AVOIDING THE BLIND SPOTS FOR
OIL & GAS/PETROCHEMICAL PROCESS CONTROL

There is tremendous profit margin to be earned by monitoring dark/opaque materials. Preventative maintenance is too restrictive. The idea is not to limit process control from lack of primary data availability, accuracy and proper measurement. True "End to End Process Control".

With 4IR Solutions' proprietary Petroleum Analyser you can finally monitor dark or opaque materials. Go beyond traditional lab or conventional on-line analysers with magnetic based technology located on your production floor. Increase profits by taking your process control and production optimisation to the next level of the 4.0 revolution.

Leaders in the oil and gas/petrochemical industries have defined two major objectives for continued growth: optimising production for maximised profits; and secondly, disrupting the conservative ecosystem of the industry in order to revitalise and attract new technologies and dynamic new thinking.

In the digital 4.0 industrial era, adopting innovative process control and process automation technologies can help achieve both goals.

Every refinery and petrochemical plant strives to optimise production through innovative process control and automation, thus increasing yields and profit margins and meeting stringent product regulations and safety requirements. Even the smallest detail can yield considerable savings. This calls for intensive monitoring of the manufacturing process at every turn.

Although the oil and gas/petrochemical industries have begun

to embrace cutting-edge 4.0 technologies, they have identified limited projects, such as predictive analytics for preventive maintenance with AI capabilities based on machine learning. "Preventive maintenance is only one step in improving the manufacturing process", as Nir Dranov, Director at 4IR Solutions explains. "Taking the 4.0 revolution all the way will enable leading oil and gas companies to stretch the margin of each refined barrel of oil significantly and increase refining capacity."

Don't stop at half-mast. Go all the way when adopting 4.0 technology.

The limitation of optical technologies (NIR, FT-IR, IR and Raman) is their inability to effectively and productively measure dark and opaque materials. This means the data availability for process control is effectively blind. Blind spots, from which data are not received, are located on more than half of the production floor.

The following diagram of a generic refinery shows the limitation of optic-based analysers (black stars) for effective data availability.

Currently, half the locations in the plant are blind spots, which are not monitored (red stars). By placing 4IR Petroleum Analysers
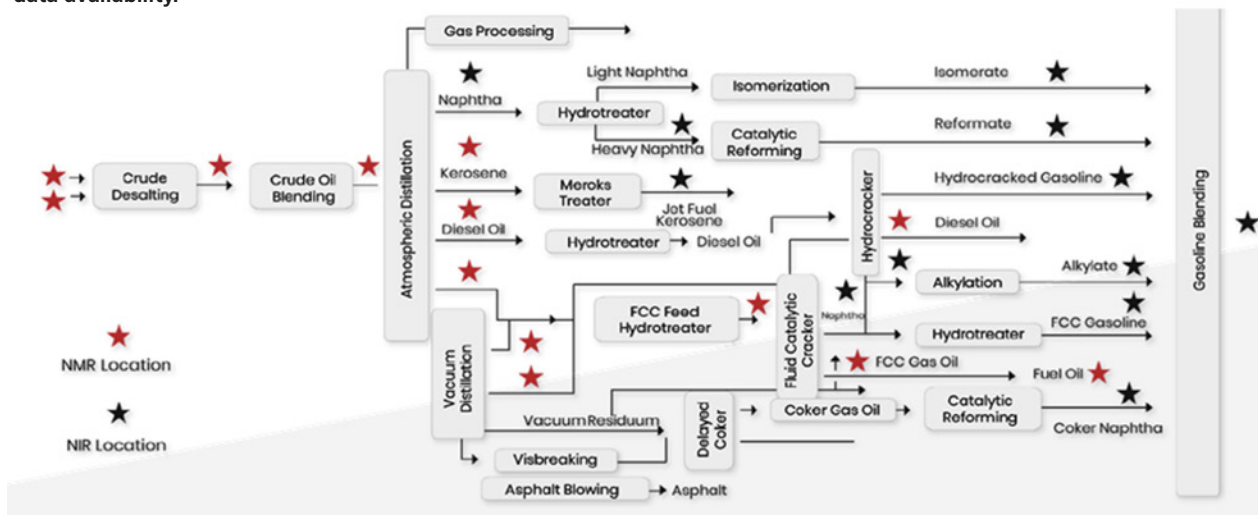
in the red star locations, process engineers in the control room will receive online real-time data for crude oil and other opaque materials and achieve 100% coverage of all production. The red stars are unique locations where only Process NMR Analysers can provide reliable, accurate and timely measurements.

Information is power. What you cannot measure you cannot manage/control.

"Imagine you could cover the blind spots. What if you could get online, real-time measurements for dark and opaque materials from the production floor directly to your control room", says Tal Cohen 4IR Solutions CEO. "For crude oil feed and its opaque distillates such as diesel, gas oil or residuals the accuracy of the results from our AI-60 analyzer is comparable to those from the standard lab-testing methods used in the industry today. The difference is - you receive our results every 5 minutes! This means you can optimise and control your production process seamlessly. You no longer have to wait a whole day for lab results! "

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In the most advanced oil and gas or petrochemical plants, a control room includes a digital command center that collects real-time information from all business units. Using smart analytical models, AI and big data, operational insights and recommendations are generated. However, if data is received only from 50% of the production floor, the process control cannot be optimal. This affects efficiencies for the entire company.

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The AI-60 automatically sends online real-time production data, which is analyzed with 4IR's AI (Artificial Intelligences) chemometrics software. The iModel/Model Gateway software enhances predictive model performance and provides predictive measurements, 'automates' validation and updates procedures while minimizing model development, model support and maintenance. iModel/Model Gateway facilitates the integration of LIMS, DCS, APC (Advanced Process Control) software.

4IR's AI-60 analyzer and its iModel/Model Gateway assures maximum efficiency and accuracy in real-time, so you can maintain and control your process at all time.

The bottom line: no giveaways, no re-processing – means, maximum efficiency.

Analyser Type	AI-60 Process NMR	NIR / FT-IR / RAMAN
Sensor Method	Magnetic (Similar to MRI)	Optical
Online Realtime Measurement	✓	✓
Dark & Opaque Crude Oil	✓	✗
Crude Oil	✓	✗
Gas Oil	✓	✗
Diesel Oil	✓	✗
Transparent	✓	✓
Kerosene	✓	✗
Naphtha	✓	✓

4IR Solutions' AI-60 is the only online real-time process analyser for opaque/dark material including crude oil.

About 4IR Solutions

4IR Solutions disrupts process control with its Magnetic Resonance Imaging (MRI)-based petroleum analyser, the AI-60. It is the only online real-time process analyser for opaque/dark material including crude oil. 4IR solutions takes the 4.0 revolution all the way. We implement digitisation, Big Data, automation, Internet of Things (IoT) and AI analytics in our products. 4IR Solutions is based in Israel, a country renowned for its leading position in Industry 4.0 technologies. 4IR offers its process control analyser with its proprietary iModel/Model Gateway.

Main learnings:

• Optic sensors cannot monitor dark/opaque materials, including crude, therefore leaving many parts of the production process unmonitored.

• By alleviating these blind spots, production optimisation can occur through process control that looks into the entire production processes, creating significant increase in profits.

• 4IR Solutions offers magnetic analysers placed on your production floor, the only on-line analyser able to measure and analyse dark/opaque substances.

• With 4IR Solutions you take your process control and production optimisation to the next level for significant increase of profit

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About the Author: Paul J. Giammatteo, Ph.D., Chief Science Officer and Vice President of Western Hemisphere Operations for 4IR Solutions, Ltd., brings 37+ years of industrial, technical, and, business experience in applying analytical, at-line, and, on-line NMR solutions to petroleum, petrochemical, chemical, pharmaceutical, biochemical, biotechnology R&D and manufacturing.