

WATER TREATMENT PLANT OPERATIONS MODEL

WATER
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Blue Plan-it® WTP Operations Simulator

Operations Guidance Tool for WTP

Building on the powerful platform of Blue Plan-it® Decision Support System, the WTP Operations Model is useful tool for water treatment plant managers and operators. On one hand, this tool can be used as a great communication tool in a decision support workshop to allow the managers, operators and engineers to **virtually experiment** their facility and understand the impacts of design and operation decisions before implementing them. On the other hand, it offers a simple-to-follow **training tool** for the operators on a day-to-day basis.

The model can be customized with several process flow diagrams in a style similar to SCADA (e.g., an overview, liquid streams, solid streams, more detailed process areas), several useful summary or detail dashboards (e.g., for O&M costs, chemical usage, power consumption, water quality, compliance, warning logs, or info on each individual unit operation). Using the built-in scenario manager, users

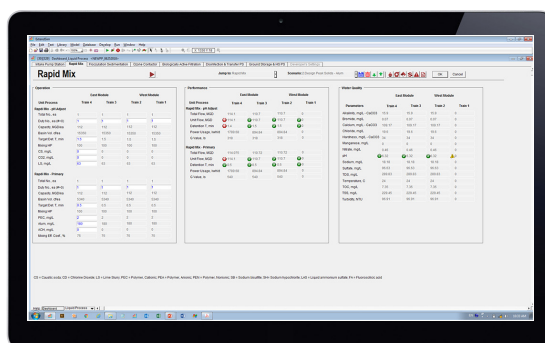
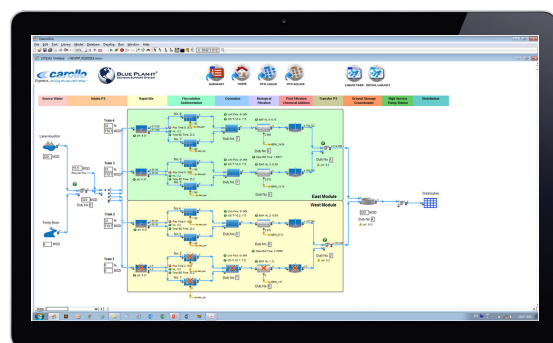
can create and manage reports to assess a wide range of flow and water quality (e.g., turbidity, TSS, DOC, etc.) conditions. User can turn on and off optional process components to evaluate and optimize operation strategies (e.g., put one or more trains offline, change blowdown or backwash schedule, adjust chemical doses, turn on and off existing or proposed unit process).

An Operations Simulator for WTP Operators

The Blue Plan-it® Operations Simulator is a standalone desktop app for operators to explore the cause and effects of changes to unit processes virtually. For example, operators can conduct a "what-if" analysis to see how the raw water turbidity and DOC and chemical doses impact product water quality and solids production, or how chlorine dose, temperature, and pH impacts the DBPs. This enhances water treatment process knowledge by allowing operators to explore complex relationships among various operational parameters. In this way, it offers a dynamic troubleshooting guide and an easy-to-follow standard operating procedure (SOP). The tool can assist the communication between managers and operators. It tracks warning logs and generates a list of notes to inform the operator the actions to take when a given warning is triggered. Different user rights can be assigned to managers and operators to allow convenient updates of the notes to capture institutional knowledge.



BLUE PLAN-IT®
OPERATIONS SIMULATOR



Blue Plan-it® Operations Simulator allows managers and operators to virtually experiment the performance of their facilities before implementing design and operational changes.

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Key Functionalities

Modeling algorithms for a wide variety of treatment processes have been integrated into the Blue Plan-it® Operations Simulator. It can be quickly customized to match the situation at a WTP facility.

Disinfection and DBP Compliance

- Predict disinfectant decay rate and DBP formation within the treatment plant and in the distribution system. Calculate CT credits to assist the utilities to determine the best way to meet CT.
- Model reactions of ozone, chlorine dioxide, chlorine, and chloramine with natural organic matter (NOM), and bromide under various pH and temperature using both kinetic and empirical equations.
- Simulate the formation of a wide range of DBPs including TTHMs, HAAs, Bromate, and Chlorite.
- Perform interactive alternative evaluation by individual unit processes such as PAC, Chlorine Dioxide, Enhanced Coagulation, GAC, UV, UV AOP, aeration, booster chlorination, etc.

Residuals Handling

- Track whole plant water and solids mass balance.
- Predict Unit Solids Production Rate (USPR) based on raw water quality (turbidity, TSS and TOC), and chemical doses (coagulants, polymers, PAC, lime, etc.).
- Assess blowdown schedule (% solids, flow, timer on and off schedule) and backwash cycle (high rate, low rate, air scouring, flow-to-waste, rinse-to-waste).
- Calculate Unit Filter Run Volume (UFRV) and other process control parameters.
- Determine performance of thickener, clarifier, and drying beds.
- Estimate mechanical dewatering operation time, truck traffic and O&M costs.

Corrosion and Stability

- Track pH, alkalinity, acidity and 13 corrosion and stability indices such as LSI, CCP, etc.
- Determine blending and chemical addition strategies to mitigate corrosivity and stability concerns for treated water at the water treatment plant and in the distribution system.
- Interact with hydraulic model (e.g., InfoWater, WaterGEM) to determine the water quality in the distribution system.

Other Functionalities

- Track chemical usage, power consumption, solids handling, labor, and other O&M costs.
- Generate PDF and Excel reports of model scenarios.
- Generate customizable reports and dashboards for CT calculation, TTHM process control sheet and solids mass balance.
- Organize operations data in one central database.
- Import data from external database, Excel or CSV files.
- Generate warning logs. Present an interactive SOP and trouble shooting guide.
- Use animated control to turn on and off existing and proposed trains and unit process.

Client Testimonial

"Carollo introduced us to Blue Plan-it® when we were discussing solids handling for our 320-mgd NEWPP expansion project. The BPI model combined easy-to-understand visual graphics with a computational engine running real time in the background. This allowed the City to quickly understand all of Carollo's assumptions and instantly showed us the impacts of changing a variety of inputs and operational constraints. The result was an incredibly powerful tool that helped us better understand cause and effect relationships throughout the WTP, which resulted in one of the most productive meetings that we had on the project. I highly recommend the use of BPI and have requested this tool to be incorporated not only into the expansion but retrofitted for the existing 80-mgd plant."

*— Drew Molly, Assistant Director,
Drinking Water Operations,
City of Houston, Texas*