stockpiled in Cassidy, BC for future use in quarry reclamation.

^d Class A Biosolids are landfilled within leachate containment areas. Non-Class A Biosolids were landfilled as a controlled waste.

Due to operational challenges at the cement kiln and the RTF throughout 2023, the CRD was only able to ship 64 dry tonnes of biosolids to the Lafarge facility in 2023. As a result of the extended downtime, available space at Hartland Landfill to mix and apply BGM per the approved contingency plan, was exceeded. An alternative contingency plan, using biosolids during the reclamation of a gravel quarry near Cassidy BC, was developed in 2023 and 646 dry tonnes of biosolids were provided for this purpose. 2,121 dry tonnes of Class A biosolids and 139 dry tonnes of non-Class A biosolids were landfilled at Hartland Landfill. As noted above, the CRD is pursuing alternative contingency options, including out-of-region, non-agricultural land application.

4. TREATMENT WORKS PERFORMANCE

4.1 Introduction

The facility was commissioned in March 2021. Commissioning was conducted in accordance with the ENV approved “*Hartland Resource Management Group: Start-up and Commissioning Plan*” to which there were no unapproved changes. The ENV was notified of service commencement in 2021. In 2023, to address operational challenges caused by hair and debris, a temporary strain press was installed. There have been no alterations made to the RTF that have impacted authorized discharge controls.

All equipment outlined in the Operational Certificate was installed according to design and manufacturers’ specifications and also registered with Technical Safety BC. Equipment commissioning activities were focused on optimizing the performance of the odour control system and demonstrating functional completion for all other equipment outlined in the Operational Certificate. Based on the completed commissioning and successful operation and maintenance of all equipment (excluding the odour control system), the facility operated within the authorized discharge limits designated in the Operational Certificate throughout 2023.

4.2 Odour Control System (Site Reference Number: E319474)

The odour treatment stack (19 m height and 900 mm diameter exhaust cone), exhausts treated air from the odour control works. These works consist of an impingement pre-filter (AMACS mesh mist eliminator), bio-trickling filters (Evoqua model BTF-1236), and a three-stage chemical scrubber (Evoqua model LP-7000-HN). The average daily odour treatment stack discharge rate was in compliance with the authorized discharge limit of 660 m³/min.

Figure 1 displays the daily average stack hydrogen sulfide (H₂S) values for the 2023 reporting period. There were no days when the RTF was operating outside the Operational Certificate H₂S limit of 2 mg/s. The slight increase during May and June was due to a trial of a new polymer at the McLoughlin Point Wastewater Treatment Plant.

No odour non-compliance events occurred in 2023.

In addition, two impingement pre-filters (AMACS mesh mist eliminator) installed in parallel (duty/standby) ensure particulate matter from the treatment stack is below the designated limits outlined in the Operational Certificate. The filter is replaced and cleaned as required and the pressure differential is monitored to ensure optimal performance.

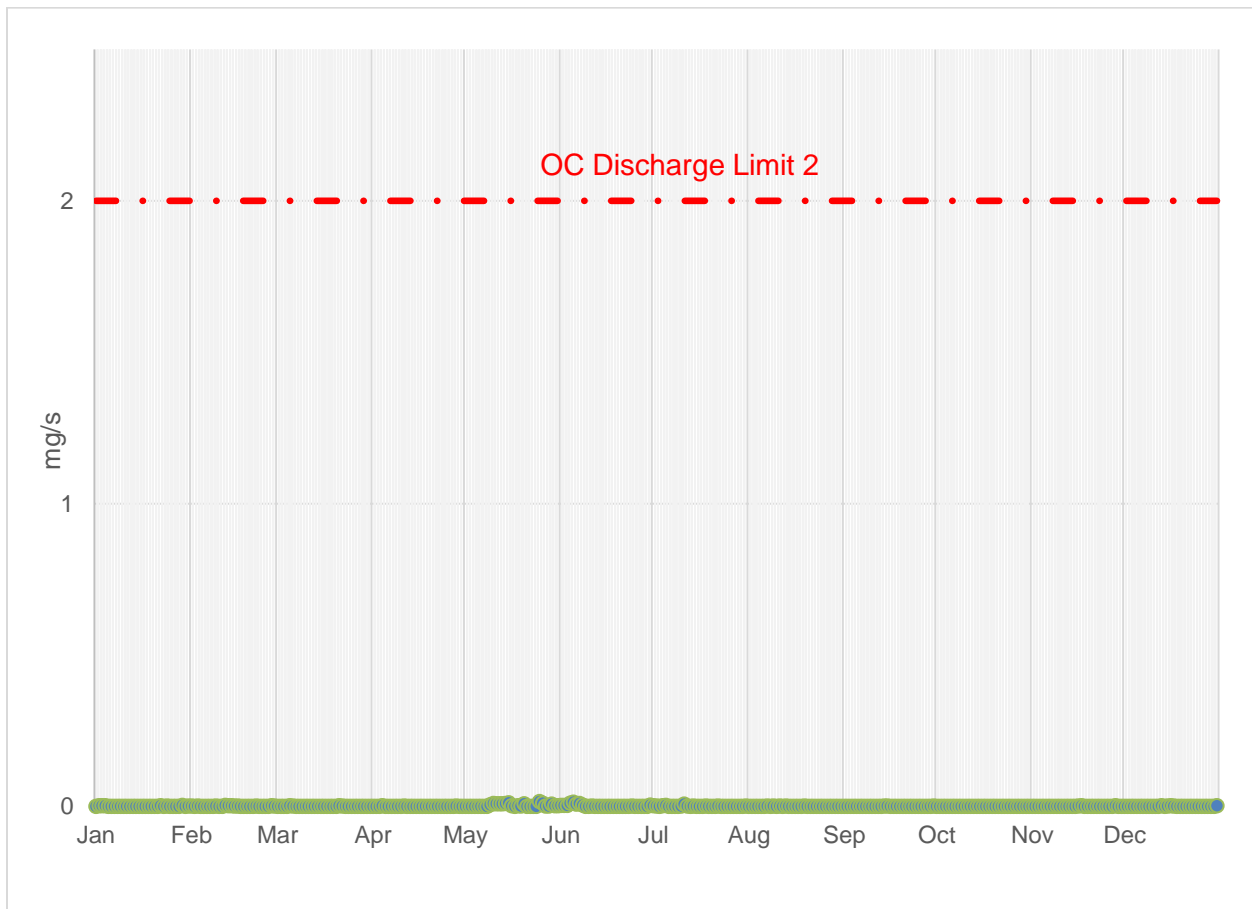


Figure 1 Daily Average Odour Treatment H₂S Discharge Data

4.3 Biogas Flare (Site Reference Number: E319472)

Biogas is harvested from the digesters and digested solids storage tank. From there, it is either pressurized by the blower or flared off. The Varec 244E series enclosed waste gas burner system was installed according to design and manufacturer specifications. The flare operated successfully throughout 2023, flaring an estimated 2,657,018 m³ of biogas, or approximately 58% of the 4,571,682 m³ of biogas produced.

Issues with the flow meter reported in 2022 have been resolved by replacing the sensing element with a new sensor that can handle high humidity biogas. The Operational Certificate nitrogen oxides (NO_x) limit of 105 mg/s and sulphur oxides (SO_x) limit of 35 mg/s are based on modelled estimates of flaring 100% of the projected biogas in the year 2040. As these gas volumes were not produced, and much of the biogas produced was used in the boilers and thermal oil heater, it is unlikely limits were exceeded, however emissions are not monitored.

4.4 Boilers (Site Reference Number: E319473)

Two boilers provide heat to the digesters and RTF operations, as required. The boilers are dual fuel, running off either digester biogas or propane. The installed boilers are a 100 boiler horsepower (BHP) boiler (Superior Boilers model 6-X-500-FMCF-W30-LP/DG) and a 250 BHP boiler (Superior Boilers model 6-X-1250-FMCF-W30-LP/DG). The boilers were installed according to design and manufacturer specifications. The boilers maintained successful and consistent operation throughout 2023. In 2023, 1,914,664 m³ of biogas was used as fuel in the boilers or the thermal oil heater for beneficial use within the plant. Approximately 15-20% of the biogas is directed to the boilers and the remaining 80-85% is used by the thermal oil heater. The Operational Certificate NO_x limit of 41 mg/s and SO_x limit of 12 mg/s per boiler stack are based on modelled estimates of burning 100% of the projected biogas volume in 2040 in the boilers. As these gas volumes were not produced, it is unlikely limits were exceeded, however, emissions are not monitored.

4.5 Thermal Oil Heater (Site Reference Number: E319475)

Biogas, supplemented by propane as required, is used as the primary fuel in a dedicated thermal oil heater. Thermal oil is pumped to the in-bed heat exchanger to maintain the fluidized bed dryer at 85°C. The Ascentec S/TH-50-BE Thermal Oil Heater was installed according to design and manufacturer specifications. The thermal oil heater operated successfully in 2023. The thermal oil heater operated primarily on biogas during 2023, with the exception of brief periods during start-up. The Operational Certificate NO_x limit of 134 mg/s and SO_x limit of 8 mg/s per boiler stack are based on modelled estimates of burning 100% of the projected biogas volume in 2040 in the thermal oiler heater. As these gas volumes were not produced, it is unlikely limits were exceeded, however, emissions are not monitored.

4.6 Diesel Pump and Generators

The Operational Certificate has authorized discharge of air emissions from miscellaneous sources, which include the following:

- Two (2) 1,000 kW diesel power generators (Mitsubishi model MDI000), for back-up power.
- One (1) 160 Hp diesel pump (Clarke/John Deere model JU6H-UF34), to operate RTF fire suppression systems.

During the reporting period, the usage of miscellaneous sources was limited to 35 hours for the generators and 29 hours for the diesel fire pump. All operation was done in accordance with Part 2, Section 6 of the *Environmental Management Act*; and the RTF Emergency Response Plan.

5. ODOUR CONTROL & RESPONSE

As part of RTF commissioning and operation, the main focus around odour was to establish successful performance of the odour control system and limit the release of H₂S from the odour treatment stack (see Section 0 for discussion). As outlined in the Odour Control and Response Plan, RTF staff completed routine perimeter odour checks to monitor for odour generated by the RTF. A summary of all formal odour complaints received in 2023 is attached as Appendix A.

There were four odour complaints received in 2023. Generally, these odour complaints were timed with maintenance activities at the RTF. RTF Operators and CRD staff continue to investigate the RTF and conveyance lines for sources of nuisance odour.

6. CONCLUSION

The RTF operated successfully throughout most of 2023. In total, 2,763 dry tonnes of Class A biosolids were produced. Of those tonnes, 64 were sent to the Lafarge cement manufacturing facility for use as an alternative fuel, 646 were provided to a gravel quarry for use in reclamation, and 2,121 tonnes were mixed with soil and directly landfilled at Hartland Landfill. During August and September, hair and fiber clogging caused a dryer shut-down. As a result, 139 dry tonnes of dewatered Non-Class A biosolids were landfilled as controlled waste at Hartland Landfill. Temporary screening equipment has been installed, and permanent screening equipment is under evaluation to address this issue into the future.

During the reporting period the odour control system performed as expected and readings at the discharge stack did not exceed the H₂S limit of 2 mg/s.

The biogas flare, boilers, thermal oil heater, and diesel pump and generators were all operated and maintained, as per design and manufacturer specifications.

7. REPORT SIGN-OFF

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APPENDIX A

SUMMARY OF COMPLAINTS RECEIVED

Appendix A – Summary of Complaints Received

Date of Complaint	Nature of Complaint	Details	Response
30-March-2023	Odour	Via phone - Complaint of odour at residence west of the RTF.	Advised that odour was likely due to maintenance activities (digester cleaning) being performed at the RTF.
27-July-2023	Odour	Via email - General complaint of odour while swimming at Durrance Lake	Advised that steps to investigate and mitigate odours were being taken.
11-Aug-2023	Odour	Via email - General complaint of odour while hiking at Mt. Work Park	Advised that odour was likely due to maintenance activities (dryer cleaning) being performed at the RTF.
26-Nov-2023	Odour	Via email - General complaint of odour at residence north of the RTF.	Advised that steps to investigate and mitigate odours were being taken.