



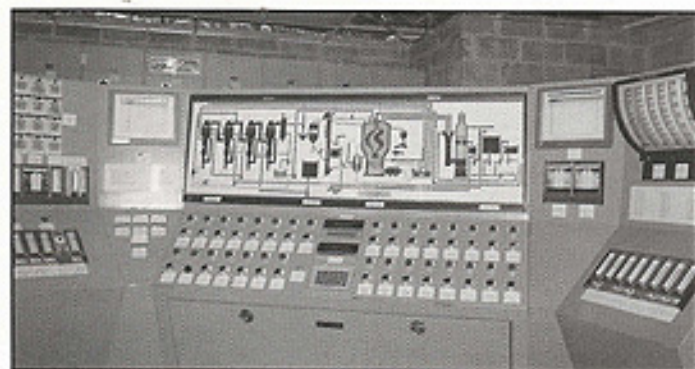
ENDERS PROCESS EQUIPMENT CORPORATION AND AGRO PULPING MACHINERY LTD.

SNAPSHOT

U.S. Firm: Enders Process Equipment Corp.
Indian Firm: Agro Pulping Machinery, Ltd.
Type of Venture: Technology licensing
Type of Technology: Fluidized bed incineration systems
Indian Beneficiary: Shreyans Paper Mills
Industry: Pulp and paper
Environmental Benefit: Power savings, resource recovery, clean water
Project Cost: \$4.1 million

The Project

Enders Process Equipment, an Illinois company, has entered into collaboration with Agro Pulping Machinery, Ltd. of Madras to manufacture and supply a "fluidized bed incineration system" for chemical recovery from spent pulping liquors from the pulp and paper industry. This project will provide small and medium-sized paper mills an affordable system to treat effluents from their units and recover valuable chemicals for recycling. Under this project, Enders will provide the engineering designs for the systems, and Agro Pulping Machinery will manufacture and install systems in Indian paper mills. Enders and Agro Pulping have signed an agreement with Shreyans Paper Mills, Ltd. of Punjab, India, to install its first fluidized bed chemical recovery system.



Graphic flow sheet of the Enders fluidized bed incineration system.

The Technology

The fluidized bed incineration system provides for the treatment of spent pulping liquors in a fluidized bed reactor to recover the pulping chemicals and simultaneously destroy the unwanted organic pulping chemicals which ordinarily seep into and pollute nearby lakes and rivers. This technolo-

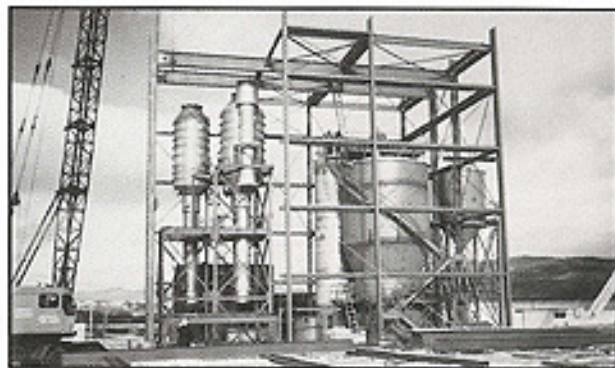
gy is of prime importance to India where out of approximately 300 paper mills, only 90 have effective systems to treat effluents and recover chemicals for recycling. The remaining 210 mills empty their spent effluent pulping liquors directly into fields and rivers. Most paper mills in India have been reluctant to install effluent treatment systems due to their high costs. The Enders system is attractive to these mills because it costs half as much as the conventional systems currently used in India. Future plans are to adapt the Enders system for effluent treatment in sugar refineries, steel making units, and petrochemical refineries.

TEST Collaboration

In September, 1993, Sanders International approached Enders Process Equipment believing its innovative and low-cost technology was ideally suited for Indian conditions and directly applicable to one of India's top environmental "priority industries": pulp and paper. In cooperation with the U.S.-Asia Environmental Partnership (US-AEP), Sanders organized a marketing visit to India for an Enders representative which resulted in an agreement with Shreyans for a pilot installation of Enders fluidized bed incineration technology. In October 1994, the Industrial Credit and Investment Corporation of India (ICICI) approved a conditional grant under the TEST program of \$600,000 for the project.

Current Status

Currently, the engineering designs for the new plant have been completed and submitted to Shreyans Industries. Moreover, 60 percent of the plant has been completed, and the new technology is expected to be operational by the end of 1995.



Construction phase of the Enders system before construction of new plant. From left to right half of the evaporator, venturi & secondary scrubber, reactor and product storage silo are shown.