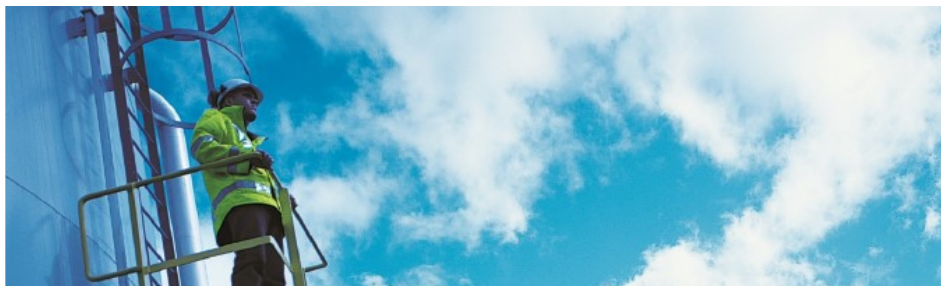


Application Note



Improved protection against over/under pressurization of safety devices

Use of Live Data

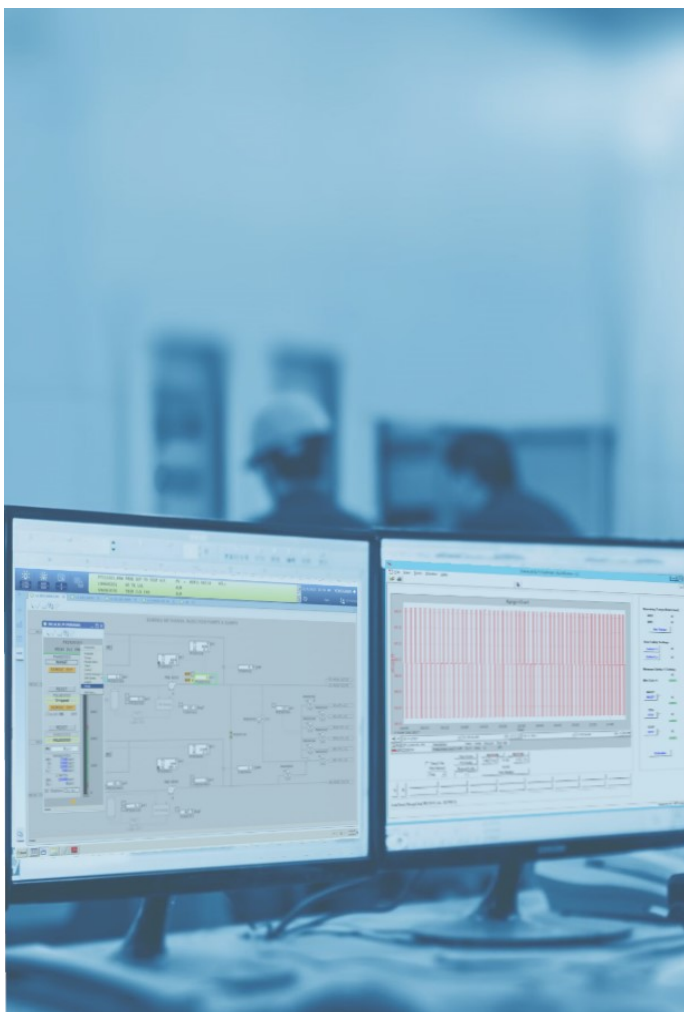
Recommended good practice for subsea production systems require sensors to be installed that measure pressure safety high (PSH), to provide over-pressure protection on downstream vessels in a production train. Similarly, pressure safety low (PSL) sensors are required to provide under-pressure protection. These pressure safety devices must use live input data to determine the safety high and safety low values to help prevent over or under pressurization of a vessel if they are to adhere to regulatory requirements.

The Bureau of Ocean Energy Management Regulation & Enforcement (BOEMRE) require Gulf of Mexico operations to use range charts to determine the safety settings of PSH and PSL for pressure safety devices. Range charts (previously referred to as Minerals Management Service Trends) display a set of data points that require two values per data point. These values consist of a high value (PSH) and a low value (PSL) that defines the range for each data point. Having access to this live pressure data will provide information on the current pressurization of a vessel; but how do you collect and store all these data points and can you record these values accurately that satisfy regulatory requirements. Are operators confident that they really know the highest and lowest pressures over a specific time period. This requires a repeatable process that can calculate range values for a defined date/time that is easily accessible from the control room.

Organizations that operate in these environments can benefit from an effective method of collecting and storing all settings for all sensors that is maintainable and repeatable over time to help prevent over/under pressurization of their pressure safety devices.

Solution

Yokogawa provides an effective solution to access live data to determine the safety settings for pressure safety devices. Exaquantum collects and stores pressure data and via its AutoTrend software application, it provides a range chart with the ability to display real-time and historical trend information for PSH and PSL values. The range chart tracks and monitors pressure safety devices that can be printed or saved electronically over a selectable time period. The PSH and PSL values are calculated based on the latest data and time range applied. If the date/time range is changed, the PSH and PSL values are updated and re-calculated based on this new information, conforming to recommended best practices and BOEMRE standards relating to pressure sensors installed on subsea production systems.



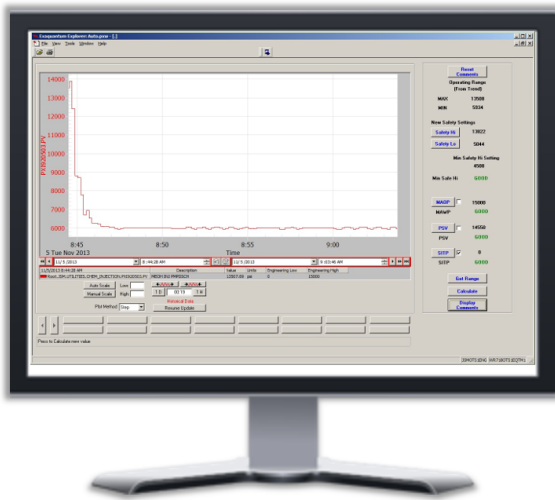
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To improve operator efficiency, navigation to the range chart is easy accessible from the HMI screens in the control room. Users can easily see which sensors to track and select which tags they want to chart with simple drag/drop functionality. An in-built calculation engine helps to determine the safety high and safety low values for pressure sensors with a quick and efficient range chart solution. In addition, every pressure device that is charted can be quality checked with a pass/fail quality check.



Benefits

Improved vessel protection against pressurization

Enables operators and end users to determine the safety settings of PSH and PSL for selected pressure safety devices for improved protection of downstream vessels against over and under pressurization.

Meets regulatory requirements

Regulatory bodies such as the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), require proof that safety settings of PSH and PSL for pressure safety devices are determined using live input data. The Range Chart software provides this functionality, and provides evidence to support these requirements.

Data recorded electronically

When the PSH and PSL values have been determined, operators can print a copy of the trend or save an electronic copy for recording and storage purposes.

How Does it Work?

Determining the Safety High and Safety Low Values

- The Range Chart is accessible directly from the HMI screens in the control that can be started from a configured menu item.
- Users can drag and drop the required safety device process value tag to the trend on screen.
- For testing purposes, operators can adjust the time-period for the trend to match the specified test period (from a 4-hour time scale up to a 30-day time scale).
- The 'Get Range' button provides a display of the high and low range values.
- Values can be set for Maximum Allowable Operating Pressure (MAOP), Pressure Safety Valve Pressure Setpoint (PSV) or Shut-in Tubing Pressure SITP or disable.
- A calculate button runs a calculation to check the values set.
- Values can be changed as required until the test shows 'Good'.
- Operators can either print or save a PDF copy of the completed Range Charts and file accordingly.

Pass/Fail Quality Check

The PSH and PSL calculations are subject to the following quality checks:

Users can drag and drop the required safety device process value tag to the trend on screen.

- New PSH shall not be less than 30% of (Range High-Low) value
- New PSH shall be less than (MAOP - 5) AND less than (0.95 * MAOP)
- If the Operator entry for PSV has been enabled, then the new PSH shall be less than (PSV - 5) AND less than (0.95 * PSV)
- If the Operator entry for SITP has been enabled, then the new PSH shall be less than (SITP - 5) AND less than (0.95 * SITP)



Key Takeaways

Uses live data to easily determine the safety settings for pressure safety devices

This software solution provides control room operators with an easy and intuitive tool to monitor and track pressure safety devices that uses real-time and historical trend information. The range chart provides the PSH and PSL values for selected devices via a simple drag and drop menu screen over a defined period of time that can be printed or saved electronically as needed.

Regulatory Compliance

The BOEMRE standards and recommended practice regarding pressure sensors state that safety settings of PSH and PSL are required to use live input data. This Range Chart software meets these requirements and provides the necessary evidence to support regulatory compliance.

Sustainable Process

Organizations that operate in the subsea production systems environment require an effective method of collecting and storing all settings for all sensors to help prevent over/under pressurization of their pressure safety devices. As part of an ongoing requirement, it is important that pressure safety data is maintainable and repeatable over time.

References

Exaquantum
Exaquantum/AutoTrend R3.10

Source Information

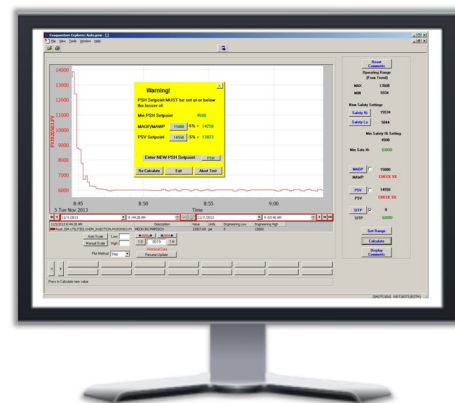
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 **LiveData**



 **Regulatory Compliance**



 **Sustainable Process**

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