Quarterly Progress Report #02

Project Title:	Use of Pressurized Ozone and Compressed Air Flotation with Membrane Filtration for Industrial Process Water Treatment
Covering Period:	October 1, 2004 to December 31, 2004
Date of Report:	January 6, 2005
Recipient Organization:	New York State Energy Research and Development Authority (NYSERDA)
Partners:	Industrial Partner: Pactiv Corporation (providing in-kind cost-share) Other State Partner: Michigan Department of Consumer & Industry Services Subcontractor: Resource Recycling Systems, Inc. Subcontractor: Western Michigan University
Technical Contact:	New York State Energy Research and Development Authority (NYSERDA) Contact: Dr. Dana Levy 17 Columbia Circle Albany, NY 11203-6399 Telephone (518) 862-1090 x 3377 Fax (518) 862-1091 Email: DLL@nyserda.org
Business Contact	Same as Technical Contact above.

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1. Project Objective: Install, monitor, and demonstrate a novel integration of technologies for removal of total dissolved solids (TDS) from pulp and paper mill process water. System impacts will be evaluated and results disseminated to various process water intensive industries including but not limited to the pulp and paper sector.

2. Background: Pulp and paper mills are very water-intensive and energy-intensive industries. Significant energy, in the form of heat, is used to make hot water for the papermaking process. Water recycling in paper mills both conserves water and saves energy (by recovering the heat embedded in the hot water); the buildup of total dissolved solids (TDS) in process water restricts the proportion of water that can be recycled. TDS, or "salts" accumulate in process water when it is repeatedly recirculated and reused, and can cause crusting and clogging of spray nozzles and other detrimental impacts on the papermaking process. Typically, a portion of the recirculated water is purged via a "bleed-off stream" in order to expel some TDS from the water, and an equal amount of "make-up" water is added which must be heated. The raw materials used in papermaking are predominantly organic (e.g., components of wood), and the TDS inherent in papermaking process water is also predominantly organic (dissolved organic salts). Whereas, suspended solids/particles are easily removed from water by filtration and straining, dissolved salts are not. Organic materials can be oxidized through chemical reactions, yielding carbon dioxide and water as products. Ozone is a powerful oxidant, and can be used to control TDS in paper mill process water. Pactiv Corporation's Plattsburgh, New York, mill produces 40 tons per day of recycled-fiber molded

products for use in the packaging industry, and seeks to maximize the recycling of their papermaking process water. Currently, Pactiv discharges 250,000 gallons per day of "purged" process water. Through this project, the team will study the economic and technical feasibility of using an innovative integrated system consisting of pressurized ozone and compressed air flotation with membrane filtration to control TDS and suspended solids to an acceptable level. If the results of the study suggest that such a system is technically and economically feasible, the team will install and operate a full-scale system. This method of recycling process water and its potential energy and environmental benefits could be valuable to other industries and could be replicated by other industries that use large amounts of process water and are hampered by TDS and suspended solids, such as food processors and commercial laundries.

3. Patents: None.

4. Publications/Presentations: None.

5. Progress in Past Quarter and Current Status: NYSERDA has not yet achieved a signed contract with the industrial partner Pactiv – the project team is hopeful that such contract will get signed in early 2005. Several events have overlapped during previous quarter (Quarter #01) to cause delay, but are all resolved now:
    * A fire occurred at the Pactiv mill in Plattsburgh - it diverted attention. The mill is back in operation now.
    * A new Director at Pactiv corporate HQ has taken over, and needed to be briefed on this project. He now supports the project.
    * The mill manager at Pactiv in Plattsburgh retired; a new mill manager has been hired and needed to be briefed on this project. He now supports the project.

6. Plans for Next Quarter: The project team is hopeful that a contract between NYSERDA and the industrial partner Pactiv will get signed in early 2005. Upon signing, the team will embark on Task 1 "Mobilization and Planning" to provide appropriate research and project planning work, including a detailed project workscope for the project. Also, the team will embark on Task 2 "Pilot Trial Development" by conducting pilot trials using the full-scale pilot pressurized ozone system located at Western Michigan University's Paper Industry Pilot Plant.

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