

DYNAMIC SIMULATION OF THE MT. VERNON WWT FACILITY USING GPS-X

CLIENT: GE Plastics Corporation

LOCATION: Mt. Vernon Facility

PROJECT DESCRIPTION

Hydromantis, Inc. applied the General Purpose Simulator (GPS-X), a dynamic simulation package, to the Mt. Vernon WWTP of GE Plastics (GEP). The Mt. Vernon treatment process is a combined physical/chemical and biological system. Flow enters the wastewater treatment process from several manufacturing areas including LEXAN resin and processing, the chlor-alkali facility, sheet products, ULTEM, and VALOX.

The objective of this project was to provide this facility with an operator-friendly plant simulation package (Scenario Manager) to:

- Provide predictive analyses for plant operation
- Assist in plant optimization for more efficient operation and treatment
- Help GEP meet effluent compliance limits
- Provide a platform for analysis of "what-if" scenarios

The Scenario Manager model package has been successfully implemented at other industrial WWTPs. The simulation tool provides the wastewater treatment plant operators and engineers with an information package to support the efficient operation of the plant. **The operators at Mt. Vernon will use the Scenario Manager to assist with management of daily operations** including spill tank pumping, biomass inventory and wasting, hydraulic loading, tank bypass, and powdered activated carbon dosage.

(over)



RESULTS

∅ Analysis of various operating scenarios completed

Several operating scenarios were analyzed during this project and customized in the simulation tool. Examples of these scenarios are:

- **PAC Addition:** Optimization of addition of powdered activated carbon for specific chemical removal
- **Shutdown:** Impact of full or partial production shutdown on the treatment process
- **Chemical Spill:** Impact of high specific chemical concentrations from the holding tanks
- **Storm Flow:** Excessive hydraulic loading to the facility
- **Sludge Management:** Management of sludge wasting and solids retention time (SRT)
- **Temperature:** Operation of the equalization basins with and without coolers
- **Tankage Downtime:** Impact of offline treatment process units
- **Conductivity:** Effect of conductivity on settling quality and biological activity (conductivity module)

∅ Respirometry data used to determine kinetic coefficients

Multiple chemicals from various process effluents enter the treatment system at any given time. Before initiating this project, the kinetics of the removal processes for these chemicals were unknown. **Respirometric experiments using an on-line respirometer were conducted** by GEP personnel. Hydromantis provided technical support for the design of these experiments and **analyzed the respirometry data to extract the kinetic coefficients required to calibrate the model for the removal of specific chemicals.**

