Case Study: Leather Tanning needs new Technology

The tanning industry is one of the oldest in the world. The treatment and disposal of the wastes generated from this process is a problem as old as the industry but one that must be handled properly. Uncontrolled release of tannery effluents to surface waters has created a great health risk to humans and a huge pollution issue for the environment. Now is the time when environmental regulations are forcing this industry to take a closer look as the way it handles wastewater.

There are a great number of steps to taking a raw hide and making it into a consumer leather product. Throughout the process there are many steps requiring the addition of water. The water is used as a carrier for the chemicals, for cleaning the hides and to allow the penetration of chemicals into the fibers of the skins to alter the properties of the final product. The water in the process is added and then later removed in pressing or wringing operations. It is during these water removal steps that wastewater is generated and then must be treated. The wet processes in the tannery are the main contributors of the wastewater.

The water consumption per kg of hides processed varies by tannery and season. In general a tannery will consume between 34-56 m^3 (~9,000-15,000 gallons) of water per ton of raw hides [1]. This estimate of water consumption is for conventional technology. For more modern tanning facilities with advanced technology, the water consumption is greatly reduced and can be one-third to one-fifth of the previous estimates.

New Logic successfully installed a 36" VSEP unit in Australia for the treatment of tannery effluent cured with salt brine. The system is removing the fats, grease, suspended solids, proteins and blood from the brine effluent stream. This is the effluent that is generated when the salt preserved hides arrive at the facility and are then rinsed. The system has been in operation since mid 2004. The filtered salt brine is dried and reused.

Initial testing identified a PVDF membrane with a 250,000 molecular weight cutoff. However, due to concerns for limited pH tolerance and free chlorine limits, the customer selected a 0.05 micron Teflon membrane instead. The customer operates the unit at 70°C and runs at a feed pressure of 100 psi. The standard cleaning is flushing with warm caustic. A periodic cleaning with a chlorine solution for sanitation is also helpful to maintain the life of the filter pack. Performance has been predictable and stable to date.

This customer is also reviewing the current data from our test work on chrome concentration as well as our work on the lime stream. These two streams are also an environmental discharge problem for their facility. So far the preliminary evaluation indicates that these streams are economical for treatment with VSEP. The advantages are simple one-step process, small footprint, energy efficiency and the ability to treat these streams independently at the source.