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# Remote Surveillance

of measurement and allocation data

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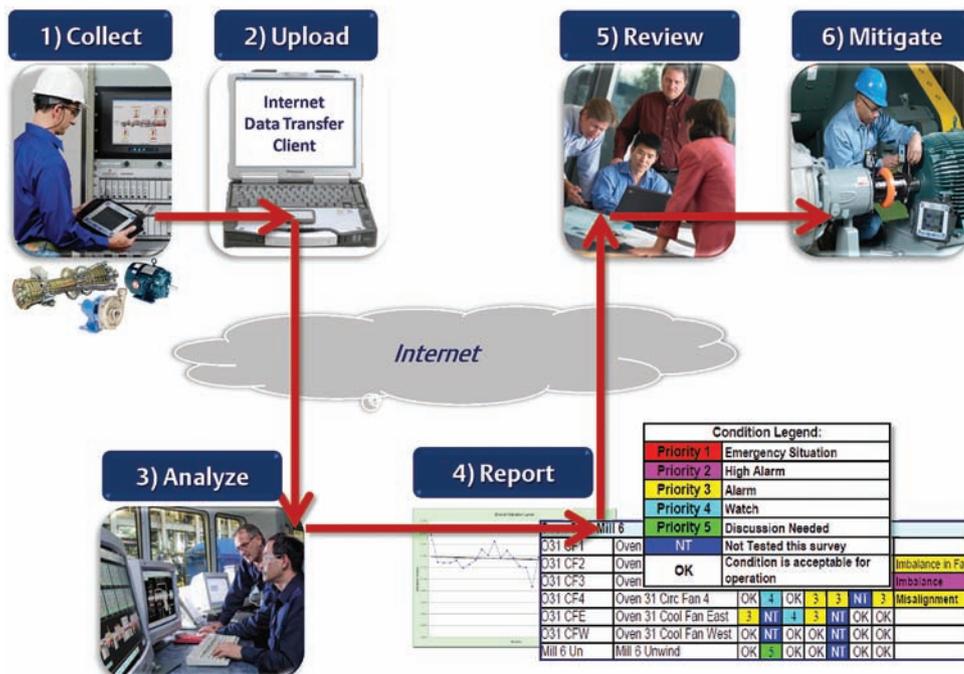
Measurement and allocation of hydrocarbon resources and products is fundamental in the financial value chain of an oil and gas production company. Ultimately, this is the transaction point at which engineering units such as volume or energy are converted into financial units, dollars and ownership value. If the company is part of a shared

pipeline or production facility, the revenue stream can be directly affected throughout that shared infrastructure at numerous points where raw or refined products are measured and allocated. These measurement and allocation points are used for custody transfer purposes, allocation between asset partners and for tax and environmental reasons. In all cases the transactions will involve government or third

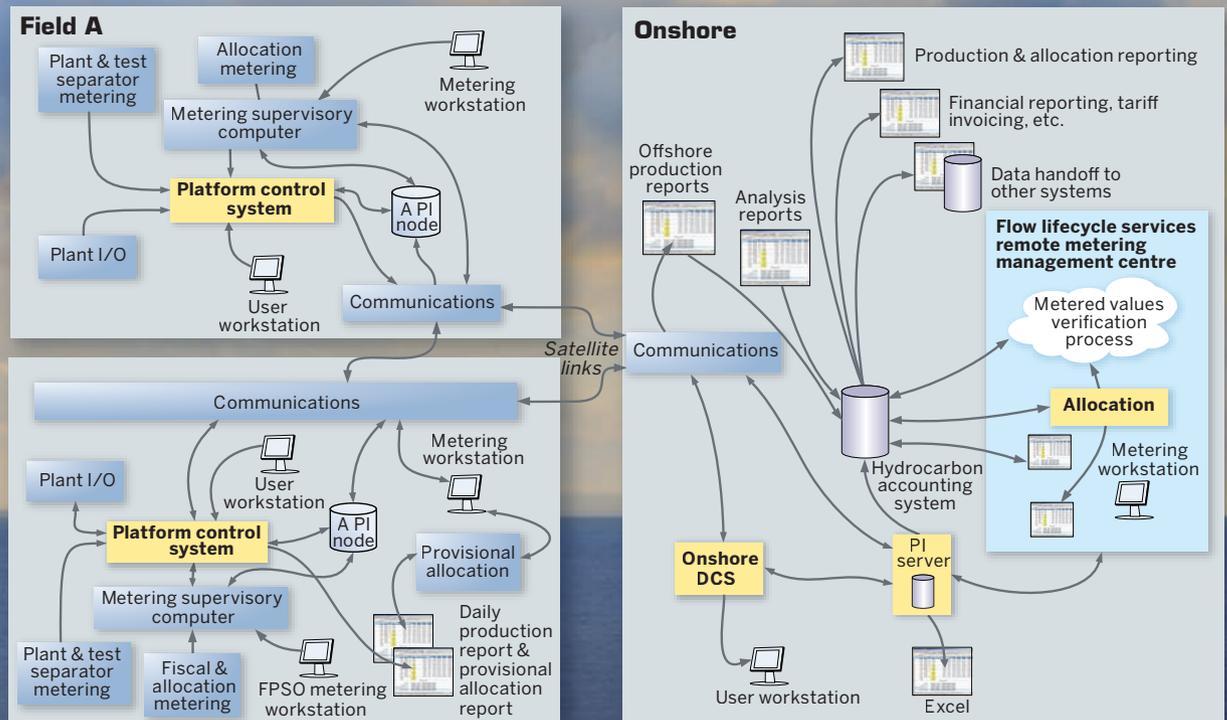
party interests, such as the tax authorities, investment partners and internal stakeholders. When dealing with suppliers, partners and the authorities it is necessary to be sure that the quantities measured, allocated and reported are accurate and that any uncertainty and potential exposure around the reported numbers is kept to a minimum. This is important in order to protect the company's shareholders, reputation and revenues.

The world of flow measurement and hydrocarbon allocation has a limited, and diminishing, number of experienced consultants and experts capable of providing a rounded view of measurement and allocation data and systems. Furthermore, the number of experts available to small operating companies

## Remote monitoring and expert oversight



## Consolidated remote monitoring



to carry out consulting and reviews of measurement and allocation systems is further depleted with recruitment to large multinational operating companies. The use of pooled expert resources, such as is found in specialist measurement consulting companies, and suitable technology for gathering and distributing measurement data can provide an answer to the issues resulting from this loss of expertise. The use of remote monitoring, electronic data transfer and the internet allows internal and external resources and pooled expertise including the untapped resource of specialist metering companies offering a wide range of flow technology. The operator or metering company can benefit from this expertise being applied to operations in remote areas, as well as locally.

### Connecting Facilities

In nearly every oil and gas production company, the measurement and allocation data is available internally from remote locations across company intranet or internet using a variety of historians. Almost all have access to their offshore or remote production facility Digital Control Systems (DCS) or historian system. Therefore, it is possible to connect the flow measurement expertise from the external metering specialists with the flow metering devices and the measurement and allocation of products in the remote sites thus releasing expensive, in-house engineering time to core activities.

The illustration below shows the connection between a remote offshore location, the onshore control centre and the measurement expert where the data is processed and returned to the operator after checking and validation in a seamless transition.

The diagram below illustrates the process of such a scheme where the expertise is overlaid with the data capture and

routine monitoring to provide an outsourced service that delivers real benefit to the process of metering and allocating oil and gas products, without requiring additional in-house resources dedicated to watching the meters tick over.

### Accessing Resources

Having access to the right level of metering expertise and resources is a considerable advantage to an operator when you consider the value of the daily production and the magnitude of even small deviations from the true measured quantity of their products.

All measurement systems suffer from a degree of inaccuracy depending upon the technology used and the standards to which the system is built. These inaccuracies combine with operations and maintenance procedures and result in an “uncertainty” in the measurement. Uncertainty is defined as “the degree of confidence in a measurement expressed as a percentage,” or in other words, the band within which the true value exists. It is the role of measurement consultants to ensure that this interval is maintained within contracted limits, and is as small as possible, by ensuring calibration and maintenance routines are carried out rigorously.

Across any multi-user asset with many complex measurements and allocations, each has an uncertainty attributed to it, where the nature of these uncertainties is not clear making it vital that they are understood and recognised. Proper procedures, operations and maintenance must be in place to ensure that any uncertainty in measurement is kept within acceptable, agreed operating limits. Having these procedures prepared by experienced consultants and engineers with an understanding of the complexities of fiscal

## Remote activities and their outcomes

Activity	Details	Assurance	Value Added
Measurement & diagnostic surveillance	<ul style="list-style-type: none"> <li>Collation of all production and sampling data</li> <li>Measurement and environmental data</li> </ul>	<ul style="list-style-type: none"> <li>Conforming to company internal measurement standard</li> </ul>	<ul style="list-style-type: none"> <li>Release of personnel to more cost-effective activities</li> <li>Minimize financial exposure</li> <li>Failure prevention</li> <li>Reduce downtime</li> </ul>
Calibration monitoring	<ul style="list-style-type: none"> <li>Collation of all calibration data</li> </ul>	<ul style="list-style-type: none"> <li>Conforming to company internal measurement standard</li> <li>Conforming to regulatory requirements</li> </ul>	<ul style="list-style-type: none"> <li>Contractual compliance</li> <li>Minimize financial exposure</li> <li>Failure prevention</li> </ul>
Allocation oversight	<ul style="list-style-type: none"> <li>Collation of gas and liquid compositions, export tickets, online analysis</li> <li>Reconciliation with monthly measurement surveillance data</li> </ul>	<ul style="list-style-type: none"> <li>Conforming to company internal measurement standard</li> </ul>	<ul style="list-style-type: none"> <li>Independent reference</li> <li>Reduce financial exposure</li> <li>Reduce potential rework</li> </ul>
Environmental oversight	<ul style="list-style-type: none"> <li>Collation of flare/fuel/overboard water data</li> <li>Balance with production data</li> </ul>	<ul style="list-style-type: none"> <li>Conforming to permits</li> <li>Balance emissions and fuel usage</li> </ul>	<ul style="list-style-type: none"> <li>Minimize regulatory exposure</li> <li>Reputation exposure</li> </ul>

or custody transfer systems helps to ensure compliance.

Measurement and allocation agreements often involve complex process models and calculations that are virtually impossible to carry out on a daily basis by hand. Transparent and fit-for-purpose allocation computer systems are, therefore, a crucial part of an operator's business infrastructure. Having access to the resource to understand these models is critical to the benefit of the company and its partners.

Consideration must also be given to:

- Data acquisition mechanisms: information must be gathered from measurement systems, data.
- Historians, price index data-feeds, and directly from users.
- Data integrity and validation.
- Open, scalable databases for the retention of all relevant information and calculation results.
- Access control and audit tracking.
- Report delivery and version control.
- Interfacing with the operator's financial and corporate information systems.

### Delivery of Results

The allocation of hydrocarbon products, whether natural gas or crude oil, is a complicated exercise with a diverse number of data sources that need to be coordinated, whether they come from analytical laboratories, calibration laboratories or measurement devices. The routine daily tasks are focused in a short time period when the dedicated personnel are required. After which the persons dedicated to the tasks are, to a large extent, redundant. The alternative scenario is that the control of allocation data, calculations and report reconciliations are given to an engineer without the measurement and allocation background who may not

recognise data errors or miss measurement before they accumulate to large discrepancies in production or result in large reallocations of funds once discovered.

The table above is a summary of the remote activities and their outcomes. By having measurement and allocation expertise on tap from a pooled resource, the delivery of complex allocation calculations, the reconciliation of diverse measurement and allocation data can be coordinated in such a way as to meet the company reporting deadlines on a daily, weekly and monthly basis, without compromising the integrity of the data. With the added benefit that company personnel are released for tasks where their real expertise is valuable.

### Conclusion

In these days of diminishing resources, outsourcing the metering and allocation department does not have to reduce the integrity of the data produced. In fact, by selecting the correct partner with the right pool of expertise, the operating company can get an enhanced service. Experts that would need to be engaged directly can be accessed, instead, from the pooled resource and shared on an as-needed basis making not only the expertise available, but available at a cost efficient rate. **AOG**



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