Halogenated Solvent Use Reduction for DuPont

Client
The DuPont Yerkes facility in Buffalo is primarily involved in the production of Corian® in the form of sheets of solid material with various designs and colors. Methylene chloride (MeCl2) and a trichloroethylene/perchloroethylene (TCE-PCE) spray are used as cleaners in the Corian® production line.

Opportunity Area
DuPont wanted to learn whether alternative chemistries or processes existed to potentially reduce or eliminate the use of MeCl2 and TCE-PCE. MeCl2 is used to clean hardened Corian® material off pump parts and piping; the TCE-PCE spray is used as a general purpose cleaner to clean different surfaces using rags.

Objectives
The primary objectives of the project were to 1) determine what commercial alternatives would work effectively as cleaning replacements and 2) understand the potential operational modifications and economic costs associated with a changeover to any of the identified alternative processes.

Work Performed
NYSP2I evaluated different alternative chemistries and processes to clean prepared samples. Alternative chemistries included Acrastrip 950 and BioSolv, which could be replacements for MeCl2. Alternative processes to replace MeCl2 included evaluation of Vacuum Cycle Nucleation (VCN) and ultrasonics which utilized water-based chemistries. Various commercially available spray cleaners were tested to replace the current TCE-PCE spray cleaner, including CRC Chlor-Free Non-Chlorinated Degreaser, Sakrete Concrete Mortar Dissolver, BioSolv and Acrastrip 950.

Results
For the operation that uses MeCl2, preliminary testing indicated that Acrastrip 950 performed the best as a possible replacement for MeCl2. Preliminary economic analysis indicates that the cost to use Acrastrip 950 would not differ significantly from current expense requirements. VCN and ultrasonics tests also indicated positive results with paybacks of 3 to 4 years. All spray cleaners tested showed positive results. More work is recommended to confirm feasibility for all viable options, better define the operational specifications needed for changeover, and more accurately quantify the economic impact of any process that could eliminate halogenated solvent use at the DuPont facility.