



Critical Equipment Monitoring for Upstream Operations



SPOTLIGHT

Presented by **Ronald Holden**



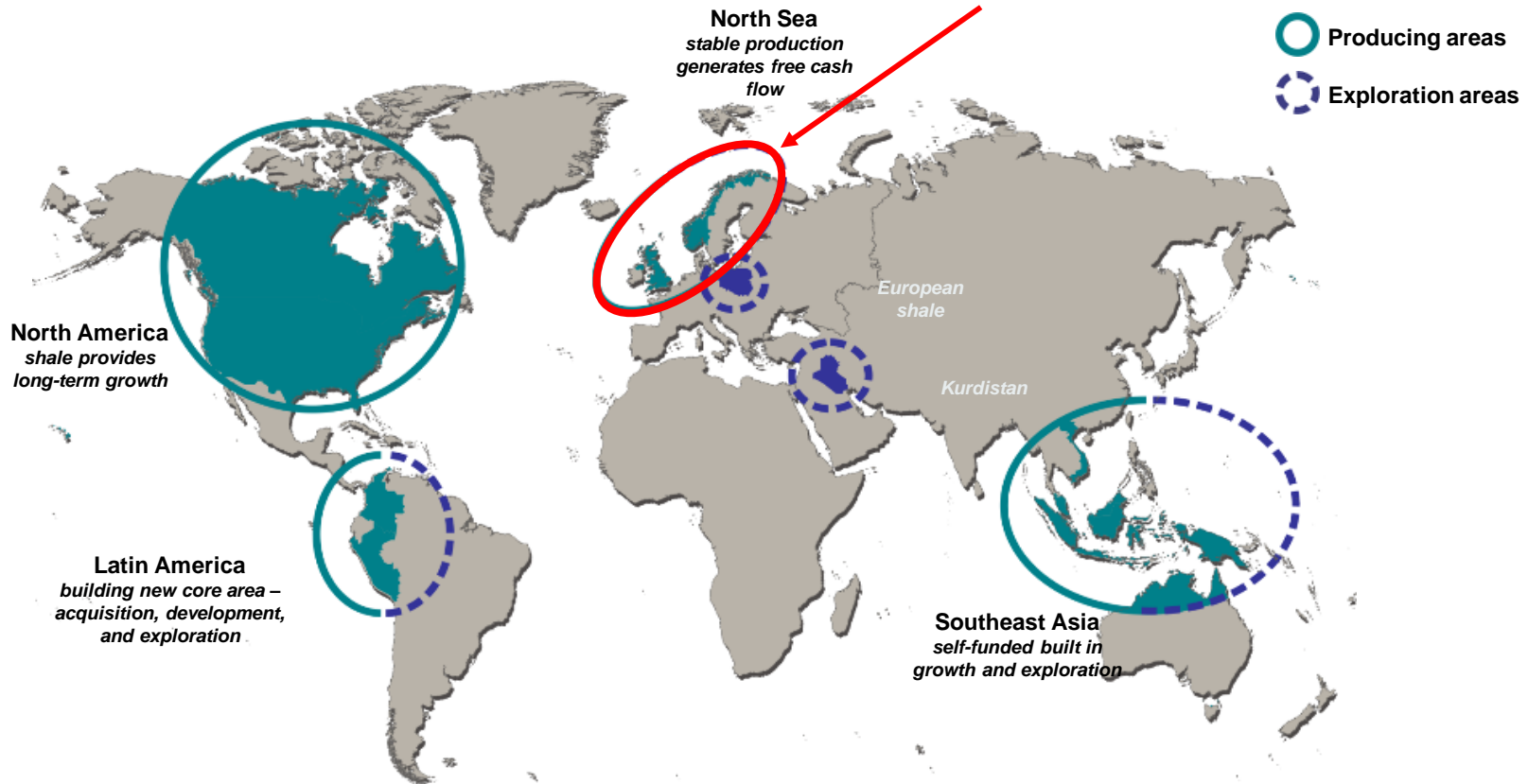
Agenda



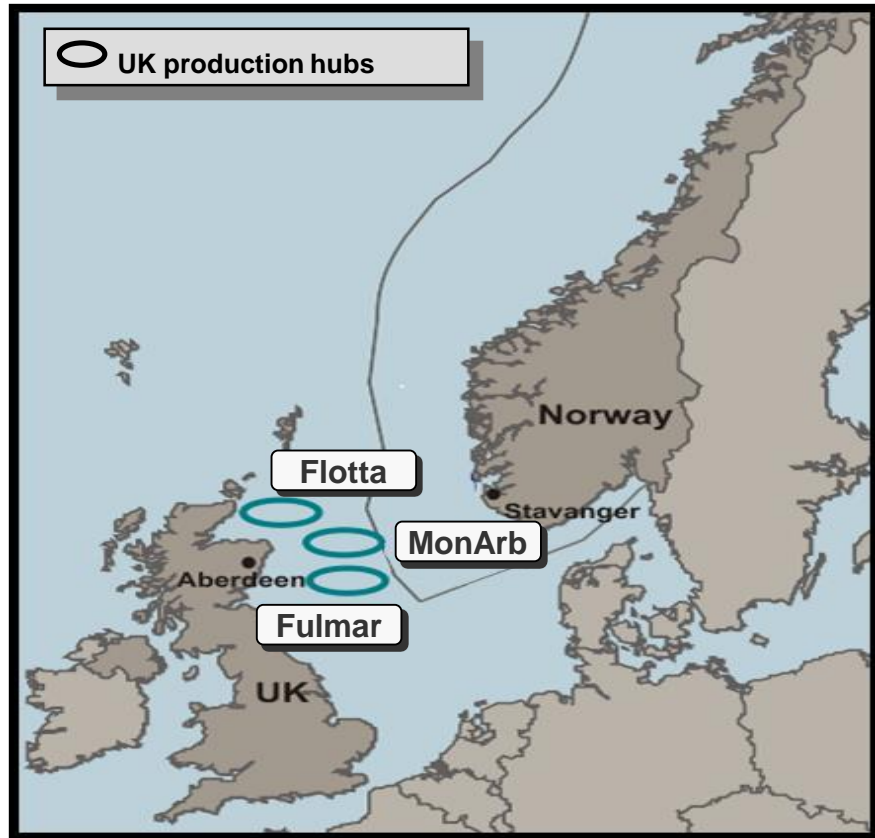
- About Talisman Sinopec Energy UK Limited
- Business Challenge
- Business Solution
- Technical Solution – the *Spotlight* Monitoring Tool
- Solution Architecture and Overview
- Business Benefits - examples
- Summary

About Talisman Energy

Focus of Presentation
Talisman Sinopec Energy UK Limited



About Talisman Sinopec Energy UK Limited



- **Flotta Area – 7 assets**

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



- **MonArb Area – 2 assets**

- Montrose (1976)
- Arbroath (1989)

- **Fulmar Area – 3 assets**

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

- **12 assets, average asset age ~30 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



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)

Technical Landscape

- Lack of performance monitoring / troubleshooting is onerous
- Equipment is often poorly instrumented or not connected into the PI System
- Information is spread across a number of displays and is not presented consistently
- General under-utilisation of PI System capabilities and resources
- 3rd party packages:
 - tend to be focused on a single type of equipment
 - often have high requirements for instrumentation
 - have high licence costs



SPOTLIGHT - PI System Infrastructure

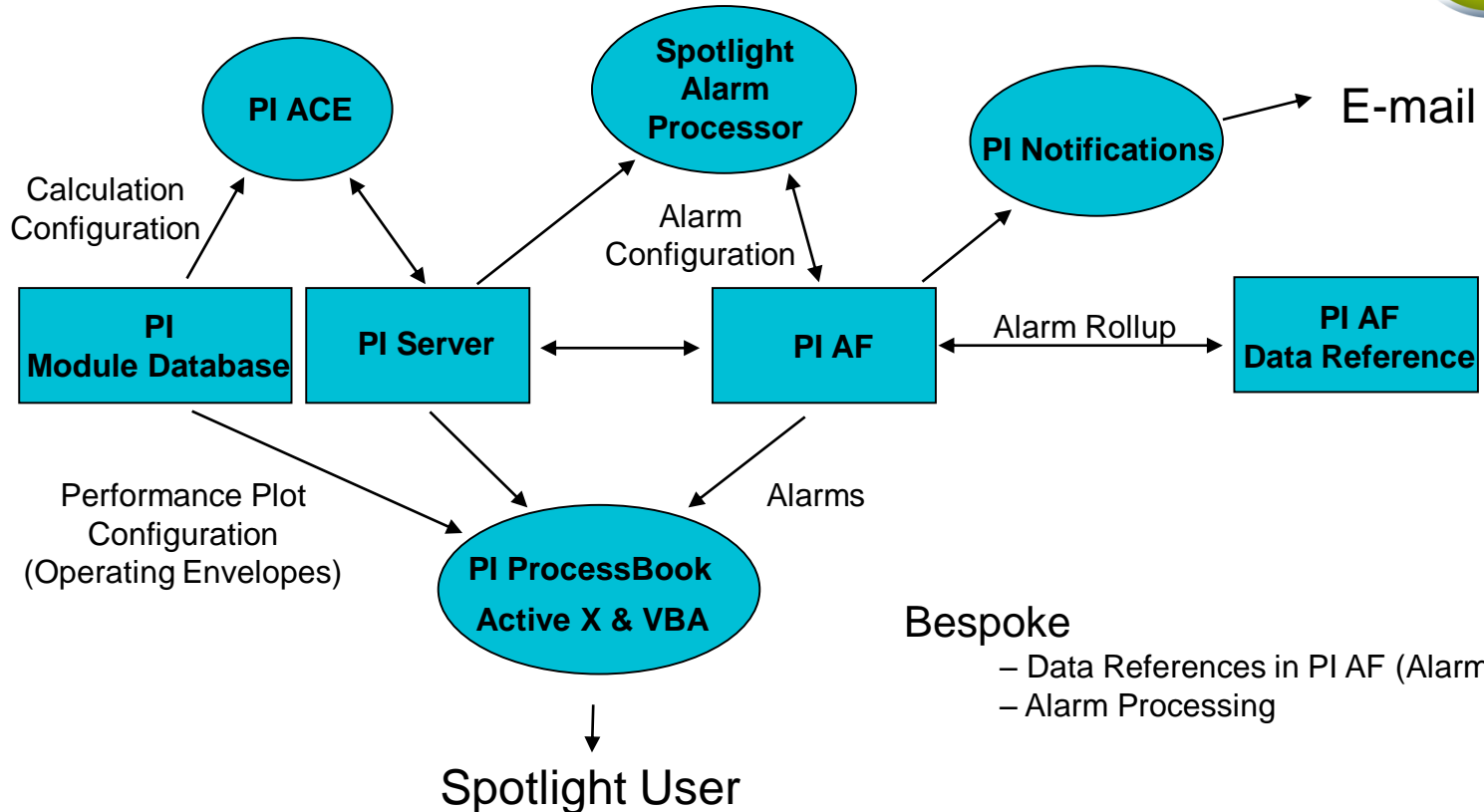
- Data is presented in a consistent manner across all equipment
- Standard equipment displays showing process values and equipment operating points
- Summary displays rolling up information from detailed displays
- Calculation of performance values related to equipment
- Continuous monitoring of live 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



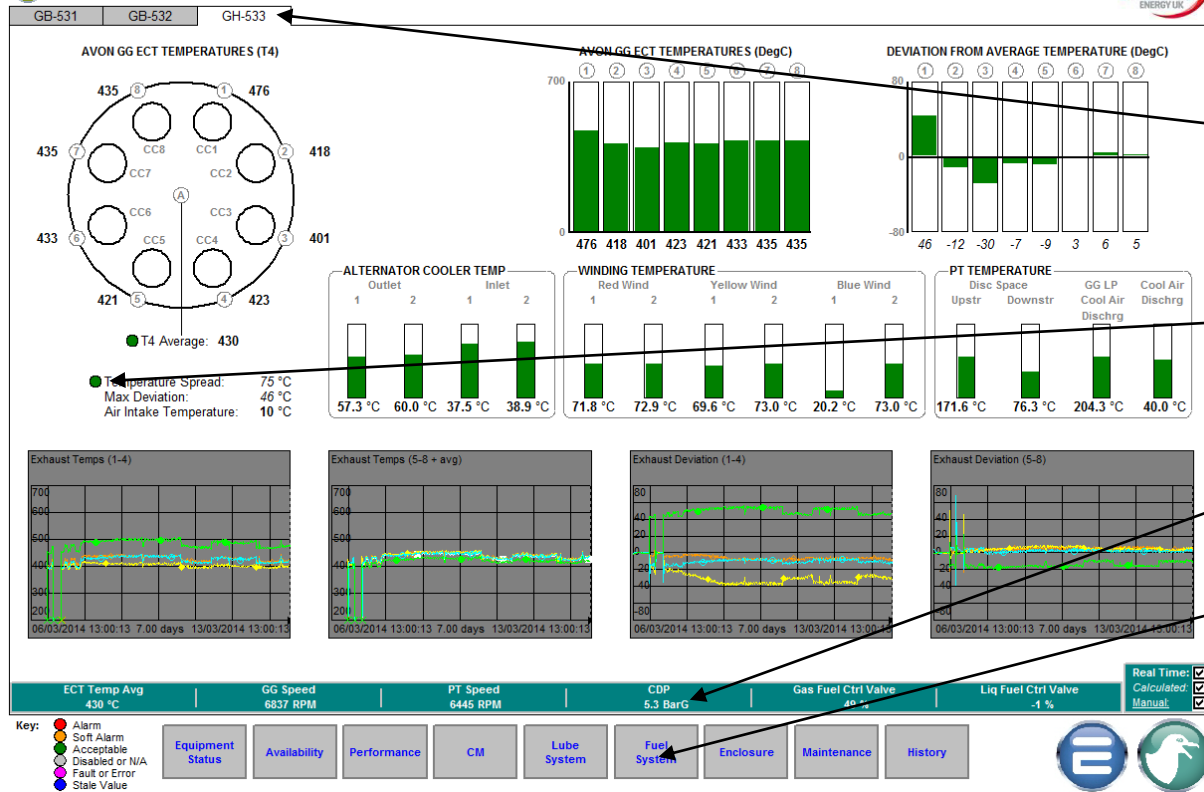
Bespoke

- Data References in PI AF (Alarm Rollup)
- Alarm Processing

Spotlight Display – Basics



Spotlight on Fulmar: GH-533 Temperature Detail



Navigate to similar displays on other equipment

Traffic Lights for alarms

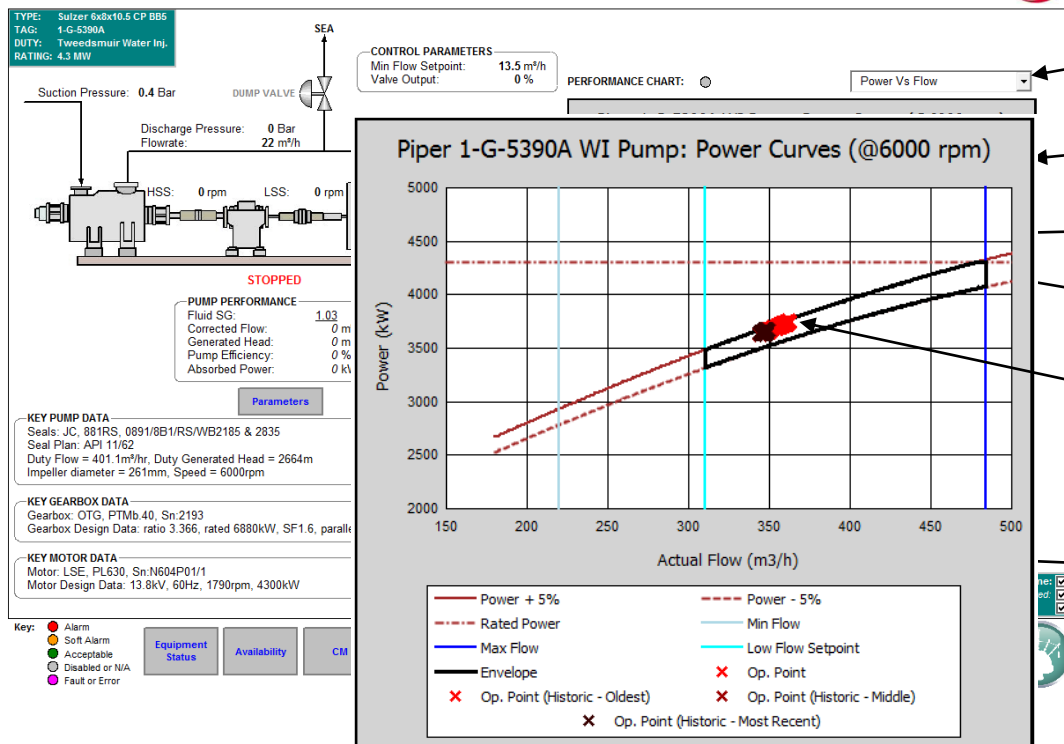
Summary bar showing key data

Navigate to other displays for this equipment

Spotlight Display - Performance



Spotlight on Piper B: 1-G-5390A Performance Detail



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



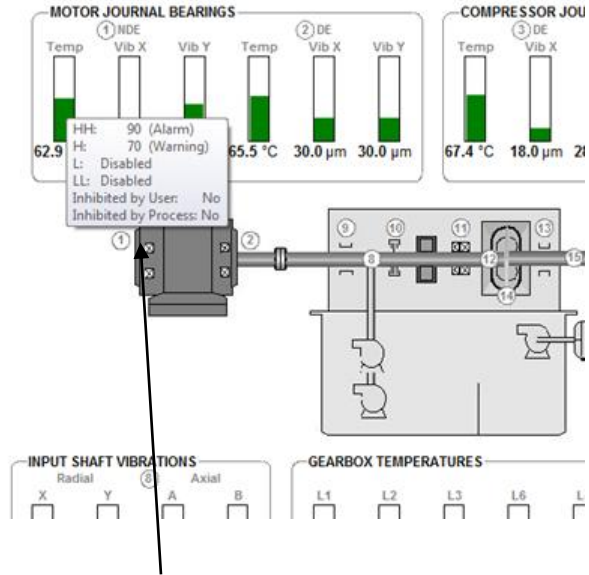
Overview	Auk	Bleo Holm	Buchan	Claymore	Clyde	Flotta	Fulmar	MonArb	Piper	Saltire	Tartan				
Gas Compression								Main Oil Line							
	Run	Avail.	Perf.	CM	Lube	Seal	Maint		Run	Avail.	Perf.	CM	Lube	Seal	Maint
K-3110A								1-G-2600A							
K-3110B								1-G-2600C							
K-3110C								1-G-2310A							
K-3210A								1-G-2310B							
K-3210B								Water Injection							
K-3210C									Run	Avail.	Perf.	CM	Lube	Seal	Maint
K-3310A								1-G-5390A							
K-3310B								1-G-5370A							
Power Generation								1-G-5370B							
	Run	Avail.	Perf.	CM	Lube	Temp	Maint	1-G-5370C							
P-8000A															
P-8000B															
P-8000C															
P-8000D															

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

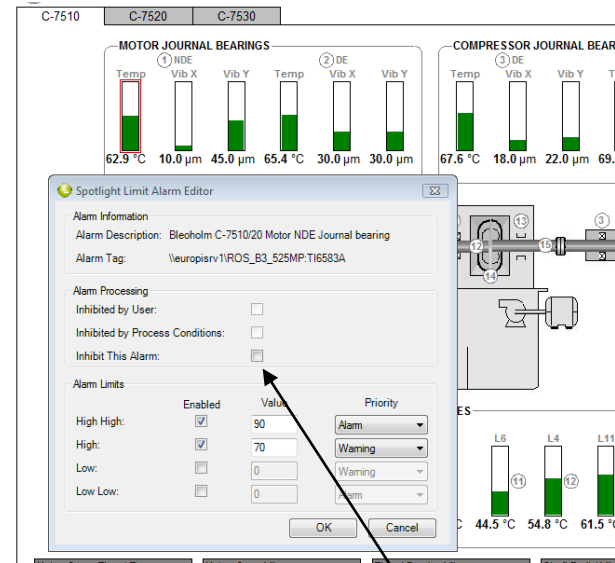
Links to detailed displays for each item of equipment

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



The screenshot shows the OSIsoft AF Configuration interface. On the left, the 'Elements' tree is expanded to show the 'Buchan' element. The 'General' tab is selected, and the 'Filter' is set to 'Name'. The table below shows the configuration for the 'Buchan' element, including various alarm inputs, limits, and states.

Name	Value
Alarm Input	0
Current Alarm State	Process Inhibit
Current Alarm State Value	3
Current Priority	Process Inhibit
Current Priority Value	3
H Alarm	True
Limit Priority	Warning
Limit Value	0.3
HH Alarm	True
Limit Priority	Alarm
Limit Value	0.4
Inhibit	False
L Alarm	False
Limit Priority	Warning
Limit Value	0
LL Alarm	False
Limit Priority	Alarm
Limit Value	0
Process Inhibit	True
User Inhibit	False

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



From:  spotlight@talisman.co.uk Sent: Fri 27/04/2012 16:26
To: Gore, Ian
Cc:
Subject: Spotlight Alarm: Piper K-3110B Compressor Active Thrust Bearing Lube Oil Temperature State: H

Process Value: 98.2186431884766

Alarm Limits:

Alarm State	Value
High High	110
High	95
Low	0
Low Low	0

Alarm Times:

Start Time	26/04/2012 00:47:00 GMT Daylight Time (GMT+01:00:00)
End Time	01/01/1970 00:00:00 GMT Standard Time (GMT00:00:00)

Notification Name: SpotlightLimitAlarmNotification\$61 Path: Piper B/Compressors/K-3110B/Lube System/Compressor Active Thrust Temp/LimitAlarm/Notifications[SpotlightLimitAlarmNotification\$61]

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 Catch**

- DP reached 3.5BarG, limit should be 1BarG
- *Spotlight* alerted users, who followed up with operators to swap to standby filter and raised work order to replace fouled filter
- If allowed to continue could have caused 14 days lost production @11,000bbls/day : 154,000bbls

- **High Seal Oil Tank Temperature Catch**

- Temp should be around 60°C, but had reached 116°C
- *Spotlight* alerted onshore users, who followed up with offshore team and it was picked up that 2 seal oil pumps were running instead of 1
- If high temperatures had continued seals could have failed and caused 10 days lost production @7,000bbls/day : 70,000bbls

- **Surging Compressor Proactive Resolution**

- Operators reported compressor surging
- *Spotlight's* history functions allowed engineers to confirm problems had occurred and make control tuning suggestions
- If allowed to continue would have caused production/mechanical problems



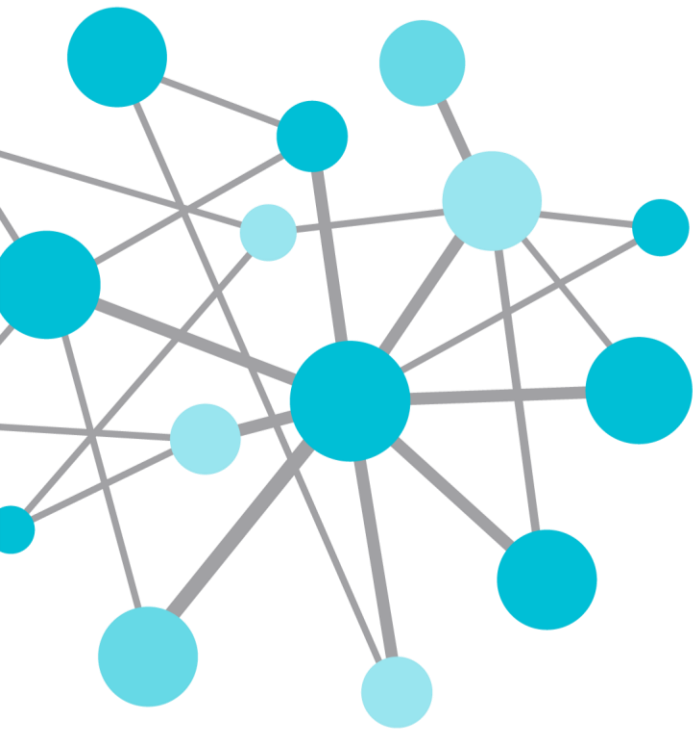
SPOTLIGHT ON ROTATING EQUIPMENT

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YOU

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