

**CLIENT:** Toyota Industrial Equipment Manufacturing (TIEM)  
Wastewater Treatment Plant (WWTP)



**BACKGROUND:**

The Toyota Industrial Equipment Manufacturing (TIEM) Plant in Columbus, Indiana manufactures industrial fork lifts. The ferrous metal finishing, phosphatizing and painting operations yield wastewater with high metals concentration.

**Complete Water Services (CWS) was retained to increase the capacity and effectiveness of the plant's WWTP.**



**PROJECT REQUIREMENTS:**

- Double the capacity of existing system to 86,400 gpd
- Reuse as much of existing system hardware as possible
- Design/Build system with small footprint (40' x 45')
- Improve stability, efficiency, ease of operation and maintenance
- Effectively treat a wide range of contaminants
- Increase capacity to treat surges of contaminant volume and concentration
- Return as much treated water as possible to the plant for process water
- Aggressive schedule, coincident with planned plant maintenance shutdowns
- Tight budget

**TIEM agreed with CWS' proposal of a cost-saving two phased approach.**

**Phase I**

- Flow equalization
- pH neutralization
- Chemical flocculation/ coagulation
- Clarification
- Sludge de-watering
- 40% of original treatment plant equipment was reused
- During the scheduled 5 day plant shutdown, equipment from the original plant was disassembled, moved and incorporated into the new WWTP. Final tie-ins were made, and the new WWTP was operational before the manufacturing plant went back online.

**Phase II**

- Ultrafiltration
- Reverse Osmosis
- More than 90% of treated water to be recycled into the plant
- Treated water will exceed TIEM's stringent purity requirements for final-rinse process water
- As with Phase I, the WWTP will be designed to allow all modifications, final tie-ins and start-up to be completed during scheduled plant shut-down

- Design maximized use of existing equipment
- Bought on-line with no interruption of manufacturing



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