

Software for Drinking Water & Wastewater System Reliability (OTT ID 1491/1531)

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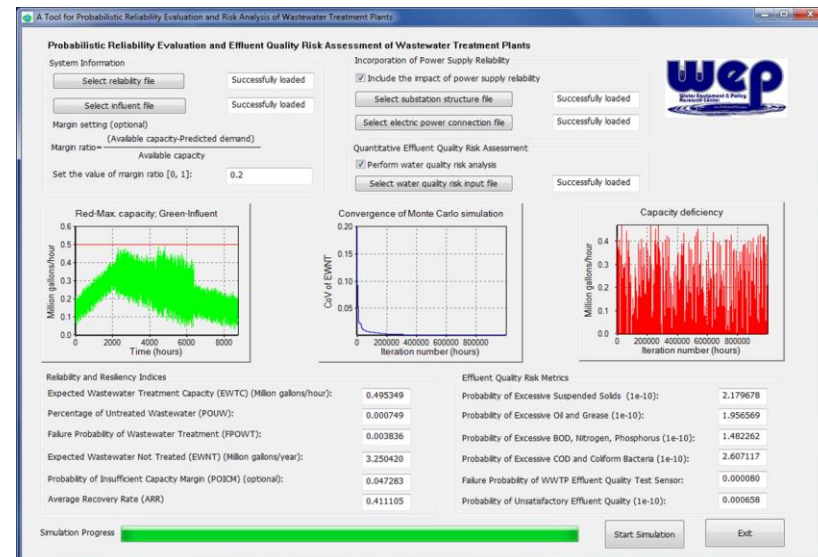
RELIABILITY

- ❑ Drinking water and wastewater treatment plants (WWTPs) are inadequate when it comes to quantitatively assessing reliability of the facility infrastructure
- ❑ There is a need to develop a comprehensive method to assess variables and uncertainties such as:
 - Random failures of mechanical components
 - The amount of influent
 - Power supply reliability
 - Biological risk analysis
 - Cyber attacks
- ❑ Many facilities are aging and are in need of expensive repairs

- ❑ Easy to use software and proprietary algorithms which aim to provide comprehensive decision support tools for evaluating the reliability of municipal water/wastewater systems
- ❑ Ability to guide cost-effective preventative measures before system failures
- ❑ Aid in making informed decisions on infrastructure repair, maintenance, and staffing when budgets are limited

Areas assessed

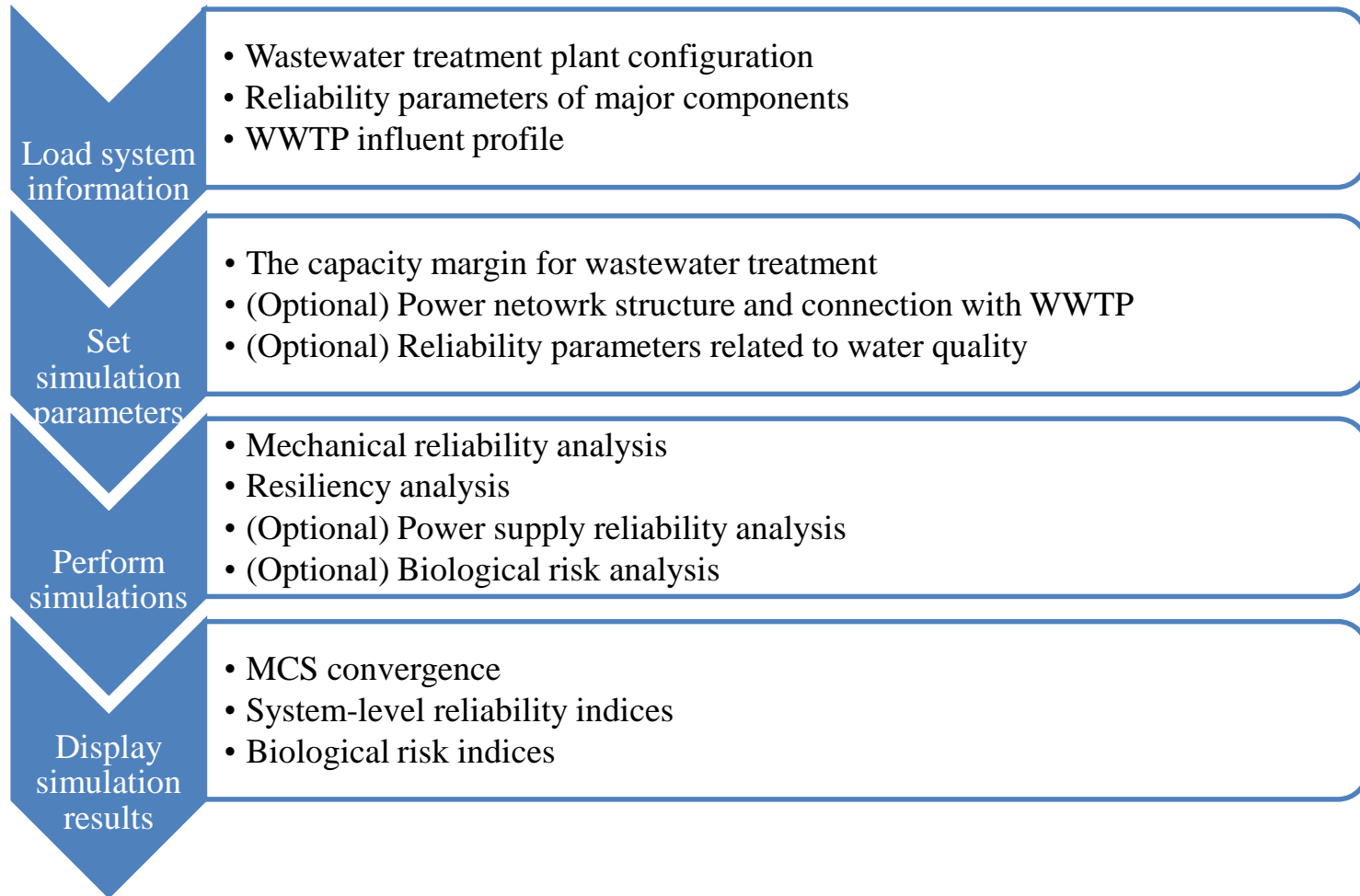
- ❑ Reliability evaluation
- ❑ Impact of power supply reliability
- ❑ Effluent quality risk analysis



- Copyrighted Software and user interface
- Proprietary algorithms

Current Status

- Technology is available for licensing under exclusive or non-exclusive terms
- Looking for a development partner to aid in the evaluation and testing



Input Files Needed

- ❑ For probabilistic reliability evaluation
 - The WWTP influent input file (the amount of wastewater needing to be treated in the WWTP)
 - The WWTP reliability data input file (the reliability data of each WWTP component)
- ❑ For incorporating the power supply reliability evaluation
 - The power supply system structure input file (the topological structure of the power supply system)
 - The electric power connection input file (the connection between the power supply system and the WWTP facilities)
- ❑ For quantitative effluent quality risk assessment
 - The effluent quality risk input file (the failure probability of each basic event)

- ❑ Comprehensive, quantitative reliability/adequacy assessment of WWTP facilities accounting for uncertain factors;
- ❑ At the component level, knowledge of the equipment failure rates can provide insight into deciding spare parts inventories;
- ❑ At the system level, the tool can help refine overall future maintenance schedule/budget and staffing projections

- ❑ Cyber contingencies/failures/intrusions
 - Analyze how the WWTP cyber network (SCADA) may fail or malfunction
 - Integrate its impact into the fault tree analysis
- ❑ System Resiliency during extreme events
 - Extreme weather
 - Insider attacks
 - Physical attacks
 - Operator errors, etc.
- ❑ Improved usability/software compatibility



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