PARADIGM
ENVIRONMENTAL TECHNOLOGIES INC.

January 26, 2007

Mr. Dwayne Kalynchuk
General Manager, Environmental Services
Capital Region District
PO Box 1000, 625 Fisgard Street
Victoria, BC V8W 2S6

Dear Mr. Kalynchuk:

Re: EXPRESSION OF INTEREST – INNOVATIVE SEWAGE TREATMENT AND RESOURCE RECOVERY TECHNOLOGY

Please find enclosed Paradigm's Expression of Interest for its innovative sludge treatment technology, MicroSludge®, as a cost-effective and environmentally responsible enhancement to the planned secondary wastewater treatment facilities in Victoria, British Columbia.

MicroSludge is a Vancouver-based technology that has the ability to meet the Capital Regional District's triple bottom line approach, by delivering economic, social, and environmental benefits to wastewater treatment plants.

Paradigm has won a number of significant awards for its technology and has also received government financial support to develop MicroSludge via the National Research Council's IRAP program, Sustainable Development Technology Canada (SDTC), Industry Canada's Technology Partnership Canada.

Paradigm would be pleased to provide MicroSludge to the Capital Regional District.

Yours truly,
Paradigm Environmental Technologies Inc.

Filipe Figueira
Director of Marketing

AWARDS

CANADIAN INNOVATION AWARD
CME & NRC-IRAP
2004
Award for Environmental Technology BC/Yukon Region

Canada's TOP
Bioproduct, Energy & Environmental Technology Companies Competition
2006-07

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FFIGUEIRA@MICROSLUDGE.COM
T: 604.742.0360 x 222 F: 604.742.0368
200, 1600 WEST 6TH AVENUE, VANCOUVER, BC CANADA V6J 1R3
WWW.MICROSLUDGE.COM

MICRO SLUDGE

INNOVATIVE SEWAGE TREATMENT AND RESOURCE TECHNOLOGY FOR VICTORIA, BC, CANADA

Paradigm Environmental Technologies Inc. would like to propose its innovative sludge treatment technology, MicroSludge®, as a cost-effective and environmentally responsible enhancement to the planned secondary wastewater treatment facilities in Victoria, British Columbia.

MicroSludge is a home-grown, award winning technology that has the ability to meet the Capital Regional District's triple bottom line approach, by delivering economic, social, and environmental benefits to wastewater treatment plants. The benefits of MicroSludge include:

- **Reduced digested sludge residuals for disposal**
- **Fewer truckloads of sludge residuals leaving treatment plants**
- **Greater methane gas production**
- **Reduced odour of residuals**
- **Smaller plant footprint**
- **Reduced size of digesters and overall capital costs**
- **Reduced exposure to rising energy prices**

Meeting Victoria's Needs

Secondary wastewater treatment at Victoria will generate primary sludge and waste activated sludge that will require disposal. Anaerobic digestion of sludge meets the triple bottom line approach, but digestion without MicroSludge pre-treatment will fail to maximize biogas production and will not minimize the quantity and odour of digested sludge residuals for disposal.

MicroSludge is a powerful, robust, and compact waste activated sludge pre-treatment technology that greatly enhances the performance of anaerobic digesters. MicroSludge works by solubilizing both volatile and fixed solids in waste activated sludge (WAS). The extreme levels of solubilization achieved by MicroSludge far exceed any competitive technology, and deliver a great number of operational and economic benefits to wastewater treatment plants. These benefits and their significance to the proposed facilities in Victoria are outlined below.

Reduced Residuals for Disposal

A recent commercial scale trial of MicroSludge at the Joint Water Pollution Control Plant (JWPCP) in Los Angeles County, demonstrated that the WAS processed by MicroSludge was eliminated from the digested residuals for disposal. This can significantly reduce the costs for residuals dewatering, handling and disposal. It would therefore also minimize the number of trucks filled with sludge residuals leaving the treatment plants in Victoria.

Increased Volatile Solids Reduction (VSr)

WAS is solubilized by MicroSludge before being fed to the anaerobic digester. This greatly increases both the rate and the extent that WAS is degraded inside the digester and converted to biogas. Reducing hydraulic residence time in digesters, while achieving high levels of VSr, allows smaller digesters to be built. This would significantly reduce capital costs and overall plant footprint for the Victoria project.

Increased Methane and Onsite Energy Generation

MicroSludge enables anaerobic digesters to produce more methane from WAS that can be used to produce electricity and heat. By decreasing the quantity of sludge for disposal, MicroSludge decreases fugitive greenhouse gas emissions from land application of sludge. MicroSludge processing results in a WAS temperature increase of 25 C°, thus reducing the heating requirements for anaerobic digesters.

Reduced Odour of Residuals

Odour of sludge residuals is the greatest single source of complaints by the general public concerning WWTPs. An independent industry study by the Water Environment Research Federation (WERF) recently found that MicroSludge reduced the odour of co-digested residuals at the JWPCP by more than 50%. For MicroSludge processed WAS only digestion, the same investigators concluded that the odours were eliminated completely. No other pre-treatment technology or chemicals caused any decrease in odours of the residuals.

Increased Flexibility

MicroSludge processing reduces viscosity of TWAS by approximately 90%, lowering the energy needs for TWAS pumping and digester mixing. For Victoria this reduction in viscosity could enable MicroSludge-processed TWAS to be easily pumped from a number of aerobic treatment facilities to a single sludge management facility for anaerobic digestion.

No Adverse Impacts

MicroSludge caused no adverse downstream effects at the treatment plants where it has been tested. The quality of the dewatering liquid, as measured by the concentrations of nitrogen, phosphorus, metals, and biological oxygen demand (BOD), is not significantly affected by the upstream processing of WAS by MicroSludge. Additionally, MicroSludge does not adversely affect the ability to dewater residuals.

How MicroSludge Works

◄ **The MicroSludge System at the JWPCP plant in LA County, one of the largest wastewater treatment plants in North America.**

The microbes in waste activated sludge (WAS) have extremely resilient cell membranes. This limits the extent and rate that the microbes are degraded inside anaerobic digesters. Consequently, conventional anaerobic digesters only convert 20 to 30% of WAS to biogas, leaving the remainder to be dewatered and disposed of at significant expense. MicroSludge works by destroying these microbial cell membranes, enabling anaerobic digesters to achieve significantly greater percentage conversion of WAS to biogas in a shorter period of time. The scanning electron microscope images below show WAS before and after MicroSludge.

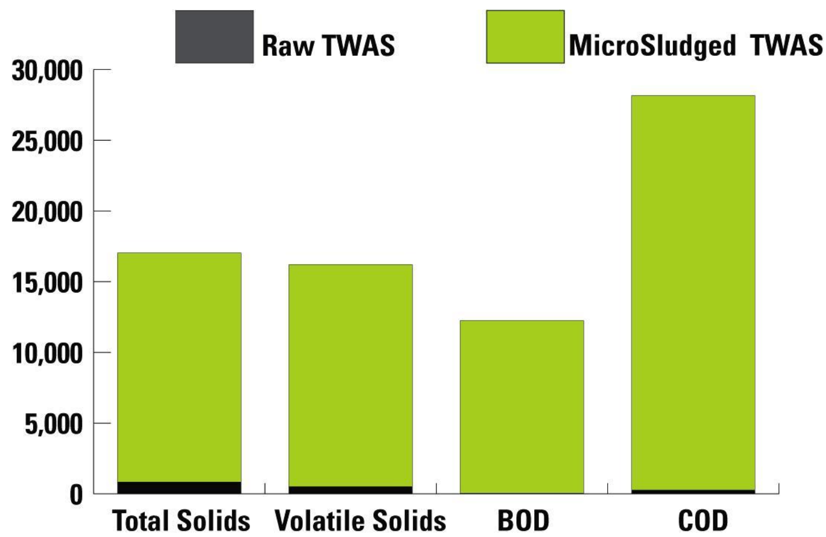
BEFORE *MicroSludge*

AFTER *MicroSludge*

The image on the left shows intact bacterial microbes magnified 20,000 times. The image on the right shows the same microbes following the MicroSludge process. The cell membranes have been destroyed and the liquid cellular contents have been released for easier digestion. No other technology has been able to achieve this.

MicroSludge Increases Solubilization

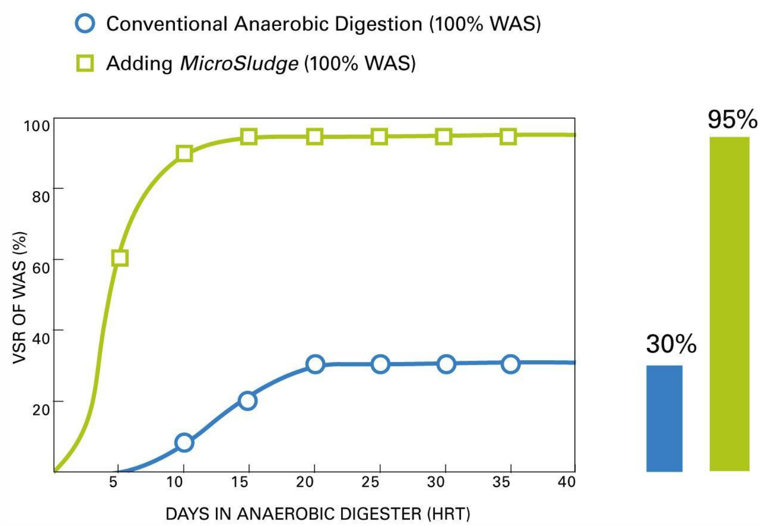
MicroSludge liquefies WAS to radically change the distribution of Total Solids (TS), Volatile Solids (VS), Biological Oxygen Demand (BOD), and Chemical Oxygen Demand (COD) from the solid phase to the liquid phase. The figure below illustrates this effect of MicroSludge on the concentrations of TS, VS, BOD, and COD (mg/L) in WAS at the JWPCP.



Commercially Tested and Independently Assessed

CH2M HILL, one of North America's most respected wastewater treatment engineering firms, conducted an independent assessment of a full scale test of MicroSludge at a Canadian WWTP serving 70,000 people. Their report concluded that:

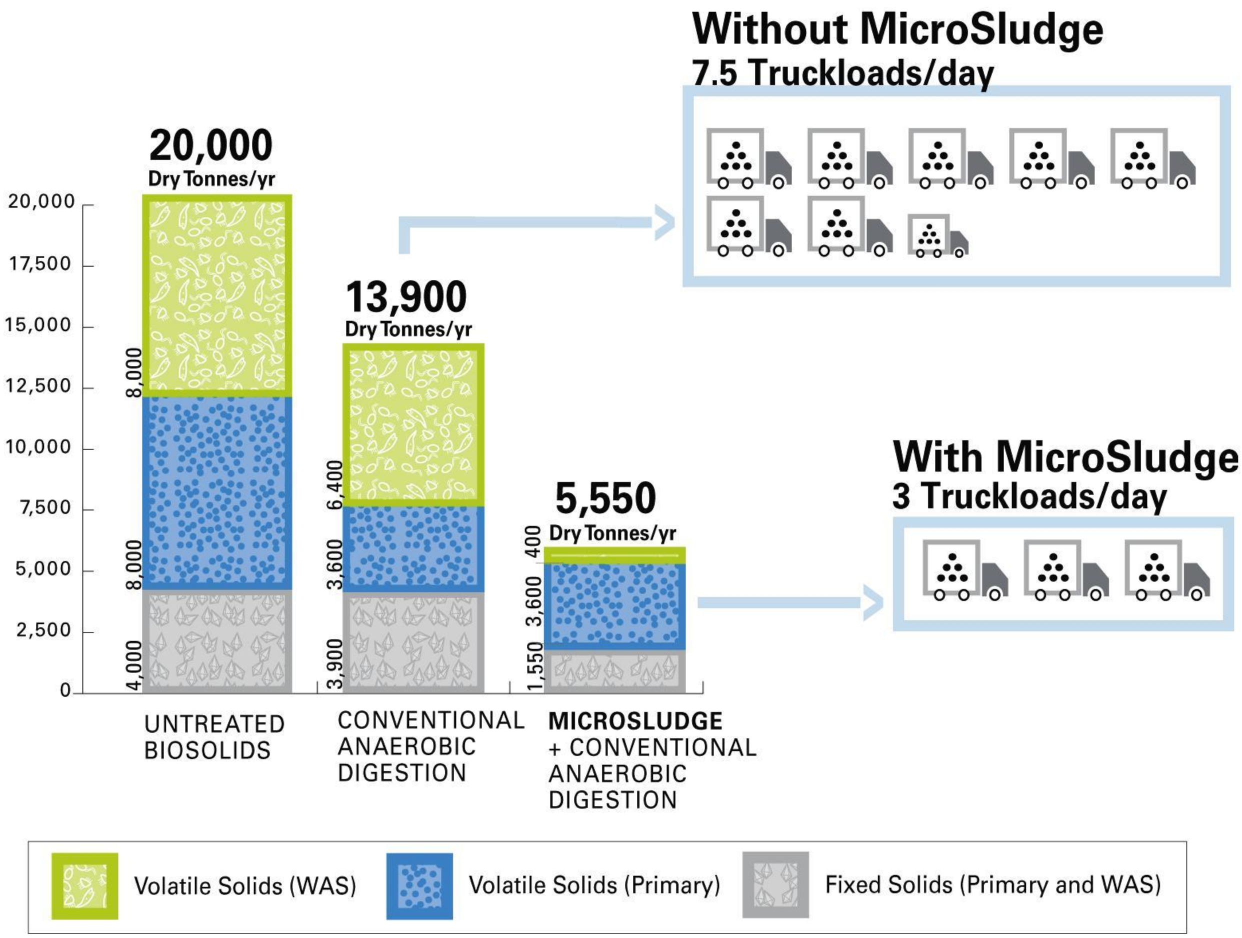
- MicroSludge increased the extent that WAS was degraded in anaerobic digesters to up to 90% as compared to 30% without MicroSludge.
- MicroSludge increased the rate at which WAS was degraded in digesters, thereby increasing digester capacity at wastewater treatment plants.
- MicroSludge did not alter the performance of the downstream dewatering or other WWTP operations.



A commercial prototype of MicroSludge was also tested for 12 months at North America's third largest WWTP, the Joint Water Pollution Control Plant (JWPCP), located in Carson, Los Angeles County. The results of this trial confirmed that MicroSludge eliminated all WAS processed by MicroSludge from the final residuals for disposal, with no negative impact on filtrate quality. CH2M HILL is currently preparing a report on the JWPCP trial.

An Example of Benefits at a Typical WWTP

For a typical WWTP in North America serving about 500,000 people, the amount of primary sludge and WAS requiring anaerobic digestion would total approximately 20,000 dry tonnes per year. Using a conventional 15-day HRT anaerobic digester, typically only 20% of the WAS and 55% of the primary sludge would be converted to methane and carbon dioxide, leaving approximately 13,900 dry tonnes of digested residuals for disposal. MicroSludge would reduce the total dry tonnes of residual solids by approximately 60% to about 5,550 tonnes, as illustrated in the chart below.



Dewatered digested residuals typically contain about 75% to 80% water. Therefore, the actual wet tonnes of digested residuals for disposal would be about four to five times the dry tonnes shown above.

Many WWTPs are capacity-constrained and require major capital investment for more anaerobic digesters. Installing MicroSludge could significantly increase the throughput of anaerobic digesters, reducing or even eliminating the need to build new, costly anaerobic digesters for decades to come.

An Example of Economic Benefits at a Typical WWTP serving 500,000 Population

MicroSludge System Operating Costs	**$/Year**
Chemicals @ $0.46/kg	266,000
Purchased electricity @ $0.7/kWh	347,000
Maintenance (labor and wear parts)	300,000
Total Operating Costs	**913,000**
Direct Benefits	
Reduced biosolids disposal costs @ $40/wet tonne, including polymer	2,106,000
Net value of electricity from increase in methane @ $0.06/kWh	670,000
Heat from increase in methane & cell disruption @ $0.02/kWh	440,000
Total Incremental Benefits	**3,216,000**
Net Benefits from MicroSludge	
MicroSludge Direct Benefits less Operating Costs	**2,303,000**
Installed Cost	**$5,000,000**
Payback	**2.2 Years**

For more Information

Please contact Paradigm to get more detailed technical information about MicroSludge.

sales@microsludge.com

Gordon Skene
President
Phone: +1 (604) 742 0360 ext. 271
gskene@microsludge.com

Rob Stephenson
Chief Technical Officer
Phone: +1 (604) 742 0360 ext. 226
rstephenson@microsludge.com

Filipe Figueira
Director of Marketing
Phone: +1 (604) 742 0360 ext. 222
ffigueira@microsludge.com

Awards

2004 Winner BC/Yukon Region Environmental Technology Award, presented jointly by the Canadian Manufacturers & Exporters (CME), and the National Research Council of Canada (NRC-IRAP).

2006 Winner BCTIA Excellence in Product Innovation award, presented by the BC Technology Industries Association.

2006-7 Winner Canada's Top Three Bioproduct, Energy & Environmental Companies award for 2006/2007, presented by the Ottawa Life Sciences Council.

The Paradigm Technical Advisory Board

Dr. Mohammad Abu-Orf is the Biosolids Technology Leader with Metcalf & Eddy.

Dr. Manocher Asaadi, Ph.D. is the former Head of Research and Development of **Thames Water**, the largest water utility in the United Kingdom.

Dr. Yves Comeau is Professor of Environmental Engineering at the **École Polytechnique** in Montreal, Canada.

Dr. Glen Daigger, Ph.D., P.Eng., DEE is the Senior Vice President, Technical Fellow and Chief Wastewater Process Engineer with **CH2M HILL** (USA).

Mr. Joseph Husband, P.Eng., DEE is Vice President of **Malcolm Pirnie, Inc.**

Ms. Cristina Jacob, MSc., P.Eng. is a Senior Engineer with the **Greater Vancouver Regional District** (Canada).

Dr. Kevin Kennedy is Professor of Civil Engineering at the **University of Ottawa**, Canada.

Mr. Ian Law, is a senior process engineer with **Wessex Water**, UK

Mr. Les Nemeth, MASc., P.Eng. is a senior process engineer with **EarthTech Canada**.

Mr. Jim LeClair, P.Eng. is a Business Unit Manager with Invensys **APV Products Limited**, (USA) at a subsidiary of Invensys, plc.

Dr. Jan Oleszkiewicz, Ph.D., P.Eng., C.Eng (UK), FCSCE, DEE is a Professor of Environmental Engineering at the **University of Manitoba** (Canada) and an authority in anaerobic digestion.

Dr. Albert Pincince, Ph.D., P.Eng., DEE is Senior Vice President of **Camp Dresser & McKee Inc.**

Dr. Barry Rabinowitz, Ph.D., P.Eng. is a Senior Environmental Engineer with **CH2M HILL Canada Ltd.**

Dr. Bob Reimers, Ph.D. is a Professor, School of Public Health and Tropical Medicine, Department of Environmental Health Sciences at **Tulane University**, New Orleans, USA.

Mr. John Willis, P.E., is a Senior Associate with **Brown and Caldwell**.

Dr. Tom Wilson, Ph.D., P.Eng., DEE is a Senior Environmental Engineer with **EarthTech USA**.