IKM ValveWatch AS

AUTOMATED ONLINE VALVE MONITORING SYSTEM

For a safer, more environmental-friendly and sustainable energy industry

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The ValveWatch system was developed to meet the need for better monitoring and maintenance of emergency shut-off valves (ESVs)

ValveWatch is an advanced, automated online valve monitoring system designed to ensure the reliability and safety of critical valves and actuators. ValveWatch is used by industries that rely on critical valve operations, such as offshore oil and gas platforms. The system was developed to address the severe consequences of valve failures, highlighted by incidents like the Piper Alpha disaster.

Background
Several major oil and gas accidents have been partly caused by failure of valves or insufficient maintenance of safety valves. This can include problems with blowout preventers, pressure control valves, or fire safety valves that are not working properly due to poor maintenance, mechanical failure, or lack of testing. To avoid such incidents in the future, stricter requirements have been set for the maintenance and inspection of valve systems, and operators on the Norwegian Continent Shelf (NCS) must now follow detailed procedures for regular testing, maintenance and updating of safety barriers, including valves.

The Petroleum Act
This Act, which came into force in 1996, encompasses several aspects of safety and the environment related to the oil and gas industry in Norway, and gives the authorities the authority to impose strict requirements on operators.
An important aspect of the Petroleum Act is that the barriers must not only be set up, but also continuously monitored and improved. This means that operators must keep up to date with new technology and procedures and implement improvements in a systematic way to prevent accidents.

The ValveWatch system
The ValveWatch system was developed to meet the need for better monitoring and maintenance of emergency shut-off valves (ESVs) on offshore oil and gas platforms. The background for the development can be traced back to the Piper Alpha accident in 1988, which showed how critical it is to be able to insulate pipelines quickly and effectively to prevent catastrophic fires.
After this accident, the Norwegian Petroleum Directorate (NPD) introduced stricter rules for testing and maintenance of critical valves.

This led several companies, including Statoil, Norsk Hydro, Saga Petroleum and Phillips Petroleum, to start looking for solutions to meet these requirements. In 1997, these companies partnered with Liberty Technologies, Inc. (later acquired by Crane Nuclear, Inc.) to develop a system that could monitor the valves continuously without affecting production. The ValveWatch system was developed to monitor leaks and the mechanical condition of valves using dynamic pressure sensors and strain sensors. The system collects data that can be used to assess the valve's performance and condition, enabling maintenance to be planned more effectively.

The development
Solberg & Andersen played a crucial role in the development of the ValveWatch system. Solberg & Andersen worked closely with major Norwegian oil companies such as Statoil, Norsk Hydro, Saga Petroleum, and Phillips Petroleum. This collaboration was essential in identifying the need for a reliable valve monitoring system and in defining the system's requirements.

In 1997, Solberg & Andersen partnered with Liberty Technologies, Inc.). This partnership as instrumental in the development of the ValveWatch system. Solberg & Andersen contributed significantly to the development and testing phases of ValveWatch. They were involved in creating prototypes and conducting field tests to ensure the system met the stringent safety and operational requirements of the offshore oil and gas industry. After the initial development, Solberg & Andersen continued to play a role in the implementation and support of ValveWatch systems on various offshore platforms. Their expertise helped in fine-tuning the system and ensuring its reliability in real-world valve conditions.

Platform supply vessels battle the blazing remnants of the offshore oil rig Deepwater Horizon. A Coast Guard MH-65C dolphin rescue helicopter and crew document the fire aboard the mobile offshore drilling unit Deepwater Horizon, while searching for survivors. Multiple Coast Guard helicopters, planes and cutters responded to rescue the Deepwater Horizon's 126-person crew.

A COMPLETE SERVICE PROVIDER

IKM is a complete service provider for the Energy Industry. The group does currently employ approx 3 500 employees and has a budgeted revenue of 7 billion NOK for 2024. IKM have over the years managed to combine strong growth with positive earnings. IKM have also succeeded in providing a safe workplace for their employees and have become a reliable contractor for its customers. Their wide range of services have made IKM quite unique as a complete service provider related to the Energy Industry on the (NCS).

ValveWatch is the leading online remote, local condition and performance monitoring technology for valves.

ValveWatch has over the past 25 years paved the way for industrial awareness of condition and performance monitoring of all types of valves. ValveWatch is the leading online remote, local condition and performance monitoring technology for valves.

ValveWatch has become the de-facto valve Condition & Performance Monitoring system for critical valves. The ValveWatch system is installed on approximately 2000 valves and is the benchmark standard for critical valve performance and condition monitoring. This includes current monitoring of BDV, ESD, PSV, X-mas trees (Ving and Master valves), FOV & HIPPS valves in multiples countries, offshore and onshore facilities with a long list of Oil & Gas Operation companies.

CUTTING EDGE TECHNOLOGY

In March 2024, IKM Group strategically expanded its portfolio by acquiring ValveWatch. This move was part of IKM's commitment to strengthening its position as a global leader in industrial services and technology for critical sectors such as oil and gas, energy, and process industries. ValveWatch brought cutting-edge technology and deep expertise in real-time valve monitoring and predictive maintenance systems, aligning seamlessly with IKM's focus on innovation and operational excellence.

Digital transformation in industrial operations
By integrating ValveWatch's solutions, IKM enhanced its ability to deliver comprehensive, data-driven valve management services, meeting the growing demand for digital transformation in industrial operations. The acquisition leveraged IKM's extensive global presence to scale ValveWatch's technology, introducing it to new markets and industries worldwide. Following the acquisition, IKM worked on integrating ValveWatch into its existing suite of solutions, ensuring a smooth transition for existing ValveWatch clients while also exploring new opportunities for product development. The combined expertise of IKM and ValveWatch teams has enabled faster innovation cycles and greater value for customers.

Smarter, more efficient, and more sustainable
The acquisition reflects IKM's long-term strategy to invest in technologies that improve efficiency, safety, and sustainability in industrial operations. By acquiring ValveWatch, IKM positioned itself as a key player in the evolving field of industrial automation and asset management. IKM's focus on leveraging machine learning, cloud technologies, and APIs reflects its ambition to lead in the digital transformation of industrial processes. This approach ensures that IKM's clients benefit from smarter, more efficient, and more sustainable operations.

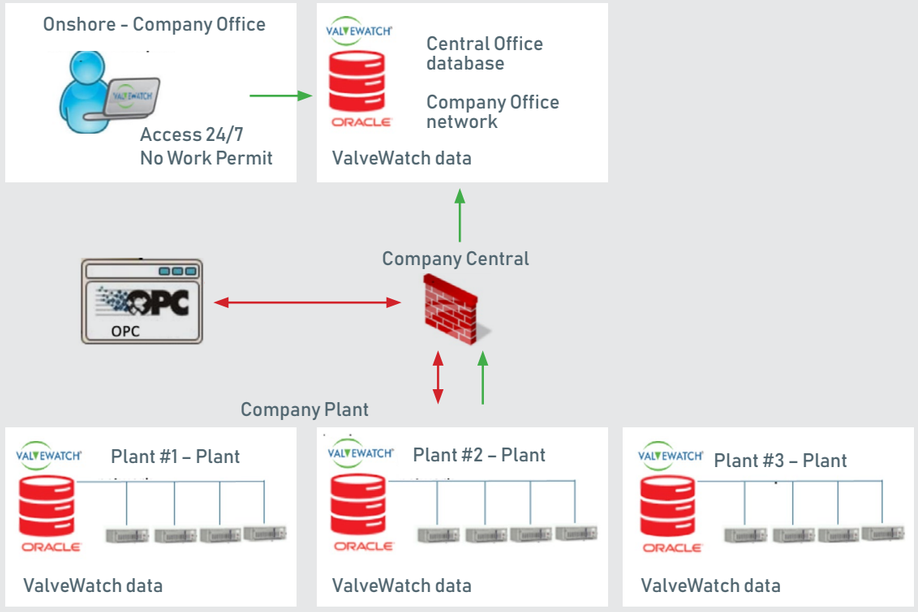
CHALLENGES WITH VALVE MANAGEMENT

Valve failures can result in significant economic losses due to production downtime and repair costs. By preventing failures and optimizing maintenance schedules, ValveWatch helps reduce these economic impacts.

Challenges with valve management
Valve management, especially in critical industries like offshore oil and gas, faces several significant challenges that ValveWatch helps to address. Valves can develop leaks over time due to wear and tear, corrosion, or mechanical failures. Detecting these leaks early is crucial to prevent environmental contamination and ensure safety. ValveWatch continuously monitors valves for signs of leakage, providing real-time alerts and data to address issues before they escalate. Valves are subject to mechanical stress and degradation, which can lead to failures.

Regular manual inspections are time-consuming and may not catch all issues. ValveWatch offers automated, continuous monitoring, which helps in identifying mechanical degradation early, ensuring timely maintenance and reducing downtime.

Automates processes
Ensuring that valves operate reliably under all conditions is critical, especially for emergency shutdown valves (ESVs) on offshore platforms. Valve failures can lead to catastrophic events. ValveWatch enhances operational reliability by providing detailed performance data and predictive maintenance insights. Regulatory compliance and safety standards require rigorous testing and documentation of valve performance. Manual testing can be disruptive and costly. ValveWatch automates this process, ensuring compliance with safety standards while minimizing operational disruptions.



VALVE WATCH

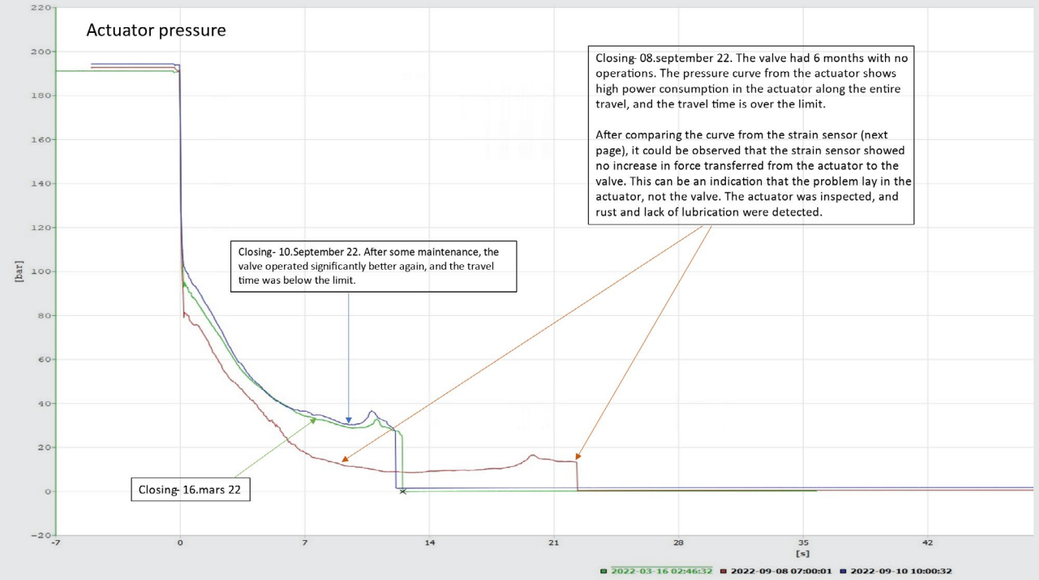
The reason why “lessons” get repeated is because the failures that have been experienced are due to hidden failures that are not possible to discover with traditional instrumentation

ValveWatch can be a powerful tool as part of an operational strategy, as it provides valuable information that can be used to track operational Safety according to IEC 61511/61508 (Functional Safety Assessment - SIL – Safety Integrity Level). Within an operating plant, Functional Safety Management for automated on/off valves, PSVs and manual valves it is required to understand why the valves fail and how it is possible to mitigate these failures.

The common factor is that the faults that one has experienced i.e the valve/actuator has failed to carry out its intended task has caused a loss in production or reduced the level of safety that the plant has been operating under. – These are expensive lessons and lessons that is often repeated.

In the terms of IEC 61508 these faults are categorized as DU Faults (Dangerous Undetected). Often these faults may have been introduced due incorrect maintenance, incorrect operation of the valve/actuator or simply due to wear and tear.

Critical valve has requirements with respect to functional testing and through leakage tests. The manual methods in testing are flawed and it is difficult to uncover the DU`s and even the DD (Dangerous Detectable Faults). Furthermore, the manual tests are often carried out when there is no pressure present, and the valve is not tested under realistic conditions.



HOW IT WORKS

With ValveWatch we can track/monitor the developing failure mechanisms that are the cause of the DU/DD`s. In other words, you will early be able to see that the valve/actuator is heading towards failure.

By monitoring the actuator/valve with ValveWatch one will be able to retrieve a full Proof Test of the functionality and performance of the valve every time it is operated. Intended or not. With the capturing of the Proof Test under realistic conditions you are able to discover all developing faults. We are moving the DU`s too DD.

Dangerous Undetectable and Dangerous Detectable Faults are expressions used in IEC 61511/61508, to be able to calculate the Probability of Failure (PFD). DD & DU Faults are faults that have occurred. Faults that have compromised the safety and perhaps also the uptime of the facility.

You are in control

The most important factor with this information is that you are in control and are aware of a potential risk. This means that you can manage the valve and understand how it may affect your operations. It will enable you to plan for maintenance and what specifically is required to be carried out. This will also let you know if it is an actuator problem or a valve problem (potentially you may just lock you valve in and repair only the actuator, as opposed to extracting the whole valve assembly and causing downtime).

GAS FLARING INFLUENCE THE ENVIRONMENT

Gas flaring is the process of burning off excess gas that cannot be processed or transported. This typically happens in oil and gas operations, particularly during the extraction and refining of crude oil.

Flaring serves as a safety mechanism, preventing the buildup of excessive gas that could otherwise lead to dangerous situations. It also helps to manage operational disruptions or when there's an excess supply of gas, ensuring that the pressure in pipelines and equipment is maintained at safe levels.

Safety flaring
Safety flaring is essential for oil and gas facilities, but non-routine flaring is often unpredictable and hard to mitigate. While companies aim to minimize flaring, it releases harmful pollutants, increasing pressure to reduce emissions. Flare valves control gas flow to the flare stack, ensuring safe and necessary flaring. These valves must work effectively, even beyond recommended maintenance intervals. Continuous monitoring, especially in critical applications, is essential.

Real-time monitoring
ValveWatch technology provides real-time monitoring and diagnostics, detecting early signs of wear or malfunction. This ensures flare valves are in optimal condition, reducing emissions and improving safety and reliability. Operators can rely on ValveWatch to extend valve life, minimize downtime, and enhance environmental management.

Operational Information & Maintenance
If you know how and why your valves are behaving in a certain way, it will enable you to make corrections to maintenance procedures and the way the valve is operated. With the correct operational valve knowledge, you can operate the valve towards the next planned maintenance interval in a safe manner.

Tailored Solutions

Each plant owner must evaluate their specific needs and circumstances. Key questions to consider include:

- What is the cost of production loss for your facility?
- What are the potential costs and credibility impacts of an accident?
- How can optimized production and reduced downtime benefit your operations?
- Can you reduce CO2 emissions from flaring with better valve control?
- Are all your valves effectively monitored to prevent accidents and pollution?

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