

DOVER WASTEWATER TREATMENT FACILITY TOUR & TECHNICAL PRESENTATION

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Corporate Profile

Headquartered in Guelph, Ontario, with over 50 full time employees in both Canada and the United States, BIOREM® is dedicated solely as a designer and supplier of Biological Odor Control systems. BIOREM® has been in business since 1991 and became a publicly traded company in 2005

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Stock Market Listing







Who is Biorem?

Most Experienced Biofilter Company in N.A.

- Public company (Jan 2005)
- Over 1,000 worldwide installations for odors & VOCs
- Over Two decades of biotechnology expertise
- 3 Offices, 15 Engineers, Scientists & Biotechnologists
- Wide range of contaminants successfully treated (total odor):
 - TRS (H₂S, DMS, DMDS), NH₃, Mercaptans, VOCs



Previous OC System

Biocube DDP-7,500

- Organic based media
- In service 2004-2015
- Media replaced approximately every 4 years.







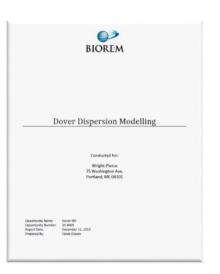


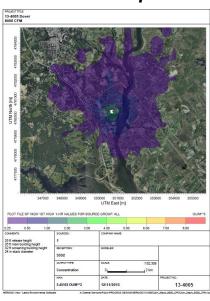
Pressure for both the engineer and Biorem

• "This is an \$X.X MM project – And if there is one odor complaint, the

project is a failure!"

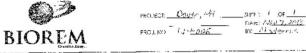
• Ray Vermette

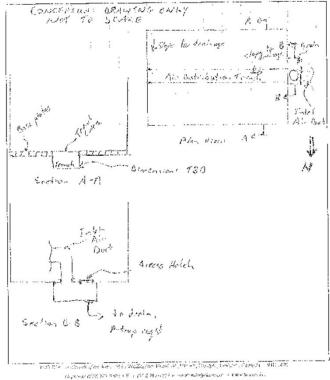






Design begins









Final Design

<u>Process Parameter</u> <u>Value</u>

Flow Rate: 13,200 CFM (design max.) Given
Inlet Air Temperature: 40 – 100 °F Assumed
Water Hardness: 50 ppm maximum allowed Required

Type of Contaminant Average / Peak Con. Levels

 H_2S : 18 ppm 45 ppm Given TRS: < 4 ppm -- Given

Design ParameterValueMaterial of Construction:ConcreteEBRT:40 secondsMedia Volume:8,800 ft³

Footprint Dimensions: (approx) 40 ft length: 38 ft width

System Water Consumption: 1,700 GPD Electrical - Main Power supply: 460V, 3Ph, 60Hz

*Concrete Volume (Estimate): 85 yds³

^{*}Concrete not in BIOREM's Scope of Supply, to be provided and installed by Contractor.

Biosorbens® Media

• The Manufacturer warrants that the biofilter media will not compact, degrade or decompose for a period of 10 years from the date of Substantial Completion, provided that the system is operated in accordance with the Manufacturer's printed Operation and Maintenance Manuals.

First PERMANENT Inorganic Media

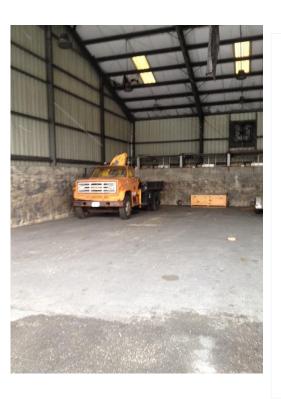


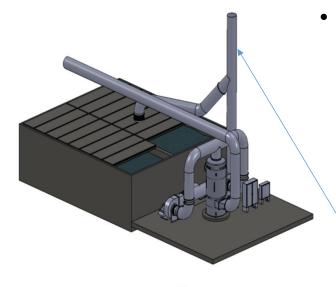
Broomfield, CO - A Decade of Operation

- Broomfield Water Reclamation Plant Engineered Media Biofilter
- Ken Rutt1, Mark J. Maxwell2, Derek S. Webb3*, Dr. Hadi Husain
- 1. City of Broomfield, Co
- 2. Tetra Tech
- 3. Biorem Technologies, Inc.
- ABSTRACT
- This paper presents the case study of one of the longest operating Biosorbens® engineered media biofilters in North America.
- The biofilter was installed in 2004 and treats a total of 14 sources throughout the plant from headwork, primary and secondary treatment and sludge management areas.
- During more than a decade of continuous operation, the biofilter has exceeded design performance consistently. In July 2015, removal efficiency for H2S and total odor was 99% and 97% respectively, exceeding the design performance handily.
- 2015 media examination showed that the original Biosorbens® media remains in an excellent condition, and Biorem anticipates another
 decade of trouble free operation.
- This long media life proves the cost advantage of engineered media biofilters over organic media systems and other technologies.



"Lets put it under the roof"





- The choice of location created some challenges
 - Foul air inlet
 - Access to equipment
 - Installation of the media
 - Access to media bed

This was later moved outside the building.

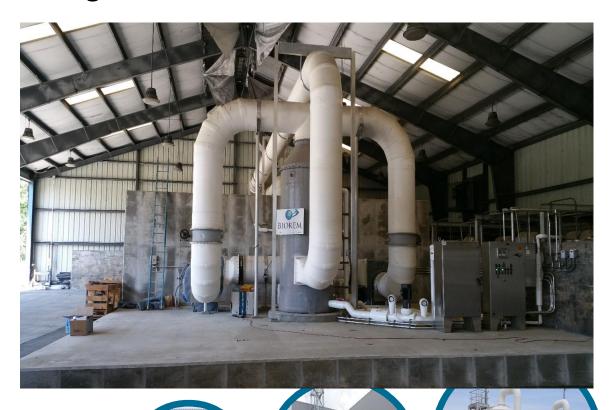






New Odor Control System

- Site constructed Biofilter
- 13,500 CFM
- Vessel Concrete
- Media Biosorbens
- Separate FRP humidification
- Construction completed June '16



System Parameters and Results

Client: City of Dover Location: Dover 2213F

Testing Date: 7/20/2016

and 7/21/2016

Results:

July 20, 2016

PARAMETER	VALUE
Average Air Flow Static Pressure " of H2O	~9
Average inlet Odor (DT)	11000
Average Outlet Odor (DT)	60
Percent Removal of Odor (%)	99.4
Average Inlet H2S (PPM)	8.8
Average Outlet H2S (PPM)	0.002
Max Inlet H2S (PPM)	12
Max Outlet H2S (PPM)	0.008
Percent Removal of H2S (%)	99.9

Thank You for Being Here!

Question?

