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CERTIFICATE

OF TECHNOLOGY ASSESSMENT

Jellyfish ™ Filter System
(Imbrium Systems Inc.)

Based on a review of the data and the information submitted in support of the technology (see Notable Aspects and Appendix), the ministry concludes that the Jellyfish™ Filter System developed by Imbrium Systems Inc. is a viable system for use in the separation of fine sediment and particulate-bound pollutants from stormwater. The Jellyfish™ Filter System will also provide effective separation of coarse sediment, oil and trash from stormwater. In simulation tests performed on a single standard-sized cartridge and correspondingly scaled vessel, influent at flow rate of 3.15 L/s loaded with fine sediment (using Sil-Co-Sil 106, with median particle size of 22 microns, concentrations varying from 100 to 300 mg/L) experienced an average 86% reduction in sediment concentration in the effluent.

Application of this technology in Ontario sites will have to meet the requirements of the Ontario Water Resources Act and the Environmental Protection Act, and will be required to obtain a Certificate of Approval issued under the Ontario Water Resources Act.

Dale Henry, Director
Standards Development Branch
Ontario Ministry of the Environment
(August 2008)

New Environmental Technology Evaluation Program

Promoting the development and application of new environmental technologies

Ontario

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Jellyfish™ Filter System

Notable Aspects of the Technology:

√ The Jellyfish™ Fine Sediment Filter (patent pending) is an engineered stormwater treatment system designed to remove fine sediment, particulate - bound pollutants, coarse sediment, oil and trash.

√ Various configurations may include a single structure that integrates pre-treatment for floatables and coarse sediment with filtration treatment. Other configurations may include a filtration-only structure for incorporation into a treatment train.

√ In a configuration that provides pre-treatment, stormwater enters the unit beneath a cartridge deck that provides a vessel cap. Influent flows tangentially into a pre-treatment zone created by the vessel wall and a skirt extending down from the vessel cap. Floatables are swept to an area beneath the cap under an opening created by a maintenance access pipe. Pre-treated water flows beneath the separator skirt into a chamber of multiple cartridges of hollow membrane-encased filter elements. Filtered water flows up through the filter elements and the cap and fills a pool that will eventually be used to backwash the filters. Filtered water that flows out of the backwash water pool then flows out the outlet pipe.

√ As stormwater runoff subsides, water in backwash pool displaces water beneath the cap and flows back through the membranes exiting through an isolated "draindown" membrane cartridge. Additionally, there is a pressure relief pipe through the cap to provide full flow of pre-treated water in the event of total occlusion of the filters. The system has no moving parts and operates on gravity flow or movement of the stormwater runoff entering the structure.

√ The device requires an upstream diversion structure to channel flows in excess of the treatment flowrate around the treatment system (i.e. a by-pass).

√ The primary contaminants treated by the units include sediment (including contaminants bound to sediment and other particulate matter), floating debris, and floating oil.

√ Standard membrane cartridge units have been designed to provide water quality treatment at operating rates ranging from 1.0 to 3.15 L/s. The standard membrane cartridge includes 91 filtration tentacles that are 137 cm long.

√ The unit tested for this review consisted of a standard membrane cartridge rated for flows of 3.15 L/s in a vessel which approximated full scale conditions. Chambers incorporating multiple cartridges would provide treatment for higher flowrates.

√ A solution of Sil-Co-Sil 106 was used to simulate stormwater runoff solids loading. Sil-Co-Sil 106 has a published particle size D_{50} of 22 microns.

- √ Trials conducted at the 3.15 L/s treatment flow rate produced effluent suspended solids concentrations that were, on average, 86% less than influent concentrations.

- √ An analysis of trials at 3.15 L/s constant flow and with influent suspended solids concentrations of 100 mg/L, 200 mg/L, and 300 mg/L, respectively, and an influent particle size D_{50} of 22 microns produced an average effluent with a D_{50} of 3.9 microns and a D_{90} of 14.3 microns.

- √ Periodic maintenance of the units is required. Captured sediments and floatables must be removed. Filter cartridges will also require periodic removal and replacement. Site-specific conditions determine the frequency of maintenance. Depending on the nature of influent, the accumulated material may require special handling and disposal procedures.

APPENDIX

Documents reviewed:

NETE Application dated February 22, 2008 to Ontario Ministry of the Environment from Mr. Stephen Braun P.Eng., Engineering Manager, Canada and International Markets, Imbrium Systems Inc. Toronto, Ontario.

Memorandum from Stephen Braun, P.Eng. (Imbrium Systems Inc) to John Antoszek, P.Eng. (Ontario Ministry of the Environment), dated April 4, 2008; additional information requested on the system.