TECHNOLOGY ADVANCEMENTS IMPROVING REAL TIME **SPECTRAL ANALYSIS**

Real time spectrophotometers offer the immediate detection capability of a wide range of important and emerging contaminants of concern

There is an increasing shift from relying on time consuming, traditional water quality analysis in the lab environment, towards real time continuous monitoring. This is due to the benefits real time monitoring provides through the early and rapid detection of contamination and from the timely detection of changes in a process allowing for fast corrective action. However, there are a number of inherent challenges that are faced when taking traditional lab analysis to the plant, process or distribution system environment.

Optical measurement of water quality through use of spectral analysis with a spectrophotometer is one such measurement technique that offers numerous benefits when performed in real time rather than in the traditional lab. Real time spectrophotometers offer the immediate detection capability of a wide range of important and emerging contaminants of concern including nitrates, TOC/UV254, turbidity, pesticides, diesel fuel and many other chemical contaminants all from one analyzer. The data redundancy provided by real time spectrophotometry measurements allows complex statistical analysis techniques, commonly referred to as chemometrics, to be used to extract surprising amounts of information from the absorbance spectrum which can determine the quantities of different chemicals present in the water. This type of information can be invaluable for process control applications and for monitoring the levels of certain chemical contaminants in water.

Generally, spectrophotometric analysis relies on the use of various light sources for shining light across either the UV, visible, or infrared (IR) light spectrum. For UV, visible and near IR (NIR) light a dispersive element such as a diffraction grating is then used to disperse and resolve the light into substantially individual wavelengths. These individual wavelengths are then detected and measured using a variety of sensor technologies. This however presents inherent problems since the light sources and sensors utilized in these systems can fluctuate and drift causing inaccuracies. In the lab environment these inaccuracies can be more easily reduced than in a real

time analyzer by ensuring frequent recalibration of the instrument before performing each test. However doing this in the field on a real time basis is very impractical making real time spectrophotometer reliability a challenge. Refer to Figure 1 for an illustration of how lamp output fluctuations and drift can affect instrument accuracy.

Therefore traditional methods of compensating for these inherent issues have been implemented with varying degrees of success, such as the use of the dual beam method and a second reference sensor. These methods however, all lead to increased optical components and corresponding cost as well as increased complexity and further inaccuracies. These methods also cause problems with light throughput making detection in high purity waters much more difficult due to resulting limitations on the total path length of the light beam through the water.

Thankfully, new innovative technologies developed by Real Tech Inc are now being applied to real time spectrophotometry instrumentation, creating new spectral analysis product solutions that overcome these traditional issues in the most simple and effective means.

Real Tech's patented and patent-pending unique technologies allow for compensation of lamp and sensor changes by continuously referencing the lamp with the same single sensor through either the water or air each time a reading is conducted, therefore eliminating these inherent inaccuracies. In addition, longer measurement path lengths are now possible which can greatly increase the resolution of the detected chemicals, creating superior performing product offerings for real time spectral analysis in high purity (ultrapure) water applications. In the end, products developed with these new technologies have significant increases in accuracy, range, ruggedness and ease of use, while allowing a much lower cost solution and reduced maintenance, making spectral analysis much more practical and attainable for municipal and industrial environments.

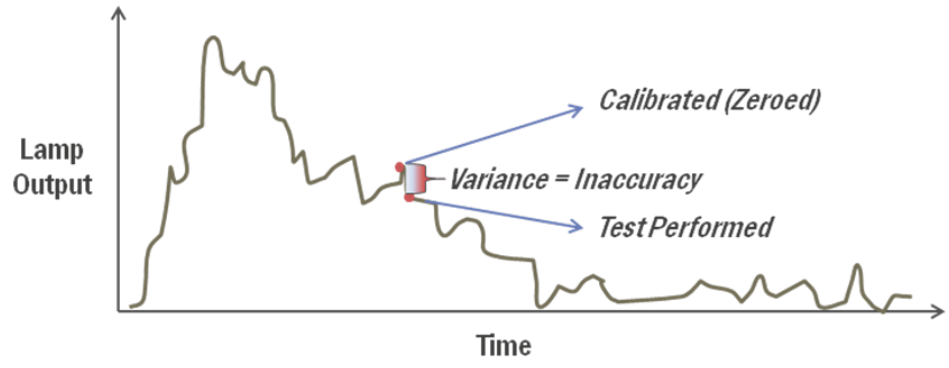

Figure 1: **Illustration of the problems with fluctuations and drift that can occur with light sources used in spectral analysis and the corresponding negative implications on performance and accuracy.**

FOR MORE INFORMATION PLEASE CONTACT:

REAL TECH INC
905.665.6888
1.877.779.2888
info@realtech.ca
www.realtech.ca