# Critical Equipment Monitoring

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Agenda

- About Talisman Sinopec Energy UK Limited
- Business Challenge
- Business Solution
- Spotlight Monitoring Tool
- OSIsoft Products Employed
- Spotlight Architecture
- Benefits
- Future Plans
- Summary

About Talisman Sinopec Energy UK Limited
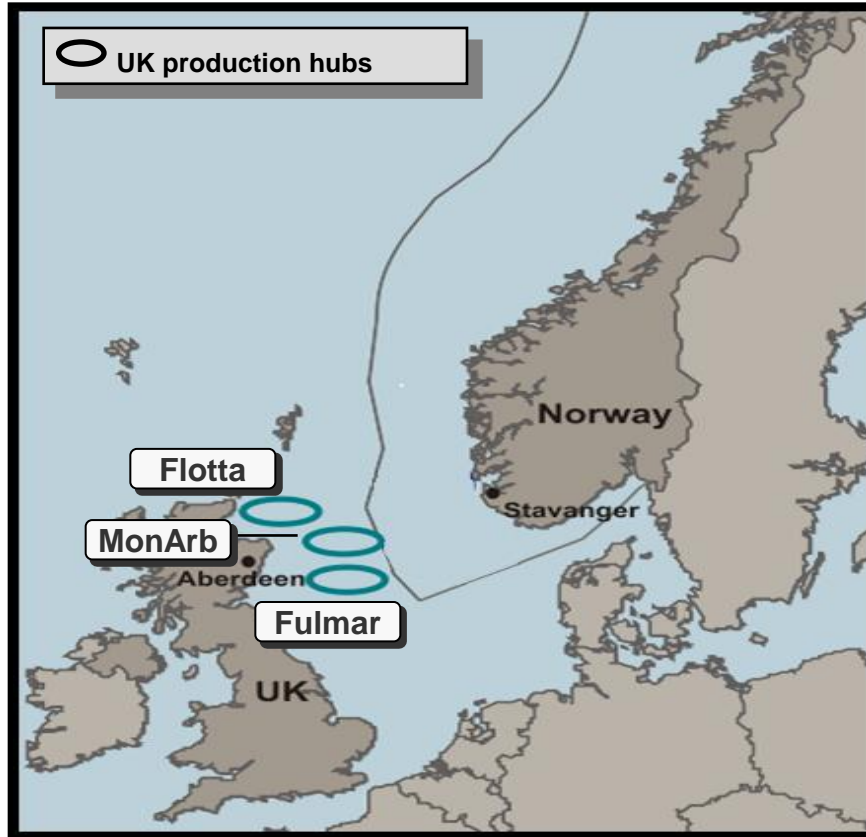
- Flotta Area

  - Flotta Oil Terminal (1976), Claymore (1977), Piper Bravo (1993), Saltire (1993), Tartan (1981), Bleoholm (1999), Buchan (1981)

- Monarb Area

  - Montrose (1976), Arbroath (1989)

- Fulmar Area

  - Fulmar (1982), Auk (1975), Clyde (1986)

- Average asset age 29 years

The PI System in Talisman UK

- Introduced 2001 for single subsea well with 1000 tag system

- Continued growth since then with system now having 250K tags, 50 Interfaces, and on average 50 concurrent users.

- Primarily used for process & well surveillance

- Used as the single source of offshore data for other systems, such as Hydrocarbon Accounting, Chemical and Corrosion reporting.

- EA signed May 2012.

Business Challenge

Safety Critical Equipment

- 39 Diesel Drive Fire Pumps
- 6 Electric Drive Fire Pumps
- 8 Hydraulic drive fire pumps
- 15 Emergency Power Generation Packages
- 26 Bilge / Ballast Pumps
- 53 Other Safety Critical Pumps

Production Critical Equipment

- 56 Gas Turbines
- 40 Gas Compressors
- 9 Diesel Engines for Main Power Generation
- 27 Main Water Injection, P.W. & Artificial Lift Pumps
- 35 Main Oil Line Pumps
- Circa 2711 Operational Pumps

A total of 2831 pieces of Major Rotating Equipment

Business Solution

Rotating Equipment Excellence Programme (REEP)

"A Management Process designed to improve the reliability and integrity of rotating equipment across all Talisman UK assets through effective monitoring & maintenance."

Aims:

- Improve reliability and achieve target availability

- Reduce production losses from Rotating Equipment

- Improve Rotating Equipment integrity

Rotating Equipment Excellence Programme

Strategy Component Categories:

• Condition & Performance Monitoring

• Vendor Support Contracts

• Spares & Tooling

• Competency & Personnel

• Audits

• Maintenance & Availability

Equipment Criticality Tiers

• Equipment categorized into Top, Middle or Lower Tier

• Calculated using lost production and Mean Time to Repair (MTTR)

Current Situation

- Lack of performance monitoring / troubleshooting is onerous

- Equipment is often poorly instrumented or not connected into the PI System.

- Information is dispersed over a number of displays and inconsistently presented.

- General under-utilisation of PI System capabilities and resources

- 3rd party packages:
  - tend to be focused on single type of equipment
  - often high requirements for instrumentation
  - high licence costs.

SPOTLIGHT

- Data is presented in a consistent manner across all equipment.

- Standard equipment displays showing process values and equipment operating points

- Summary displays rolling up information from detailed displays

- Calculation of performance values related to equipment

- Continuous monitoring of live and derived values against alarm limits and thresholds

- Notification of changes in alarm state via e-mail

- Easily expanded to include new equipment or new functionality

Spotlight Business Benefits

- Live, automated performance and condition monitoring with soft alarms

- Improved onshore/offshore collaboration

- Early detection of performance and integrity problems with operational equipment

- Move towards Condition Based Monitoring in line with REEP objectives

- Intelligent planning of package overhauls based on performance trends

- Leads to better business cases for new instrumentation, etc.

Spotlight Architecture
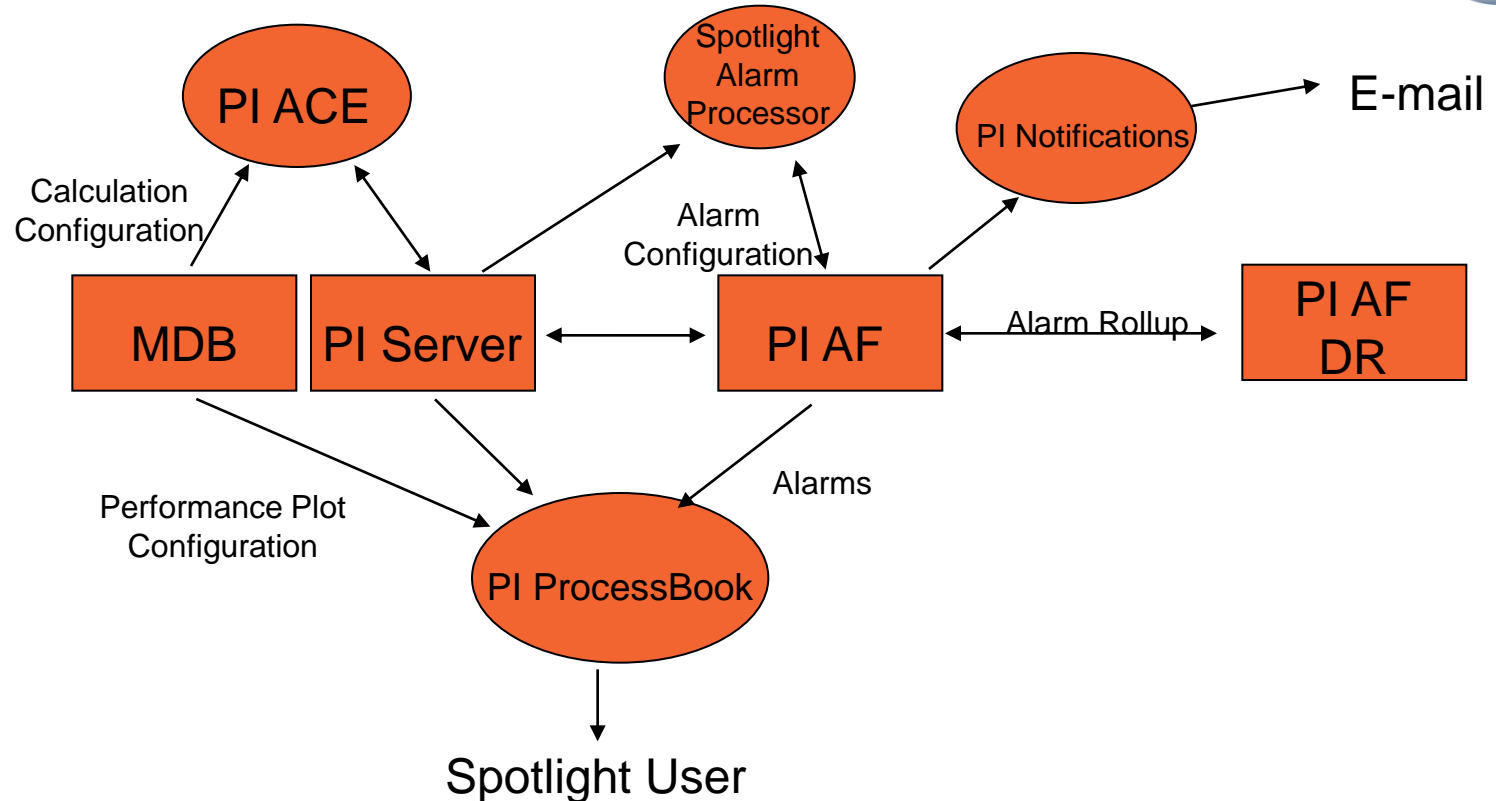
Spotlight Display – Basics
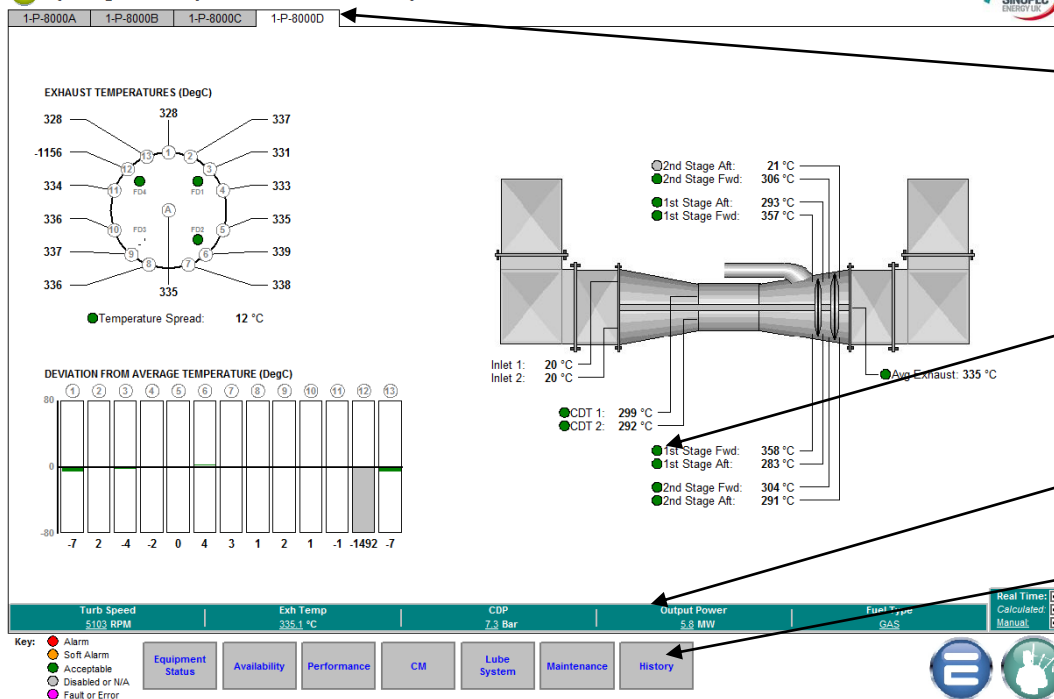
Navigate to similar displays on other equipment

Traffic Lights for alarms

Summary bar showing key data

Navigate to other displays for this equipment

Spotlight Display - Performance
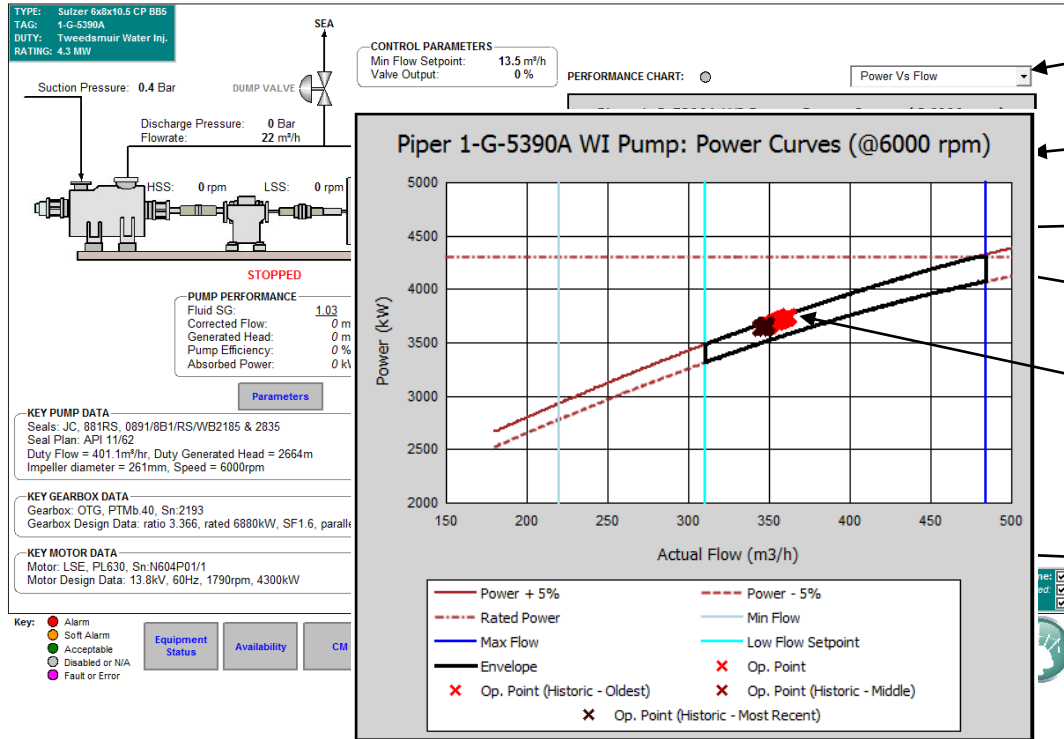
User can select different charts associated with this item

Chart showing performance constraints

Operating Envelope

Current operating point

Operating point "cloud" shows history

View operating point history over varying time periods

Spotlight Displays – Overview

Spotlight on Rotating Equipment: Piper Overview

Traffic light shows rolled up alarm status for each sub-display

Links to detailed displays for each item of equipment

Links to other asset overviews

Spotlight Displays – Alarms
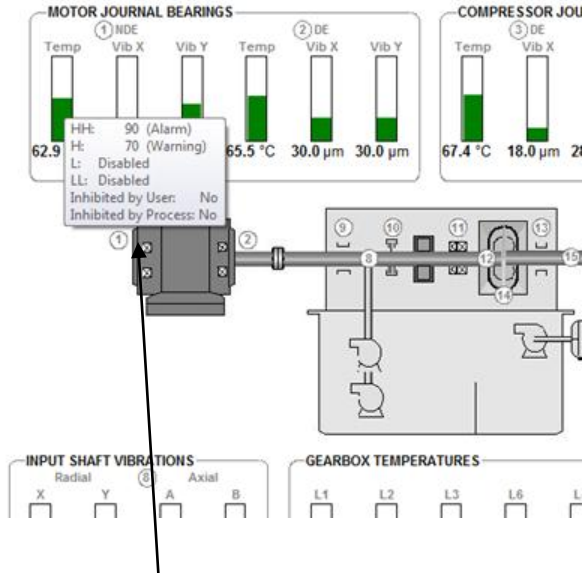
Hover over alarm status or Traffic light – get tooltip showing settings
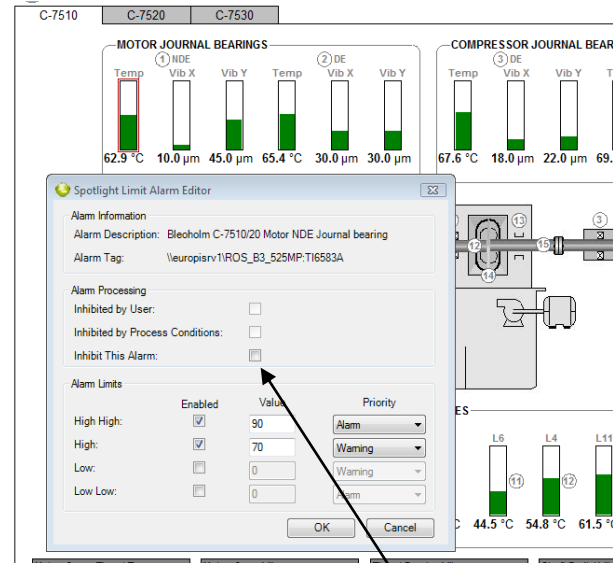
Click on alarm status or traffic light – get form to edit settings.

Spotlight – AF Configuration

Asset/Equipment Tree Structure

Individual Equipment (run indicators, etc.)

Displays (alarm rollup for summary)

Individual Alarms (allows more than one alarm type per measurement)

Alarm limits configuration

Process inhibit (run state)
User inhibit (cascaded down)

Spotlight Notifications

Asset/Equipment item in subject (allows rules to be set up)

Alarm description and state in subject (quick to see issue).

Process value and alarm limits in body.

Examples of Value Delivered

- High Seal Gas filter DP
  - DP reached 3.5BarG, limit should be 1BarG
  - Spotlight alerted users, who following up with operators to swap to standby filter and raised workorder to replace fouled filter
  - If allowed to continue could have caused 14 days lost production @11,000BBLS

- High Seal Oil Tank Temperature
  - Temp should be around 60C, but had reached 116C
  - Spotlight alerted users, who followed up with offshore and it was picked up that 2 seal oil pumps were running instead of 1
  - If high temps are continued seals could have failed and caused 10 days lost production @ 7000bbls

- Surging Compressor
  - Operators reported compressor surging
  - Spotlights history functions allowed engineers to confirm problems had occurred and make control tuning suggestions
  - If allowed to continue would have caused production problems

OSIsoft Products Employed

- Calculations
  - PI ACE (Advanced Calculation Engine)
  - PI Performance Equations

- Displays
  - PI ProcessBook (2012 SP1)
  - Office web component for X/Y plot (VBA driven)
  - Module Database (Performance Plot Configuration)

- Alarm Processing and Notification
  - PI Asset Framework (PI AF) (2010 R3)
  - PI Notifications (2010 R2)
  - Bespoke Data References in PI AF (Alarm Rollup)
  - Bespoke Alarm Processing

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