

Integrity Management Applications

The integrity management applications cover a wide range of software tools to reduce risk of safety and environmental hazards, i.e. maintain high integrity.



Integrity Management is all about minimizing the risk of leakage. The leakage can be a result of erosion, corrosion, vibrations due to slugging and excessive impact forces due to high velocities and liquid slugs, pigs or hydrate plugs. These phenomena are also flow assurance issues; hence flow assurance and integrity management should be integrated. For example is prevention of hydrates a flow assurance issue, while removal of hydrate plugs is an integrity issue in that extreme velocities may occur due to high pressure differentials. Production optimization issues are also relevant, as there is a tradeoff between high production and high risk of damage. On the other side high regularity and high integrity may be the same common objective.

Barrier Test Application

Barrier test, also called well integrity test or leak test, is performed at regular intervals to verify that the well barriers are not leaking. This web application automatically gathers necessary online data, performs pressure build-up and/or leakage rate calculations, and stores measured and calculated data including relevant trend curves.

ABB SPT Leak detection System

A model based leak detection system is available using the transit pipeline simulator Olga Online supplied by SPT. The main application for OlgaOnline is for flow assurance issues with multiphase flow, but it also works perfectly well for single phase gas or liquid flow. The need for integration of flow assurance and integrity management issues makes OlgaOnline very well suited.

Insight Erosion Management System

This online application calculates the sand erosion rate anywhere in the production system and gives warning in case of severe erosion. With such a system, the risk of leakage due to erosion is substantially reduced. The system can easily be modified, to calculate corrosion rates instead or in addition to erosion. Integration with multiphase flow simulators like Prosper, WMS and Olga can be done. This is especially useful for corrosion calculations, for which parameters like CO₂ partial pressure can be calculated.

EFDD - Early Fault and Disturbance Detection

In a large process network, several components will fail or degrade over time. The questions are which components and when it will happen. Taking advantage of the fact that many faults develop gradually, advanced signal analysis may be used to detect faults at an early stage. This may in turn ensure that components are maintained or replaced prior to critical faults, or that process disturbances are handled efficiently. Both can avoid costly down-time for a site.

EFDD – Early Fault and Disturbance Detection – is a new software application developed by the combined efforts of ABB, Statoil and academic institutions. It is using state-of-the-art fault detections algorithms for a powerful, generic approach to online and offline fault detection, including decision support functionality such as diagnostics, health conditions and status visualization.

ASSET Monitoring

Monitoring the health of process equipment generally reduces the risk of unexpected behavior. ABB's asset management portfolio allows monitoring of equipment like electrical equipment, motors, compressors, separators and heat exchangers. Also, smart as well as traditional instruments can be monitored, making sure that the data retrieved from the process is actually reliable.

By utilizing this asset management system and integrating it with a maintenance management system, optimized maintenance planning and execution can be achieved, improving overall integrity.

WRIPS (Water Reservoir Injection Pressure System)

WRIPS works as a data reconciliation system in that it detects and corrects erroneous/failed sensors. This gives reduced risk of operation outside design limits.

It was first made for calculation of most likely bottom hole pressure, with the objective to avoid operating pressure above the fracture pressure. The system can however be used for calculation of the most likely value of pressure, temperature or flowrate at any point and be used to reduce the risk of exceeding any design limit.

Well Monitoring System (WMS)

With WMS, our virtual multiphase flow meter, the pressure, temperature and velocity distribution in the production system is calculated also for multiphase flow. This can be used to reduce the risk of exceeding design limitations at points where there are no sensors installed.

One example is downstream the production chokes during cold start-up, where quite low temperatures may occur due to Joule Thompson cooling which is accurately modeled in WMS.



AFC and AWC – Active Flowline and Well Control

AFC and AWC which was made for active control to avoid or minimize slugging is also useful to maintain high integrity because slugging and oscillations gives increased wear, increased load on the operators and increased risk of trips which all increases the risk of hazards. During start-up of wells, AFC/AWC can be used to ramp up the wells in such a way that it reduces the risk of damage to the near well region and any sand screen to minimize risk of excessive sand production and rapid erosion.

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