



## Operations Challenge 2025

The Water Environment Federation's Operations Challenge is the industry's premier professional skills competition. Held annually at WEFTEC, the event recognizes excellence in wastewater operations. Teams are evaluated in five events that demonstrate the span of skills necessary for contemporary water quality professionals. The event exposes participants to emerging practices and products in a competitive, educational, and social atmosphere. More than 50 teams will participate and must be endorsed by their Member Association. The two-day event takes place Monday and Tuesday during conference.

### **Monday, September 29**

8:30 - 9:30 am Pre-competition meeting

Competition protocols are reviewed.

#### **10-11:00 am Process Control event**

The Process Control event will be held Monday morning and will consist of a written test and a scored computer simulation, using the OpTool created by Hydromantis. Teams will try to earn as many points as possible in the time allowed. Points will be awarded for correct answers in the written test, and for achieving goals in the computer simulation.

The test content and layout will be essentially unchanged from previous years. Test questions containing math or process data will have both English and metric units listed allowing teams to work a problem in whatever units they desire. The event consists of answering a number of multiple choice questions, some short math questions with multiple choice answers, and up to five operational type scenarios that have four to six questions each that may require considerable calculations. The event is timed, with a total of 25 minutes. The team can split up the test any way it chooses during the test. The team that scores the most points for correct answers will win. The event should be viewed as an opportunity for a team to demonstrate their accumulated knowledge of wastewater treatment and skills in plant process control.

Time is an important factor in taking the test. The total time available for each team for all portions of the test event is 25 minutes. The first portion of the test is a five minute test preview period. The second is 20 minutes for answering the questions.

## **10:30 am – 4:30 pm Laboratory event**

Teams will analyze and determine total suspended solids, conductivity / TDS and perform solids mass balance procedures across a treatment system. Laboratory data lets the operator know how efficiently the plant is running and helps predict and prevent troubles that may be developing within the various processes. Laboratory results are required as a record of performance for regulatory agencies and are of value to the operations staff and design engineers for performance optimization, troubleshooting, determination of loadings, and for determining when plant expansions are necessary. For these reasons, laboratory tests should be conducted as carefully and consistently as possible and according to appropriate analytical methods.

The total suspended solids (TSS) test is one of the most important process control and regulatory tests the operator / analyst can run. The results of the test can be used to estimate process loadings to treatment plants as a whole and the efficiency of various processes throughout the plant; calculate the mean cell residence time (MCRT) or sludge age; and determine the sludge wasting rate, loadings to solids handling processes, and removal and capture efficiency of solids handling processes. The TSS test result is also needed to calculate the sludge volume index (SVI).

Samples can be collected in glass or plastic bottles. The samples may be refrigerated at  $< 6^{\circ}\text{C}$  until they are ready for analysis with the samples being brought to room temperature just before analysis. Prewashing of the filter papers is required for TSS analysis to remove loose filter material to obtain accurate and precise results. For the purpose of this event, the teams will assume that this prewashing step is already complete. Team members will be required to analyze samples representing a normal treatment process including influent, effluent and intermediate process samples for total suspended solids (gravimetric method) and TDS after calibration of YSI Xylem MultiLab Meter based on conductivity as well as calculate a mass balance across the treatment system to evaluate the removal efficiency of various treatment trains and other data related to solids. Finally, penalties referenced on the Lab Event Judges Sheets are incorporated by reference into this document. Any discrepancies in language will be resolved by the judging team.

## **Tuesday, September 29<sup>th</sup>**

Tuesday's events will take place simultaneously. Beginning at 9:00 am, teams will complete the collections, maintenance, and safety events. The competition will conclude at 4:30 pm.

### **Collections event**

Teams will remove a section of in-service 8" gravity polyvinyl chloride pipe, fabricate a replacement section with a 4 1/2" compression fitting, and install the replacement section with flexible repair couplings. They will simultaneously construct a Victaulic valve tower, using a combination of hand tools and impact guns. Following completion of the physical repair activities, the integrity of the repair will be evaluated.

## **Maintenance event**

The purpose of this event is to test the skills of a maintenance team in response to issues at a sanitary pumping station.

This pumping station is in a district that has many restaurants and businesses. While the city has an ordinance dis-allowing industrial waste discharges, its restaurant grease trap program has been sub-par at best. This district service area has been very problematic over the years with many SSO's that were not rain related but countless ragging/debris issues creating pump clogs and line blockages. The high cost of station cleaning and line maintenance has prompted city management to act. Recently, the city had initiated a new CMOM Capital Improvement Project. A portion of the CIP is to develop a program to reduce or eliminate "rags" that are problematic to the pumping and collection system. As a result of the CMOM study, it was determined by the asset class engineer to install Vaughan Chopper conditioning pumps to help eliminate SSO's and future blockages. However, as with any wastewater application, there are many variables to operating an efficient collection system that must be addressed including but not limited to FOG (Fats, Oils and Grease), wet wipes and other various debris. The new management has just recently created a grease trap program to address these issues, however, these programs take time due to budget schedules, implementation, and training.

A pump station team has received high level alarms via telemetry in the problematic service district. The high-level alarms have been cleared and acknowledged several times. The SCADA trends show that the pumps are cycling as programmed but continue to hit the high-level set-point alarm (level sensor activated). It is also confirmed that the station has yet to receive the high, high level back-up float so visual and audible alarms were not activated. The early morning plan was to not only mitigate the alarming issue but perform a full service of the station and its control panel. All the results from the service would then be documented in CMMS.

Upon arrival to the pumping station, it was determined that there was an abnormal amount of build-up just below the level sensor in the neutral corner of the wet well. The wet well pumps and conditioning pump appeared to be operating well but adjustment/direction of the conditioning pump was going to be required. Since a full service was going to be performed anyway as a preventive measure, the impeller, corroded hardware, and pump nozzle were to be replaced along with the pump re-positioning.

Teams will have a 5 minute setup time for this event. They may move things on the table as desired and set up the tool box as desired. However all the tools in the tool box must start in the tool box and all tools/equipment on the table must start on the table, the only exception are the new impeller bolt and washer and the four new volute bolts. The only items that may be moved or touched during the 5 minute setup are the tool box, tools, and equipment on the starting table. The hoist, trolley, and gantry may be situated during the 5 minute setup however all pins must remain in. Hoist, trolley, and gantry must start and finish in the designated marked areas. All tools and equipment must start and end on the equipment/tool table. Installation of the rubber gasket for the new guide claw during the 5 minute setup time is not permitted. The pump service table and the equipment/tool table may not be moved.

**Safety event**

Teams will respond to a report of an unconscious colleague in a manhole. After testing the atmosphere and ventilating the confined space, they will assemble fall-protection equipment and enter the confined space to retrieve the victim. The entrants will also isolate two gate valves and repair a defective check valve. After rescue the victim will be revived and moved to a decontamination shower. A team member will simultaneously complete a virtual reality confined space procedures exercise.