The historically low oil price continues to significantly affect the global process industries. It seems clear that capital expenditure remains to be on hold whilst new projects are postponed and/or cancelled, as owner operators shift the focus towards existing facilities, more efficient operations and maintenance, and the possibility of lengthening the lifetime of current plants.

The outlook for the process industry is rather uncertain at the moment, yet new opportunities still exist. With fewer new builds and projects in 2016, owner operators can focus on improving existing assets, enhancing efficiency and improving operational expenditure. The focus seems to be shifting towards maximising output of existing facilities with the minimum required investment.

Appreciating existing assets

Besides oil and gas companies, pharmaceutical and chemical producers, and other plant operators, are all under pressure from multiple directions. In addition to the fluctuating oil price, shrinking margins, and the ever increasing need for more stringent regulations and heightened efficiency, are also influencing daily operations.

One of the ways in which owners and operators can answer to competition in the oil and gas industry is looking to extend the lifecycle of existing facilities in order to achieve optimum value while they are still operational. In fact, there are many benefits when compared to building new facilities: there is no new capital investment needed, the existing infrastructure is already in place, and the plant personnel have already been trained.

Some of the key resources for extending the initially planned lifetime of an operational facility include: access to current and accurate information of an asset, and the opportunity to take action based on this information. These resources can help owner operators to improve operational efficiency, reduce maintenance costs and drive safety; all are important reasons as to why actionable, up to date engineering information has become crucial for any owner operator to succeed.

Plant lifecycle challenges

The challenges related to engineering information can vary from stage to stage in the asset lifecycle. As is widely known, most facilities and plants go through a lifecycle with seven distinct phases, starting with conceptual planning and ending with decommissioning.

Conceptual planning

The foundation of the asset lifecycle is conceptual planning, where the owner describes and documents the exact plans and visions for the plant: size, cost, capabilities, location, etc. During this phase, the core plant requirements are established and need to be documented. These requirements must be captured so they can be re-used and referenced throughout the rest of the facility’s lifecycle.

Design and visualisation

Often, large parts of the engineering design are outsourced to one or more engineering, procurement and construction (EPC) companies and subcontractors. The more contractors and sub-contractors involved, the greater the challenge regarding both the integrity and accessibility of 3D designs and engineering data. In this part of the lifecycle, an intelligent, rule-based 3D environment will enable faster, silo-free plant design and engineering; better collaboration, and reduced time to market. Leveraging a data-centric 3D modelling approach will help to maximise project communication and enable a real time concurrent engineering approach, allowing efficient management of inconsistencies throughout a facility’s lifetime.

Construction and procurement

Material surpluses and shortages can prove very costly during the construction process. Implementing a solution for the
whole lifecycle, from materials specification and change management through procurement and tracking to inventories, forecast and material issuing, will help to drive efficiency and reduce overall project risk. With the use of current information from various sources such as 3D models, 2D engineering tools, materials management, and project control and scheduling systems, construction planning and decision making can be optimised.

Handover and commissioning
For today's large scale projects, the information required to operate the asset efficiently and safely is widely distributed across different locations; therefore, producing comprehensive archives can be challenging. The commissioning phase requires the handover of all relevant project data and engineering information; a task that consumes many working hours and resources in the absence of an efficient information management solution. Implementing the right solution will help owners and operators to prepare and organise all the information required for plant handover and commissioning, and expand reach across enterprise silos, whilst enabling quality control during the information handover process.

Operations and maintenance
Once the plant is up and running, actionable information is needed to ensure successful, proactive and safe plant operations and maintenance activities. Having outdated or unstructured asset data will lower efficiency, increase cost and reduce safety in both the operations and maintenance of a plant. Having a virtual representation of the physical asset will help plant operators to overcome these challenges by improving operational safety, shortening repair cycles, and enhancing maintenance efficiency.

Renewal and reparation of the asset
Today’s operating plants are in a constant state of change due to ever altering regulations, new processes and solutions, and changing personnel. Brownfield projects can take place inside existing facilities, meaning up to date 3D models and engineering data are a must. If information is lost, modern data capture solutions, including laser surveying and scanning, will help operators to create new models of the plant, enabling safe refurbishment and project execution.

Decommissioning the facility
As a plant reaches the end of its useful life, the decommissioning phase needs to be diligently planned to minimise liability and adhere to health, safety and environmental regulations. An integrated engineering environment will support an efficient and safe decommissioning.

Lengthening asset lifetime by digitalising asset information
Keeping engineering information current, synchronised and accessible throughout the asset lifecycle can be a major challenge for owners. To lengthen asset lifetime and improve operations and maintenance, the engineering design basis needs to be consistent and highly accurate on three fronts:

- The physical asset information (what is there).
- Logical and functional information (what was designed to be there).
- Regulatory and safety imperatives (what is required to be there).

These can be considered as the pivotal tenets of engineering integrity. Having a clear overview of the above, combined with a virtual representation of the physical facility, can help owners and operators to ensure engineering integrity and, through this, lengthen the lifetime of their existing assets. Engineering software solutions, such as Intergraph's SmartPlant® Enterprise for Owner Operators and SmartPlant Fusion, enable owners and operators to create a virtual plant asset, and manage the technical complexity of the asset and associated work processes in one place, throughout the entire lifecycle.

Once the plant is up and running, actionable information is required to ensure successful, safe plant operations and proactive maintenance activities. This way, the possession of more actionable, insightful engineering information is becoming a key differentiator for operational and maintenance success. It can enable operators to run their assets more efficiently and safely, while enabling a quicker and more effective execution of modification projects.

Conclusion
A digitalised plant asset can help owner operators to lengthen asset lifespan, manage cost, improve efficiency and gain a competitive advantage in the current challenging operating environment. Solutions that enable operators to maintain engineering information integrity throughout the complete lifecycle of a plant can be considered key for operational success.