Infrared analysis can be a valuable measurement method for industrial wastewater professionals to help ensure discharges meet regulatory requirements.

Fixed filter infrared (IR) analysers have been used to test oil content levels in produced water on offshore drilling platforms around the world for over 45 years. EPA methods 418.1 and 413.2 were used extensively until the Montreal Protocol called for Freon (the solvent used in the analysis) to be phased out. Hexane/infrared extraction as well as ASTM D-7066 S-316 (dimer/trimer of chlorotrifluoroethylene)/infrared extraction are now widely used for offshore oil in water testing.

Infrared analysis provides an alternative to gravimetric testing which will significantly reduce costs and save time in the following ways:

1. 90% less hexane required for solvent extraction
   When using EPA method 1664, a litre sample requires 100ml of hexane for the extraction. The amount of solvent cannot be reduced with this method as the weight of the residual oil would be too low it would be less accurate for lower levels of oil and grease. With the hexane/infra-red extraction method, only 50 µl of extract are required for analysis and the sample size can be reduced to 100 ml for a fairly well mixed waste stream. This 100 ml volume only requires 10 ml of hexane for the extraction. In addition to a cost savings, reduced solvent usage means less waste, exposure and volatile fumes.

2. 10-15 minutes versus 2 hours for analysis
   The hexane/gravimetric method is time consuming and labour intensive -- taking up to 2 hours before a final result. The hexane/infra-red method takes less than 10-15 minutes. This means quick sample turnaround and less laboratory technician time.

3. Analysis can be done on-site
   Fixed filter infrared analysers, like the Wilks InfraCal Analysers (photos 2 and 3) are compact (less than 6” square), light weight (less than 5 lbs) and be operated from a 12 volt power supply allowing them to be operated from a vehicle. Wastewater effluent testing can be done at the site -- making it easier to catch high oil and grease offenders. By screening for out-of-compliance effluent discharges, the number of samples collected, transported and ultimately tested in the laboratory can be reduced. The same can apply for in-laboratory testing. Samples can be quickly screened and the effluent samples that are over the oil and grease limit can be tested by the EPA 1664 method—saving time, solvent, and labour costs.

Matching Regulatory Methods

An often-asked question is will the infrared oil in water analysis method match the regulatory method?

While the amount of oil in water is highly regulated -- it can also be a challenging measurement. It is complicated by the fact that oil comes in many forms and the measurement is defined by the particular regulatory method. When EPA 1664 is the regulatory method, the “oil” is anything that is extracted into hexane and remains after the hexane has been evaporated and shows up as weight. In regions where infrared analysis is the defining method, the “oil” is whatever is extracted into the solvent and has carbon-hydrogen bonds that absorb infrared light at a specific frequency. Each method is looking at different properties of oil and can potentially give different results. How one type of oil in water measurement compares with different regulatory methods is not always simple and straightforward. Listed below are four factors that need to be considered.

1. Precision and bias for each method
   There are acceptable errors for each method typically expressed in the precision and bias statement for the method. EPA Method 1664 states in their “Ongoing precision & recovery” section
This white paper is now available to view on Envirotech Online.

White Paper describes instrumentation and controls that companies need to install on their tanks and vessels.

With a few precautions and a relatively minor investment, this event could have been identified early on, and action could have been taken to mitigate the leak and its destructive aftereffect. For example, a recent leak of 4-methylcyclohexane methanol at Freedom Industries in West Virginia shows how a system functions with different loads and regulators can be sensitive to small changes. Another example clearly shows that infrared analysis can be a valuable measurement method for industrial wastewater professionals to help ensure discharges meet regulatory requirements.

Table 1: Comparison of a five way sample split with 3 different labs performing EPA 1664 and an infrared analyser

<table>
<thead>
<tr>
<th>InfraCal</th>
<th>InfraCal</th>
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<th>Lab 2</th>
<th>Lab 3</th>
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Table 2: Comparison of samples tested with EPA 1664 and an infrared analyser

<table>
<thead>
<tr>
<th>InfraCal</th>
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<th>EPA 1664</th>
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Infrared Analysis is a Valuable Technique for Wastewater Professionals

All of the considerations listed above may make it look like any corroboration could be difficult. However, by using careful analytical procedures, understanding the composition of the waste stream and knowing the limits of each measurement system, useful information can be generated. Table 2 shows samples from on an oil rig in the North Sea that were tested by a laboratory using EPA 1664 and the InfraCal TOG/TPH Analyzer, Model HATR-T2, which uses hexane as an extraction solvent. This example clearly shows that infrared analysis can be a valuable measurement method for industrial wastewater professionals to help ensure discharges meet regulatory requirements. Industrial pretreatment operators have the advantage of taking samples before and after treatment to see how their system functions with different loads and regulators can catch high FOG levels before it stops sewer lines.

Reduce Water Pipe Bursts with New High-Frequency Pressure Transient Logger

Water and asset monitoring specialist HWM-Water Ltd (UK) has developed a new data logger specifically for monitoring the water network for damaging pressure transients and combating ‘water humour’. With a five-year battery life, fast data sampling and large memory, HWM’s Pressure Transient logger is suitable for both long-term surveys and rapid trouble shooting deployments.

The new logger features an expanded 4GB of flash memory and uses advanced data compression algorithms to store up to eight billion readings per day. It can operate in the field for weeks or even months while still sampling rapidly enough (25Hz) to effectively monitor pressure transients. Conventional data loggers are unable to sample at a fast enough rate to store enough data to log and catch damaging pressure spikes, which may only last a fraction of a second. Despite – and in part because of – the speed and brevity of the event, these moments of extreme pressure differential are a major factor in reducing asset lifetime and causing burst water mains.

Sources can be tracked, but only after they have been identified, analysed and compared against other known network events, such as pump or valve activation, or high consumer activity. By reducing the severity of, or even eliminating, pressure transients in the water network, asset life can be significantly improved and burst frequency reduced.

The Pressure Transient logger is supplied with a robust aluminium case containing the data logger, pressure transducer with quick-fit connector, download lead, software and full documentation.

For More Info, email: 30121pr@reply-direct.com

Tank Protection White Paper Released

Endress+Hauser (USA) publishes “Protecting our Water – Keep Chemicals in the Tank.” White Paper. Leaking or overfilled tanks containing chemicals, fuel oil, sewage or hazardous materials can cause environmental problems, contaminate drinking water and cost a company millions of dollars in fines and lawsuits. TV and newspapers frequently run stories about tanks that leaked and the expensive ramifications that resulted. For example, a recent leak of 4-methylcyclohexane methanol from Freedom Industries in Charleston, WV, USA, resulted in 31 lawsuits and the company filing for bankruptcy.

With a few precautions and a relatively minor investment, this event could have been identified early on, and action could have been taken to mitigate the leak and its destructive aftereffect. The new tank protection system described in this white paper will prevent the occurrence of such events. The products have been designed with years of experience in mind and are well established and reliable. This non-commercial white paper describes instrumentation and controls that companies need to install on their tanks and vessels.

This white paper is now available to view on Envirotech Online.

For More Info, email: 29829pr@reply-direct.com

Separator Alarm Systems Business Unit Taken Over

German Automation Company Pepperl+Fuchs GmbH and Labkotec Oy (Finland), a leading provider of measurement solutions, have signed a business sales agreement. Labkotec takes over business from Pepperl+Fuchs the Separator Alarm Systems business unit. At the same time, the companies have agreed to a two year co-operation agreement in order to provide devices and solutions for the market. Former rivals now work in cooperation. The acquisition provides Labkotec a market leading position in Europe and strengthens the company’s position as a major player globally.

In connection with the transfer of business, former P+F’s employees will transfer into Labkotec GmbH, a company that is Labkotec owned subsidiary in Finland.

For More Info, email: 30163pr@reply-direct.com

Water / Wastewater

Table 1: Comparison of samples tested with EPA 1664 and an infrared analyser

Table 2: Comparison of a five way sample split with 3 different labs performing EPA 1664 and 2 infrared analysers

For More Info, email: pr@reply-direct.com