

# Solar Aquatics™ System (SAS) for Wastewater Purification

*“In continuation of its long history of leadership in the environmental engineering field, Proctor & Redfern is committed to the development of the Solar Aquatics System for sewage and septage treatment applications in the province of Ontario. This environmentally friendly technology is particularly appropriate for small communities with septic tanks or for remote tourist facilities.”*

Frank C. Moir  
Vice-president  
Proctor & Redfern Ltd.  
Don Mills, Ontario

## THE COMPANY

Driven by a corporate philosophy to provide preeminent professional consulting services to meet the needs of clients, Proctor & Redfern is one of Canada's best known engineering firms. Proctor & Redfern is a full service consulting firm, recognized by clients for sound technical and management performance. The firm is wholly owned by its staff and committed to upholding its standards of excellence.

ICON Systems Limited, a wholly owned subsidiary of Proctor & Redfern, is working with the patent owners, Ecological Engineering Associates to promote Solar Aquatics in Ontario.

## THE CHALLENGE

There are increasing consumption and pollution stresses on Ontario's water resources. Many communities have identified the need for an improved wastewater treatment system that is more cost effective, decentralized (treatment at the source) and ecologically based. To address these needs, ICON Systems constructed the Solar Aquatics™ System (SAS), at the Ontario Science Centre (OSC). This model demonstration facility is designed to educate the public, validate and optimize the technology and create commercial opportunities for Solar Aquatics™ in Ontario.



Solar Aquatics™ System Demonstration

## TECHNOLOGY DESCRIPTION

The SAS uses diverse, self-adaptive aquatic environments to treat wastewater. Plants, snails, bacteria and other microorganisms metabolize or bind up wastewater contaminants in ten aerated translucent tanks and an anoxic marsh. Chemical flocculation, precipitation and neutralization are avoided and mechanical simplicity is emphasized. Proper temperature, humidity and light conditions are maintained in a greenhouse for year-round treatment. Long retention times produce fewer and more stabilized solids, high quality effluent, as well as providing a buffer against accidental toxic discharges to sensitive receiving waters. ICON Systems has acquired the Ontario rights for the Solar Aquatics™ technology from the patent owners, Ecological Engineering Associates, of Massachusetts. The demonstration facility at the Ontario Science Centre treats 6,800 L/day of sewage, or approximately 10 per cent of the Centre's total effluent.

## RESULTS

Permitted SAS facilities are in operation in several states in the USA., as well as in Nova Scotia, Alberta, British Columbia and in Mexico. A one-year monitoring program, developed in cooperation with the ministry, has been completed.

Results from the monitoring have established Solar Aquatics™ as a proven and viable technology. Removal efficiencies for total suspended solids, BOD and ammonia nitrogen were 99%, 99%, and 98% respectively.

## TECHNOLOGY OPPORTUNITIES

The SAS is ideally suited to communities seeking a sewage treatment facility with the following qualities:

- \* sub-surface discharge of the effluent to a nitrate-sensitive aquifer;
- \* seasonal septage or boat wastes;
- \* treatment capacities ranging from 22 to 4500 m<sup>3</sup>/day (serving 100 to 20,000 people);
- \* proven tourist attraction, educational facility and winter refuge;

- \* potential for seasonal irrigation, habitat restoration and water reuse;
- \* green image and value-added features that facilitate community acceptance;
- \* cost competitive with conventional concrete/chemical-based systems;
- \* potential for synergistic integration with horticultural production facilities.

Surface discharge requires chemical polishing for phosphorus removal. Research for a less chemical dependent process is underway at Proctor & Redfern.

### **PARTNERSHIP IN POLLUTION PREVENTION AND RESOURCE CONSERVATION**

The demonstration of this technology was partially supported by the ministry, and the Ontario Realty Corporation.

Industrial companies located in Ontario may seek ministry/industry services that will help them to:

- \* Reduce, reuse and recycle solid waste;
- \* effectively remediate historic pollution and destroy hazardous contaminants;
- \* reduce or eliminate liquid effluent and gaseous emissions;
- \* use energy and water more efficiently.

Equipment and services supply companies can benefit from the information provided on technologies identified for business development.

### **FOR FURTHER INFORMATION, PLEASE CONTACT:**

The SAS has been assessed by the ministry under the New Environmental Technologies Evaluation (NETE) Program. Copies of opinion are available from ICON Systems Limited.

Erin Mahoney  
Proctor & Redfern Ltd.  
45 Don Mills Road  
Don Mills, Ontario  
M3C 3K3  
Tel: (416) 445-3600, Ext. 2264  
Fax: (416) 445-5276  
E-Mail: emahoney@pandr.com

Joe Gemin  
Proctor & Redfern Ltd.  
45 Don Mills Road  
Don Mills, Ontario  
M3C 3K3  
Tel: (519) 570-4886 or  
1-800-465-0348  
Fax: (519) 570-3379  
E-Mail: jgemin@pandr.com

Andrew Vitaterna  
Proctor & Redfern Ltd.  
45 Don Mills Road  
Don Mills, Ontario  
M3C 3K3  
Tel: (905) 688-4272 or  
1-800-688-5812  
Fax: (905) 688-5812  
E-Mail: avitator@pandr.com

George Cadete  
Environmental Partnerships Branch  
Ministry of the Environment  
2 St. Clair Ave. West, 14th Floor  
Toronto, Ontario  
M4V 1L5  
Tel: (416) 327-1258  
Fax: (416) 327-1261  
E-Mail: cadetege@ene.gov.on.ca

### **MINISTRY OF THE ENVIRONMENT SERVICES**

For information on Ministry of the Environment assistance to industry, please contact the Environmental Partnerships Branch at (416) 327-1492, Fax (416) 327-1261

For more project profiles and other publications, visit the ministry's website at <http://www.ene.gov.on.ca>

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