AQUANTIFY: ENABLING EFFICIENT RECORDING AND REPORTING OF PLANT PERFORMANCE AND WATER QUALITY

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AQUANTIFY: ENABLING EFFICIENT RECORDING AND REPORTING OF PLANT PERFORMANCE AND WATER QUALITY

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ABSTRACT

The water industry has lacked a system for recording plant performance data conducted and water quality sampled by Operators. Ten years ago Wannon Water and Goulburn Valley Water combined to address this issue, however the vendor was based overseas, the system was quite complex and the lack of sufficient resources by both water corporations meant the technology was outdated before the system was fully built. Fast forward to 2011 – Wannon Water and Goulburn Valley employed the services of a Victorian company to deliver a modern, industry specific system. In 2013, that system has arrived!

Aquantify has the user in mind at every step. With the Operator being the primary user, the aim was to make it as quick and easy as filling in a log sheet, but with so much more. Examples of data captured:
  - External laboratory data
  - Meter reads and calculated volumes
  - In-house water quality data such as turbidity, colour, iron and pH at various process stages
  - Various WRP operational data
  - Winter storage levels, rainfall data, visual inspections and irrigation volumes
  - Safety shower/integrity/ security checks, generator start-ups
  - Instrument cleaning and calibrating

The system is easy to assemble in design and very flexible in its arrangement, so additions or changes to plants can be easily added or altered.

1.0   INTRODUCTION

Nine years ago I began my career in the water industry. Right from that first day I realised there was so much more to the industry than I had imagined. Thankfully for the first weeks I had someone there to show me the basics of how the water treatment plants and wastewater plants operated. Within a few weeks I could remember the timing and sequence to backwash the filters, find all the meters that needed reading around the traps, remember the order for grabbing mixed liquor samples for the wastewater treatment tanks and I could do some basic navigation through the SCADA screens to look at current reads and trends – although it took years to understand what some trends meant! All was good when things were going well and if they weren't there were alarms and there were the SCADA trends to help.

As time went on, I wanted to understand more about how the plants worked and how to optimise them rather than just doing the regular day-to-day. Optimising plants often required using data that wasn't online and therefore not on SCADA, so manually typing weeks or months of log sheet data into spread sheets was the only way to do it. There had to be a better way...

2.0   DISCUSSION

2.1   The Focus and Features Aquantify Offers Operators

Understanding the Operator needs has been the focus.

1. **Operators dislike time wasting.** When the Operator clicks on the *Aquantify* icon, there is no password pop up, the system recognises that the user has already entered a password to operate the computer and that person is the user of the program. Data entry is quick and easy.
2. **The Operator only wants what they need.** The Operator simply chooses which site they would like and the data required to be entered for the day appears. This is all done behind the scenes using a schedule created by log sheet administrators. The schedule can be changed in real time (on the spot) if additional data is required or if some data is not required.
3. **Flexibility for different users**. Operators can choose the order of how the tests appear, so they can enter the information in the order *they* collect it.

What features are helpful for the Operator?

1. **Graphing trends**. When an Operator clicks on a test, two graphs for that test appear (Figure 1). One is a graph and one is a timeline. The timeline has a slider that the Operator can move to see the entire history of data entered. There is also a box around the data which is represented on the graph and you can move the box to have historical data appear on the graph if detail is needed.
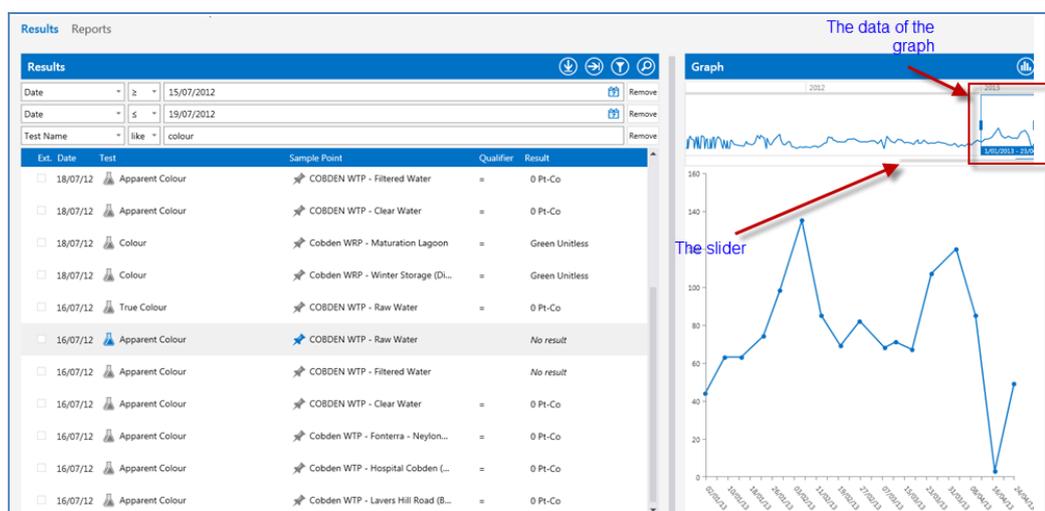
Figure 1:   *The Aquanitfy data entry screen*

The timeline gives the Operator much more information than the graph, for example Figure 2 shows the graph is fairly constant data with a few spikes, whereas the timeline shows an increase over time. This increase might be due to seasonal variation or a subtle process failing. This graph is of apparent colour for raw water. The Operator *could* use the slider to go back to when the levels were this high in the past and then look at the coagulant dosing for the same time period to see what dose rate was used in the past as a response to the increase in colour. Having this operational data at hand could be a very quick aid to help alter plant operation.
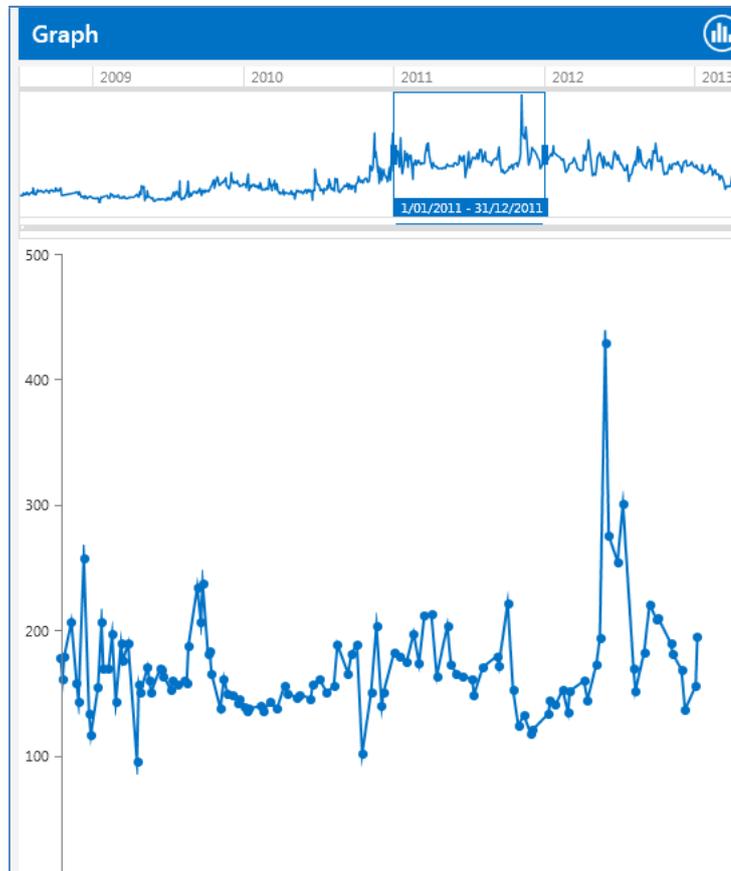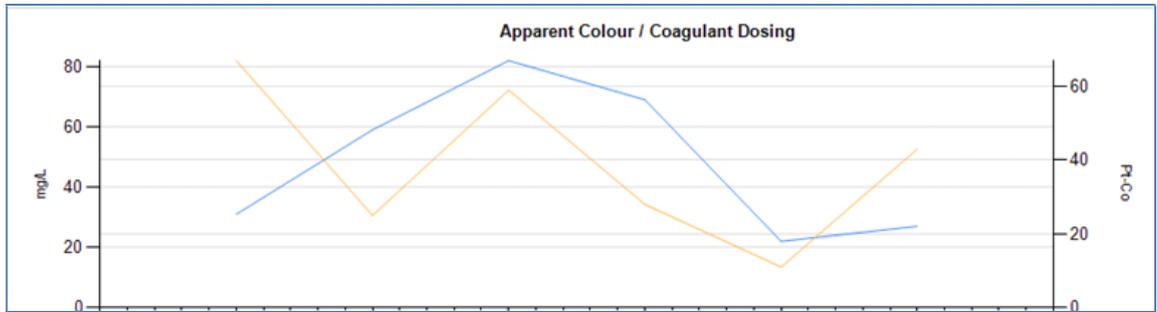
Figure 2: *Viewing long term trends using the panoramic view*

Long term improvements in plant performance can also be seen with the graphs. Figure 3 shows the long term improvement in colour removal from a clarifier. This very quickly confirms an operational change success or failure.


Figure 3: *Graphs can show improved operational performance over time*

What if an Operator wanted to graph more than one parameter at a time? The reporting tool is simple, yet powerful. Report templates can be quickly created. When selected, a report template will quickly produce a table and graph (Figure 4). The Operator then uses this template each time they want to view this information. The data presented can be modified by the Operator, for example the date range, or sample points can be modified.

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Figure 4: *Example of how reports can be created with multiple parameters*

2. **Adding and viewing comments.** Comments can be added to any data entry (Figure 5). If a comment is added to a test, it is clearly visible by a speech bubble (Figure 6). An Operator can hover the mouse over the speech bubble to read the comment. Comments can be easily added to any report if required.
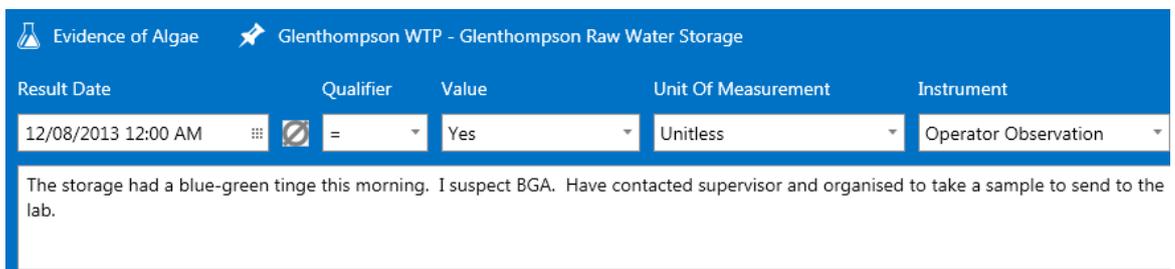

Figure 5: **Comments are added by the operator**
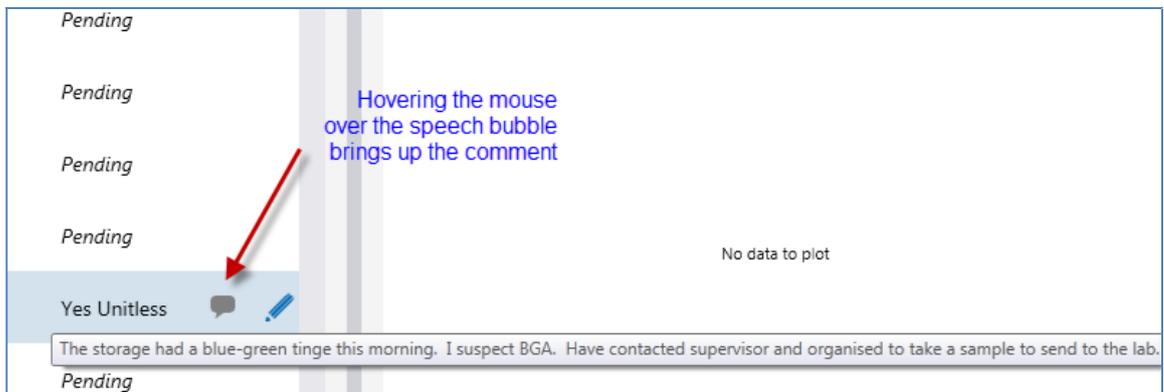
Figure 6: *Viewing comments on the data entry screen by hovering over the icon*

3. **Limits on test results.** Alert and maximum limits can be placed on any test. When a limit is breached a pop up appears (Figure 7) and the Operator enters comments. The comments can then be automatically emailed to a pre-determined list of relevant people.
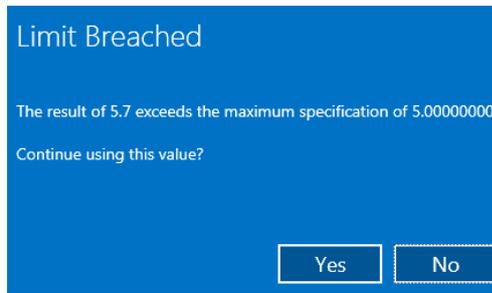
Figure 7: **Pop ups appear for the operator when a limit is exceeded**

What about having operational limits on the tests that don't have online monitoring, so that you can easily detect that the plant is not running the way it should? When setting up limits they can be named as operational or something else (such as HACCP).

4. **Calculations.** Flow volumes, dose rates, mixed liquor suspended solids, sludge age, etc. can all be calculated from the data entered by the Operator. The functionality of calculations is very similar to *Excel* spread sheets. A calculator icon appears beside all tests which are calculated (Figure 8). Results for calculations appear automatically when all the data relating to them has been entered.

**Figure 8:** *The calculator icon appears next to tests that are calculated results*

5. **Entering data using drop-down lists.** Data entry can be via pre-selected drop down options. Operational checks such as security checks, visual inspections, calibrations etc. can be added, the Operator chooses their response from a dropdown list (Figure 9).


Figure 9: *Drop down options can be used*

6. **Viewing external laboratory data.** Aquantify also houses external laboratory data, which is imported into the system. This allows for comparison of in-house testing results with external laboratory results.

External data is easily distinguishable from in-house data by the external "dot" (Figure 10). An operator can filter this data in or out (Figure 11). This data can be easily added into reports if required.
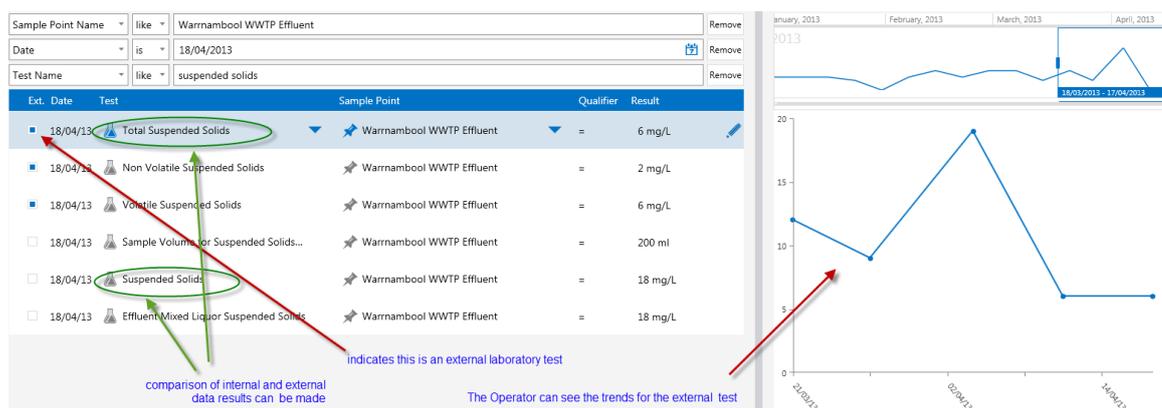
Figure 10: *External laboratory data can be easily identified and comparisons can be made with in-house data*
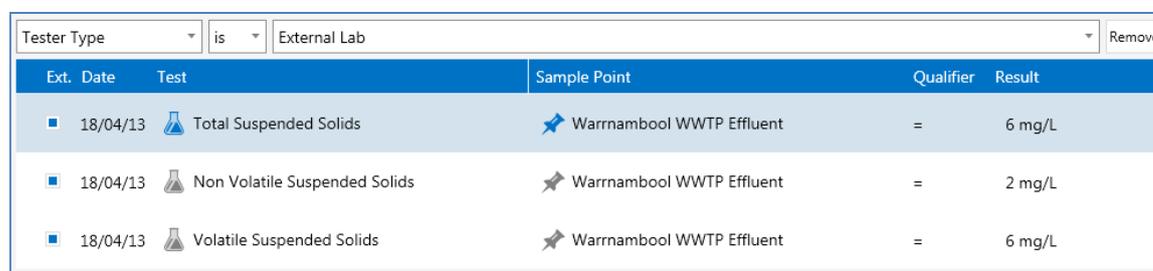
Figure 11: *An operator can add a filter to only see external lab data (or only internal data)*

3.0   CONCLUSIONS

I've given you a glimpse of how Aquantify can benefit you as an Operator. Having lots of data at your fingertips, makes plant control and improvement in plant performance a much easier task. After years in the water industry I believe I have found a better way, offering maximised and optimised plant control in an efficient and reliable way.