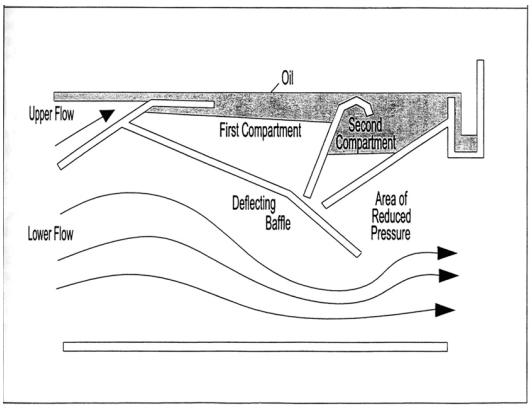
STrategic Envirotechnology Partnership Fact Sheet

Suparator™ Thin-Film Oil Recovery System

Introduction: This fact sheet is a concise summary of a more detailed analysis conducted for the Massachusetts STrategic Envirotechnology Partnership (STEP), through funding from the Environmental Protection Agency - Region 1. For further information on the full report, see the STEP web site, at http://www.stepsite.org, or contact Jenny Braun-Friedman at (617) 626-1052. For further information on the Suparator®, contact John Scambos, Aqueous Recovery Resources, Inc., at (914) 241-2827.

Technology Description: Aqueous Recovery Resources, Inc. markets the Suparator® Thin-Film Oil Recovery System. This technology is a commercially available alternative to traditional end-of-pipe techniques that use mechanical separation by adhesion and/or collection techniques for treating wastewater contaminated with oils. However, adhesion and collection end-of-pipe techniques are poorly adapted for treating the effluent from aqueous cleaning processes. The design of the Suparator® incorporates an innovative adaptation of Bernoulli's Principle. The system recovers thin films of floating oil by utilizing the specific gravity differential between oil and water. The Thin-Film aqueous cleaning system is based on a proven technology that was originally developed for the petroleum refining industry.



The Suparator® product package includes a stainless steel (304 or 316) process tank, a patented thin-film separation device, and a patented level-following weir. The thin-film separation device is integrated into the stainless steel process tank and the level-following weir is installed in the "target" tank (i.e., the tank containing the contaminated aqueous cleaning solution). The thin-film separation device is currently available in three different general models, capable of processing approximately 8, 45, 500 gpm.

Technology Application: Four applications of the Suparator® were independently reviewed and verified the ability to achieve a continuous, high-efficiency oil-water separation for a variety of aqueous cleaning applications. The aqueous cleaning applications included: separation of a quench oil from city water; separation of a medium

distillate oil from an oil-rejecting alkaline aqueous cleaning solution; separation of a sanding oil from an oil-rejecting neutral aqueous cleaning solution; and separation of miscellaneous oils from an emulsifying alkaline aqueous cleaning solution.

Technology Performance:
The applications demonstrated the viability of the technology as an alternative to traditional end-of-pipe oil-water separation techniques and confirmed that:

- for applications where the recycling of oil is a consideration, the technology recovered a high-quality (i.e., no bacterial degradation), high-purity (i.e., low concentrations of water and other impurities) oil stream that can be recycled with only minimal treatment.
- for applications where the recycling of oil is not a consideration, the technology significantly reduced waste oil disposal volumes and costs by recovering an oil stream with low water content (i.e., <1 % water by volume versus >10 % water by volume).
- the technology significantly extended the life of aqueous cleaning solutions.
- the technology did not deplete the aqueous cleaning solution of surfactant during the oil-water separation process.
- the oil-water separation process was most efficient when used in conjunction with an oil-rejecting neutral aqueous cleaning solution.

Cost Information: Capital and operational costs of the units vary. Systems reviewed in this study ranged from $6,000 to $8,000, with payback periods of 38 days to 15 months.

Regulatory/Safety Requirements: The four applications reviewed here involved no significant regulatory or health and safety issues.

Implementation Considerations:
Technology users need to:

- compare the relative advantages of "pump-feed" versus "gravity-feed" Suparator® system (in the "gravity-feed" system, the oil is not re-emulsified by the progressing cavity pump prior to entering the process tank).
- institute a scheduled maintenance (cleaning) program.
- prevent the intake of contaminants into the progressing cavity pump associated with the Suparator®.

In addition, laboratory testing suggested that the oil-water separation is least efficient when used in conjunction with an emulsifying alkaline aqueous cleaning solution.

The unit is simple to install, operate and maintain. Effective operation requires only that the process flow through the unit be maintained at a level sufficiently low to prevent turbulence. Optimization of the oil-water separation process requires manual adjustment of the height settings of the overflow siphon and water overflow weir. Maintenance is low, typically consisting of the occasional draining of the stainless steel process tank and subsequent spray cleaning of the thin-film separation device and stainless steel process tank.