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## Virtual Witness Testing

The Lubbock facility of **Goulds Water Technology™** has now developed a new testing protocol termed a “Virtual Witness Test”. This new protocol represents an exciting expansion to the facility’s existing testing capabilities and greatly expands the potential for a participatory examination of our finished products by our customers prior to shipment of the product.

### What is it?

Virtual Witness Testing is a web-based witness of the testing activities. It combines real-time digital read-outs of the facility’s Data Acquisition system, two (2) user-controlled cameras; one in the testing area, and one within the test control area; each with zoom and pan capabilities, and a dedicated Test Lab Engineer for the duration of the test.

### Why use a Virtual Witness Test?

The gold standard for factory testing has always been a witness test at the production facility. These types of tests may include multiple parties or possibly a registered professional engineer. While this type of testing is still available, participating in a Virtual Witness Test can have the following additional benefits:

- Eliminates need to coordinate travel schedules of participants.
- To meet project deadlines.
- Eliminates travel restrictions associated with budgetary constraints or problems with visas.
- Provides a more economical solution when multiple witnesses are desired.

### How is it done?

Virtual Witness Testing is accomplished through the use of a web-based meeting session. Once a Virtual Witness Test has been scheduled by the facility, log-in information, as well as a copy of the facility’s agreed-upon Test Plan, will be forwarded to the customer of record. At a minimum the Test Plan will include the following:

- Design conditions
- Additional measured flow points
- Measurement instruments, including last calibration date
- List of test fixtures utilized.
- Specified fluid properties
- Test speed
- Test points

This is a web-based function, so the location of the participants is not an issue. Additional participants may be added by the customer of record as may be required. Participants can view the same test from different continents simultaneously.

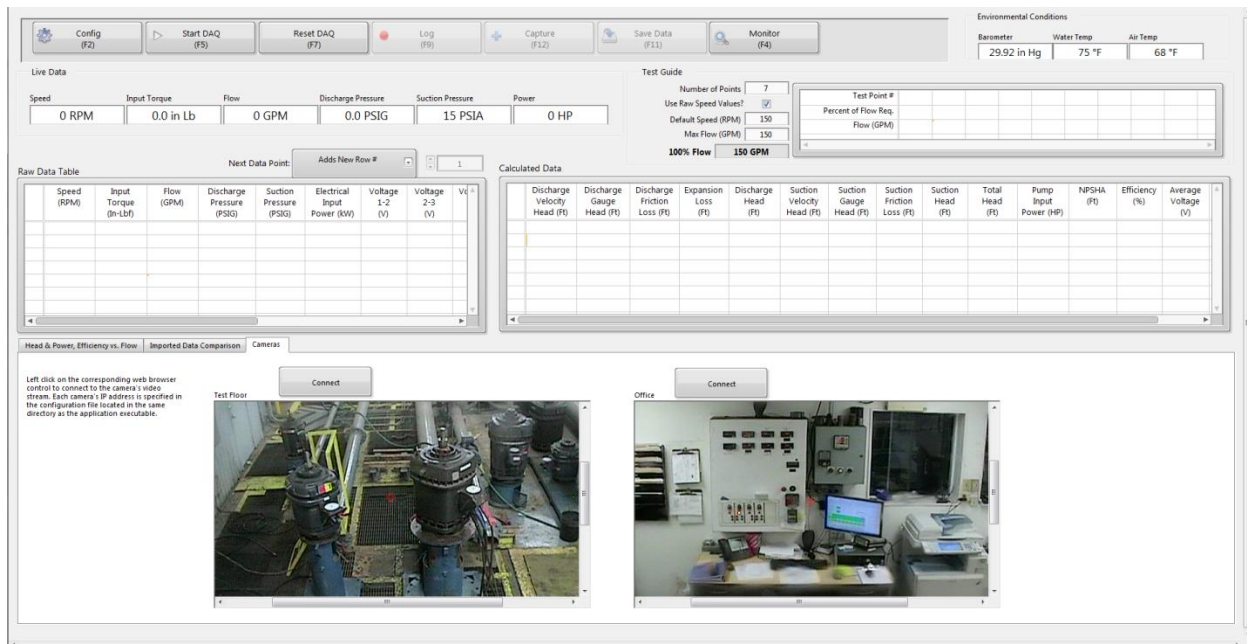
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### What is the User Experience?

The Test Lab Engineer will guide the test and provide verbal cues. The test dashboard will be similar to that shown below. Participants will be able to see the data tables being populated in real-time, as well as observing the physical test being performed via the two (2) controlled cameras. When directed by the participants, the Test Lab Engineer will change the focus and/or zoom of either of the cameras; allowing the participants to view pressure gauge dials, or any other instrument used in the lab.



The screenshot shows a software interface for a pump test. At the top, there are control buttons: Config (F2), Start DAQ (F3), Reset DAQ (F7), Log (F9), Capture (F12), Save Data (F11), and Monitor (F4). Environmental conditions are displayed: Barometer (29.92 in Hg), Water Temp (75 °F), and Air Temp (68 °F). Live data is shown in a row: Speed (0 RPM), Input Torque (0.0 in Lb), Flow (0 GPM), Discharge Pressure (0.0 PSIG), Suction Pressure (15 PSIA), and Power (0 HP). A Test Guide section includes: Number of Points (7), Use Raw Speed Values? (checked), Default Speed (RPM) (150), and Max Flow (GPM) (150). Below this are two data tables: 'Raw Data Table' and 'Calculated Data'. The 'Raw Data Table' has columns for Speed (RPM), Input Torque (In-Lb), Flow (GPM), Discharge Pressure (PSIG), Suction Pressure (PSIG), Electrical Input Power (KW), Voltage 1-2 (V), Voltage 2-3 (V), and Voltage V. The 'Calculated Data' table has columns for Discharge Velocity Head (ft), Discharge Gauge Head (ft), Discharge Friction Loss (ft), Expansion Loss (ft), Discharge Head (ft), Suction Velocity Head (ft), Suction Gauge Head (ft), Suction Friction Loss (ft), Suction Head (ft), Total Head (ft), Pump Input Power (HP), NPSHA (ft), Efficiency (%), and Average Voltage (V). At the bottom, there are two camera feeds labeled 'Test Floor' and 'Office', each with a 'Connect' button. A small text box on the left of the camera feeds reads: 'Left click on the corresponding web browser control to connect to the camera's video stream. Each camera's IP address is specified in the configuration file located in the same directory as the application executable.'

If agreed upon in advance, a staff Professional Engineer can be present to oversee the test. If desired, control of the cameras may be surrendered to any of the participants in order to view the testing operation at their leisure.

### What test reports will be received?

Upon completion of the test, a pair of results pages will be generated and distributed prior to concluding the interactive web session. These documents will include the following:

- Specified design conditions
- Performance curves for head, power, and efficiency.
- Performance data table.

If it is agreed to in advance, the results can also receive the Professional Engineer seal from the state of Texas.

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