



# ELECTRO-GALVANIZING RECOVERY AND REUSE

## Significant Savings

- Waste stream reduction lowers disposal fees
- Water and chemical reuse reduces overall consumption
- Metal recovery shows significant annual savings

## Projects

- Electro-Galvanizing operation reuses acid and de-ionized water as well as metals in operations

## Technology Benefits

Membrane Separation System Using Nanofiltration (NF) and Reverse Osmosis (RO)

- Simple mechanical process
- Consistent high quality water
- Ability to reuse purified streams
- Low operating costs
- Unattended operation
- Elimination of disposal costs

## Products Removed

- Zinc and Zinc-Nickel
- De-ionized Water
- Sulfuric Acid

## Services Provided

- Systems Design
- Equipment
- Operator Training

## Equipment Shown

Typical Nanofiltration and Reverse Osmosis Systems. Inset shows spiral-wound membrane used in this application.



## The Application:

A steel coil-coating plant was using forty-four gallons per minute of de-ionized (DI) rinse water in an electro-galvanizing operation. As well as the DI water, the rinses contained sulfuric acid, zinc or zinc-nickel in solution, as well as dissolved iron. The goals for the project were to reduce the waste disposal by concentrating the zinc and/or zinc-nickel in an acidic solution for reuse in the electro-galvanizing operation, and reuse the separated water in the rinse stage.

## Treatability Studies

Dynatec conducted two levels of treatability studies to determine the best technology to meet the customer's goals. Since the ultimate purpose of the project was recovery and reuse, chemical treatment was immediately ruled out. Evaporation was determined to be too costly due to the size of the waste stream. Initial bench scale work determined that a combination of nanofiltration and reverse osmosis could meet the prospects goals.

The company had earlier pilot testing done for two days with another company. Dynatec wanted to confirm both the results found during that test as well as the results found during the benchtop treatability work. With Dynatec's ability to use membranes from a number of different vendors, we were able to test the waste stream on a variety of products. The in-house pilot test showed that a higher rates and quality of recovered water could be achieved using different membranes than the original pilot work had shown. The pilot testing also showed that much more prefiltration was required than predicted. The pilot testing proved the benchtop work to be correct in that a combination of nanofiltration and reverse osmosis could meet the customer's goals.

## Solution

Dynatec's ability to customize a solution to meet the customers goals allowed us to propose a system that incorporated both the information that was learned during the pilot testing and customization that the customer requested. Dynatec was able to customize this solution to the prospects project and propose a solution. The project cost was significantly less than that of the competition. Dynatec was awarded the project by giving the customer a solution at lower cost and the ability to customize the solution to the specific requirements of the application.



The customer is able to reuse the concentrated metal solution in the galvanizing operation, while the permeate (purified water) is reused in the rinse stage.

## Savings

The savings included the ability to reuse metal that had previously been disposed of, the reuse of both sulfuric acid and de-ionized water in the process. In total, the annual savings exceeded \$1M US. The project ROI was approximately 6 months.