# MODELING CORROSIVITY/STABILITY

## Water Treatment Plant and Distribution System Water Quality Modeling (Part I)

### **Corrosion and Stability Tool**

The Blue Plan-it<sup>®</sup> (BPI) corrosion and stability tool (available in desktop and web app versions) assists users in analyzing the chemical compositions of existing or future surface and groundwater sources and assessing corrosivity and stability under various blending conditions. Its technical features:

- Track flows and relevant water quality parameters such as alkalinity, acidity, pH, sulfate, chloride, hardness, temperature, total dissolved solids (TDS), etc. for each water source or any blends.
- Calculate eight corrosion and stability indices, including Langelier Saturation Index (LSI), Larson Index (LI), Ryznar stability Index (RI), Aggressive Index (AI), Driving Force Index (DFI), Momentary Excess Index (ME), the calcium carbonate precipitation potential (CCPP), and Chloride-to-sulfate Mass Ratio (CSMR).
- Calculate the effect of more than 20 common water treatment chemicals (e.g., acids, bases, disinfectants, coagulants) on water quality, corrosion and stability.
- 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.
- Perform steady state and dynamic blending analysis, sensitivity analysis, optimization, Monte Carlo simulation, etc.
- Uses water quality modeling in conjunction, or integrated seamlessly, with hydraulic models such as EPA Net, InfoWater, Optimatics, CityWater, etc. The resultant distribution system water quality could be presented using GIS.

• Evaluate alternative schemes for optimizing water quality while minimizing chemical usages and system wide life cycle costs.



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#### Corrosion and Stability Decision Tree

The BPI® corrosion and stability tool utilizes a group of useful water quality indices to determine the corrosive nature and scaling potential of the assessed water systems. It generates a dynamic decision tree for evaluating over five types of analysis on water corrosivity/stability, including:

- Carbonate chemistry related corrosion and scaling.
- Sulfate and chloride related corrosion.
- Asbestos-cement piping related corrosion.
- Corrosion products on unlined and galvanized iron pipes (e.g., red water events).
- Galvanic corrosion of lead solder connected to copper pipe.



#### Blue Plan-it<sup>®</sup> Web App and Dashboard Tools

Combining contemporary and friendly interface with proven water chemistry algorithms, the BPI® corrosion and stability tools can be accessed on desktop or through a web-based app. Users can perform analysis online and export results into Excel or PDF files. Using friendly dashboards users can view modeling results and identify areas that are adversely impacted by introducing new water sources and measures required to improve water quality (e.g., blending, chemical addition, flushing, etc.).



Blue Plan-it<sup>®</sup> used in conjunction with InfoWater Hydraulic Model predicts multiple corrosion and stability indices in the distribution system.

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