



Direct Assistance Program

New York State Pollution Prevention Institute (NYS P2I) partners with industry

to improve production processes, enhance recycling and reuse and reduce the use of hazardous materials

Assessment of Alternative Coatings for Improved Electrode Longevity and Toxic Metal Elimination

Client

PeroxyChem is a leading global manufacturer and supplier of hydrogen peroxide, peracetic acid, persulfates and adjacent technologies with a facility located in Tonawanda, NY.

Opportunity Area

PeroxyChem is attempting to change the electrode material in their process from a toxic metal to a more environmentally friendly alternative metal. However, the new electrode metal is seeing unusual corrosion and shorter longevity possibly due to the failure of the coating used to protect soldered joints and bus bars.

Objective

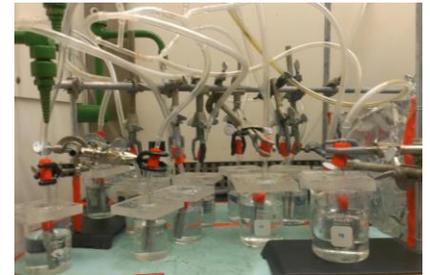
The objective of this project was to determine the cause of the corrosion and shorter longevity of the new electrode metal and identify an alternative coating material that would successfully withstand the process environment, prevent corrosion, and provide a longer life span for the new electrode. With a successful coating, the new electrode metal will enable the replacement of the previous electrode metal thereby eliminating toxic materials and the generation of toxic hazardous waste at this facility.

Work Performed by NYS P2I

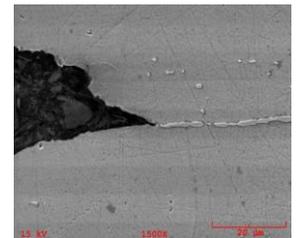
- Evaluated several electrodes made with the new metal to find the root cause of the unusual corrosion and shorter life-span using Scanning Electron Microscope (SEM) analysis and SEM Energy Dispersive X-ray (EDX).
- Performed a literature review to identify plausible coatings that would be compatible with the new metal electrode in the process environment.
- Conducted accelerated corrosion and delamination tests using several alternative coating materials on the new metal electrode to determine performance quality and longevity.

Results

- Determined original coating had poor performance and the new metal was being manufactured with a defect. These two findings were contributing to the corrosion and short lifespan of the new electrode metal.
- Identified an alternative coating material that can potentially withstand the process environment, prevent corrosion, and provide improved longevity for the new electrode metal.
- Should the new coating material be implemented, it would enable the replacement of the previous electrode metal thereby eliminating toxic materials and the generation of over 1,000 pounds of toxic hazardous waste.



Laboratory setup for accelerated corrosion/delamination testing of coatings on electrode substrates



1500 magnification using SEM showing a defect at the point of initiation for the corrosion

