PRO-TEC Coating Co.
PRO-TEC Coating Company was established as a joint partnership in 1990 and is strategically located in Northwestern Ohio. Their 730,000 square-foot plant, located near Leipsic, Ohio produces high-quality, coated steel products with output of over 1.1 million tons annually. PRO-TEC is recognized as a leader in Advanced High Strength Steels (AHSS) in the United States.

The Client’s Needs
PRO-TEC Coating Company’s plant in Leipsic, Ohio is one of the largest facilities in North America producing hot-dipped galvanized/galvannealed steel products. The process of galvanizing/galvannealing begins with high quality, cold rolled steel coils.

Prior to surface treatment, the raw steel is cleaned with a caustic degreaser. This process results in substantial quantities of spent caustic cleaner that contains oils and greases, grit, water, and other solids that is collected and sent to disposal offsite.

The disposal of the spent cleaner represents a significant expense in not only the rising cost of disposal for the effluent, but also in the costs of replacing the caustic degreaser for production.

Despite several attempts to solve this issue, a cost-effective and technically feasible solution could not be achieved. PRO-TEC contacted Veolia Water Technologies to explore alternative technologies and processes. The solution required that both cost and performance objectives be met, including a further reduction of their environmental impact.
Metals Industry

Process Description
Veolia Water Technologies proposed a design based on CeraMem® ceramic membrane technology. These membranes are ideal for this application due to tolerance of high operating temperatures, aggressive cleaning regimens, and resistance to high pH levels typical of the spent cleaner.

After some initial laboratory testing, a full-size, crossflow membrane system was designed and built. The goal of the system was to recover the spent caustic degreaser to a specified rate and quality for reuse with a vastly reduced quantity of waste generated from the process.

Commissioning by the Veolia team was completed on site to verify system performance:
- UF (ultrafiltration) Titania membrane, 0.01μm pore size
- Recovery rate, caustic degreaser: 95%
- Design flow: achieved 140% during performance validation
- Permeate quality: <10mg/l TSS and dispersed oil & grease
- Operating temperature: > 50°C; pH 10 – 13

Results
Commissioning was successful. The system achieved 95% recovery while the permeate quality exceeded the design criteria for TSS and dispersed oil & grease, and also exceeded flow rate by 40%.

Satisfied that the system met the design requirements during commissioning, the system was fully integrated into PRO-TEC’s caustic degreaser blow down treatment operation, and has been operated by PRO-TEC since commissioning. The standard, pre-engineered system installed at PRO-TEC is part of a family of systems called the FMS4-3 that comprises of up to three, full-sized CeraMem membranes, associated tanks, valves, and instrumentation with a treatment capacity of 1 to 25 gpm in a modular, packaged design.

To date, the FMS4-3 treatment line at PRO-TEC has exceeded performance guarantees, while achieving a large reduction in degreaser waste and makeup (> 95%) for the facility. This excellent performance has been consistently achieved with full system availability.

System Highlights
- >95% Caustic cleaner recovery for reuse, with 95% less chemical makeup costs
- Reduced environmental impact
- >20x Less waste sludge and associated disposal costs
- Short payback period
- Automated, pre-engineered system with minimal installation and commissioning