

Residuals Treatment Facility

2022 Annual Report

Operational Certificate ME-109471

Capital Regional District | Parks & Environmental Services, Environmental Protection



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RESIDUALS TREATMENT FACILITY 2022 ANNUAL REPORT

1. INTRODUCTION

The Residuals Treatment Facility (RTF) is owned by the Capital Regional District (CRD) and designed, built, financed, operated and maintained by Hartland Resource Management Group (HRMG). The RTF is located 15 km northwest of Victoria, British Columbia (BC) on the northwest corner of the Hartland Landfill (Hartland) property. The CRD received Operational Certificate ME-109471 from 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,
- 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. Mount Work Regional Park lies to the west and south of the RTF. Willis Point Road borders the site to the north, and beyond that is a Department of National Defence rifle range. Private residential properties are located 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 transports 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 will be beneficially reused at Hartland as either biosolids growing medium, or biocover. Non-agricultural land application opportunities are now being pursued due to Hartland contingency capacity being consumed in 2022/23 following extended down time at Lafarge. A March 2023 change to CRD policy, that previously banned all land application, was required to allow for land application opportunities to be considered. The long-term use of the CRD's biosolids is to be determined by June 2024.

3. BIOSOLIDS PRODUCTION AND USE

In 2022, a total of 3,014 dry tonnes of biosolids were produced (equivalent to 3,173 wet tonnes at ~5% moisture). Table 1 includes a summary of the biosolid end use for 2022.

Table 1 Biosolids Production and Use

Biosolids Type	Produced	End Use		
		Definitive Plan ^b	Contingency Plan: BGM ^c	Hartland Landfill ^d
Dried ^a Class A Dry Tonnes (Wet Tonne Equivalents)	3,014 (3,173)	447 (470)	565 (595)	2,002 (2,108)
Non-Class A Dry Tonnes (Wet Tonne Equivalents)	0 (0)	X		0 (0)

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 Land applied within the leachate containment area of Hartland Landfill.

^d Class A Biosolids are placed within leachate containment areas as a layer of interim cover or are directly landfilled. Non-Class A Biosolids are landfilled as a controlled waste.

Due to operational challenges at the cement kiln throughout 2022 and into 2023, the CRD was only able to ship 447 dry tonnes of biosolids to the facility in 2022. As a result of the extended downtime, available space at Hartland Landfill to mix and apply Biosolids Growing Medium (BGM,) per the approved contingency plan, was exceeded. This resulted in the need to landfill 2,002 dry tonnes of biosolids in 2022. As noted above, the CRD is pursuing alternative contingency options, including non-agricultural land application.

4. TREATMENT WORKS PERFORMANCE

4.1 Introduction

The facility commenced commissioning on September 18, 2020, and commissioning continued to the end of the 2020 reporting period. 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. In 2021, ENV was notified of service commencement and there have been no alterations made to the RTF that have impacted authorized discharge controls since then.

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.

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 2022 reporting period. There were no days when the RTF was operating outside the Operational Certificate H₂S limit of 2 mg/s.

No odour non-compliance events occurred in 2022.

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.

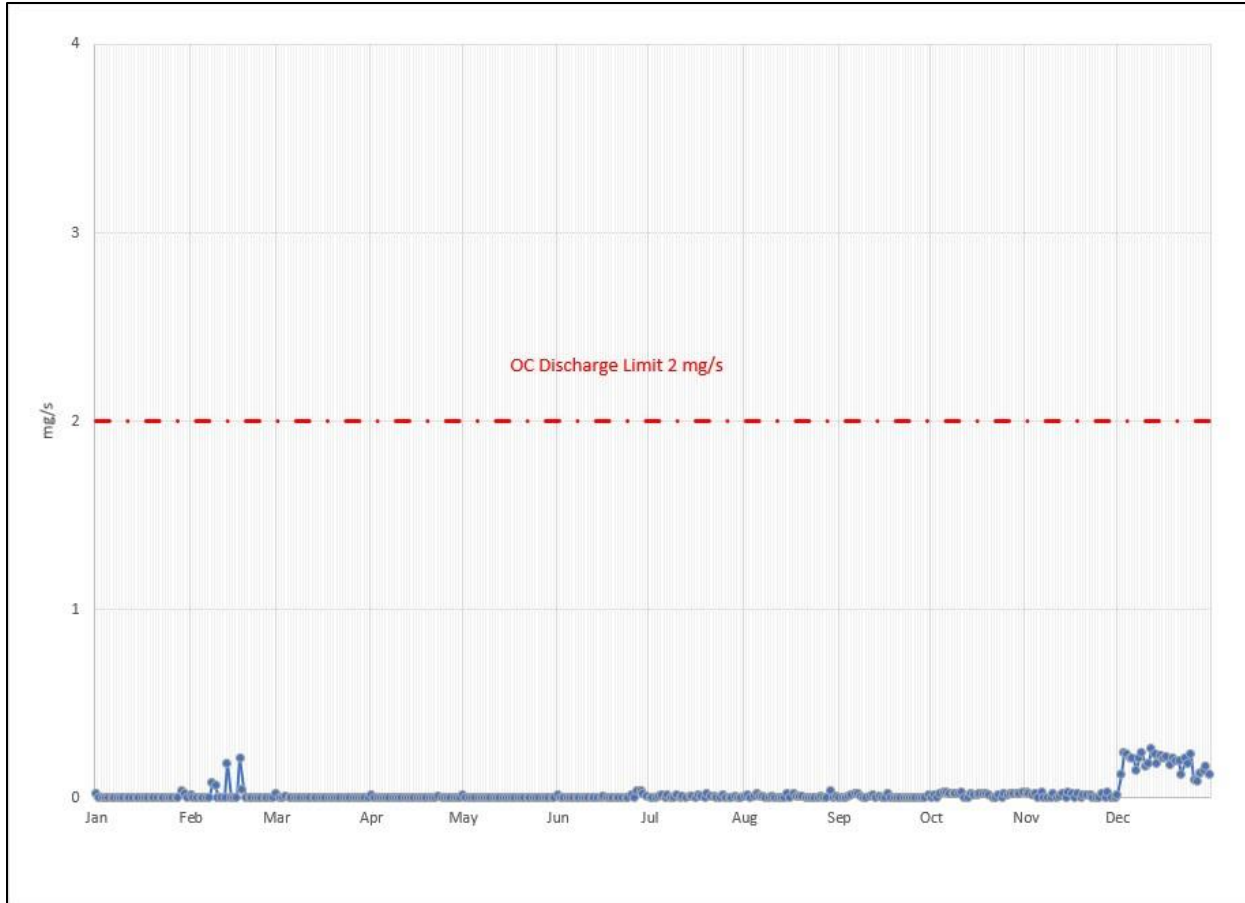


Figure 1. Daily Average Odour Treatment H₂S Discharge Data

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 was commissioned in September 2020, began flaring biogas on December 16, 2020, and operated successfully throughout 2022. In 2022, an estimated 2,332,771 m³ of biogas was flared. Due to condensate interference, the flow meter temporarily reported erroneous data. This issue was resolved in November 2022 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 expected 2040 biogas. As these gas volumes were not produced, 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 one 100 BHP boiler (Superior Boilers model 6-X-500-FMCF-W30-LP/DG), and one 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 were commissioned in September 2020 and maintained successful and consistent operation through to the end of the 2022 reporting period. In 2022, 2,006,366 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 expected 2040 biogas 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 was commissioned in September of 2020 and operated successfully in 2022. The thermal oil heater operated primarily on biogas during 2022, 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 expected 2040 biogas 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 miscellaneous sources, which include as follows:

- Two (2) 1,000 kW diesel power generators (Mitsubishi model MDI000)
- One (1) 160 Hp diesel pump (Clarke/John Deere model JU6H-UF34)

During the reporting period, the usage of the miscellaneous sources was limited to 62.5 hours for the generators and 23.5 hours for the diesel fire pump. All operation was done in accordance with Part 2, Section 6 of the *Environmental Management Act*.

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 4.2 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 2022 is attached as Appendix A.

There were three odour complaints received in 2022. Investigations determined that the odour complaints may be related to anomalous operating conditions in the centrate return line. CRD staff continue to investigate the RTF and conveyance lines for sources of nuisance odour.

6. CONCLUSIONS

The RTF operated successfully throughout 2022. In total, 3,014 dry tonnes of Class A biosolids were produced. Of those tonnes, 447 were sent to the Lafarge cement manufacturing facility, 565 tonnes were used to create biosolids growing medium, and 2,002 tonnes were mixed with soil and used as daily cover material or were directly landfilled at Hartland Landfill during 2022.

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 Complaint	of	Nature Complaint	of	Details	Response
7-Feb-2022		Odour		Via email – General complaint of odour at residence east of the RTF.	Advised that steps to investigate and mitigate odours were being taken.
16-Aug-2022		Odour		Via email - General complaint of odour at residence north of the RTF.	Advised that steps to investigate and mitigate odours were being taken.
16-Nov-2022		Odour		Via email – General complaint of odour at residence north of the RTF.	Advised that steps to investigate and mitigate odours were being taken.