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Halifax Regional Council
May 24, 2005

TO: Mayor Kelly and Members of Halifax Regional Council

SUBMITTED BY: Brad Anguish (Acting)
For Brad Anguish, Director, Environmental Management Services

DATE: May 11, 2005

SUBJECT: Ecological (Solar Aquatics™-type) Wastewater Treatment

INFORMATION REPORT

ORIGIN

- Committee of the Whole meeting, October 19, 2004.
- Committee of the Whole meeting, April 27, 2005 - Regional Planning discussion

BACKGROUND

On February 12, 2002, based on staff reports of January 29 and February 5, 2002, Council approved the following motion in relation to the suggested use of Solar Aquatics™ type of treatment technology (Ecological Wastewater Treatment - EWT) in the context of the Harbour Solutions Project:

8.2 Ecological Wastewater Treatment / Solar Aquatics™ (supplementary report)
(deferred from Feb. 5, 2002)

- That Halifax Regional Council not dedicate an outfall in the Harbour Solutions project to Solar Aquatics™ technology.
- That Halifax Regional Council consider the use of Solar Aquatics™ technology in the future in a full cost/performance comparison with other innovative and conventional systems for a small plant, serving a small community.

DISCUSSION

EWT is essentially secondary- or advanced secondary-level sewage treatment, similar in concept to an activated sludge process, with the addition of plants and some invertebrates to assist in the absorption of nutrients during the treatment process. The facility is housed in a greenhouse, and the use of clear-walled tanks has been patented by the Solar Aquatics™ brand name. Breakdown and absorption of organic material and nutrients take place within these tanks. Floatables and settled grit/solids are dealt with traditionally. Final clarification is through a wetland-type stage if sufficient land is available, with UV disinfection.

The US EPA, in a study of EWT systems (the “Living Machine” concept, similar to Solar Aquatics™), concluded that the plant material contributed to the aesthetics of the facility but added little to the treatment efficiency (the local NS distributor indicates up to 10% increment). They concluded that the process may be suited to flow rates up to 100,000 US gal/day (less than 1,000 persons equivalent) but becomes more costly than conventional systems above that level. US federal funding support for continued demonstration projects was not recommended. The results of this analysis was in accordance with cost estimates produced for the use of EWT in the Harbour Solutions context.

Nova Scotia has had two installed Solar Aquatics™ facilities. The facility in Bear River (Annapolis County) has been converted to a different treatment technology (sequencing batch reactor) to maintain regulatory compliance with a larger sewage load, and is no longer a Solar Aquatics™ facility. The facility in Beaverbank (HRM) has been mothballed and replaced by a recirculating sand filter system. The owner is considering reactivating the facility with a different treatment process. Thus, experience to date in Nova Scotia with such systems has not been positive.

While an EWT facility would produce an advanced-secondary quality effluent, the treated effluent still must be discharged to a suitable water body. Use of such technology in a marine discharge situation with adequate assimilative capacity in the receiving waters would not present any problems. However, a recent analysis of freshwater assimilative capacity conducted for Regional Planning concludes that the inland waters of HRM have little assimilative capacity due to relatively low flow volumes. Placement of any new inland central sewage treatment facility would have to follow an adequate study of alternatives, costs and receiving waters. Small-scale treatment options range from individual onsite septic systems, to cluster septic, alternate technologies such as central sand-bed filtration, EWT, or small conventional systems.

Sewage treatment in areas outside of service boundaries (ie. off of large-scale central systems) are typically proposed by the developer. While onsite septic is traditionally used, developers may propose alternatives such as those mentioned above. The developer must obtain provincial approval for any treatment facilities. For onsite systems, the homeowner is responsible for operation and maintenance. Central systems of any type may become the responsibility of the municipality if HRM agrees, or alternate management mechanisms may be used.

During the Regional Plan discussions, Committee of the Whole agreed to place Solar Aquatics™ treatment systems in the "parking lot" for the next round of regional planning consultations. Solar Aquatics™ and other innovative systems will form part of the focus of the next round of consultation.

Policy

The current draft of the Regional Plan contains policy in regard to development off of central services. In conformance with Council's decision of February 12, 2002, HRM will consider the use of Solar Aquatics™ or other EWT technology in the future under the following conditions:

- proven treatment technology, proposed by the developer
- serving a small community (less than 1,000 persons)
- approval by NSDEL
- full cost/performance comparison with other innovative and conventional systems for a small plant
- supported by appropriate receiving water assimilative capacity studies
- capital costs of the facility to be born by the developer
- operating responsibility and costs defined, with appropriate funding mechanisms.

If HRM should choose to operate such a facility, then appropriate budget allocations would be required at the time. Current practice is not to assume responsibility from developers for small-scale treatment plants due to costs and high risks of system performance problems. HRM's long-term intention is to reduce the number of small-scale STPs, rather than increase them, to reduce the operations and performance risks. However, under the Regional Plan there are select rural areas identified for growth (for example Sheet Harbour, Hubbards, Fall River, Musquodoboit Harbour), which would be exceptions to this intention.

Should HRM wish to promote EWT technology, then HRM might choose to encourage development proposals using such technology, or HRM might choose to contribute to the capital cost of a facility, possibly in the context of supporting a trial installation. However, NSDEL is the more appropriate agency to fund and regulate proposed sewage treatment technologies.

BUDGET IMPLICATIONS

None associated with this report.

FINANCIAL MANAGEMENT POLICIES / BUSINESS PLAN

This report complies with the Municipality's Multi-Year Financial Strategy, the approved Operating, Capital and Reserve budgets, policies and procedures regarding withdrawals from the utilization of Capital and Operating reserves, as well as any relevant legislation.

ALTERNATIVES

None.

ATTACHMENTS

None.

Additional copies of this report, and information on its status, can be obtained by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Financial Review by:

May 13/05 as received

Kellea Redden May 13/05
Kellea Redden, CMA, Financial Consultant (EMS / P&D)

Report Prepared by:

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