



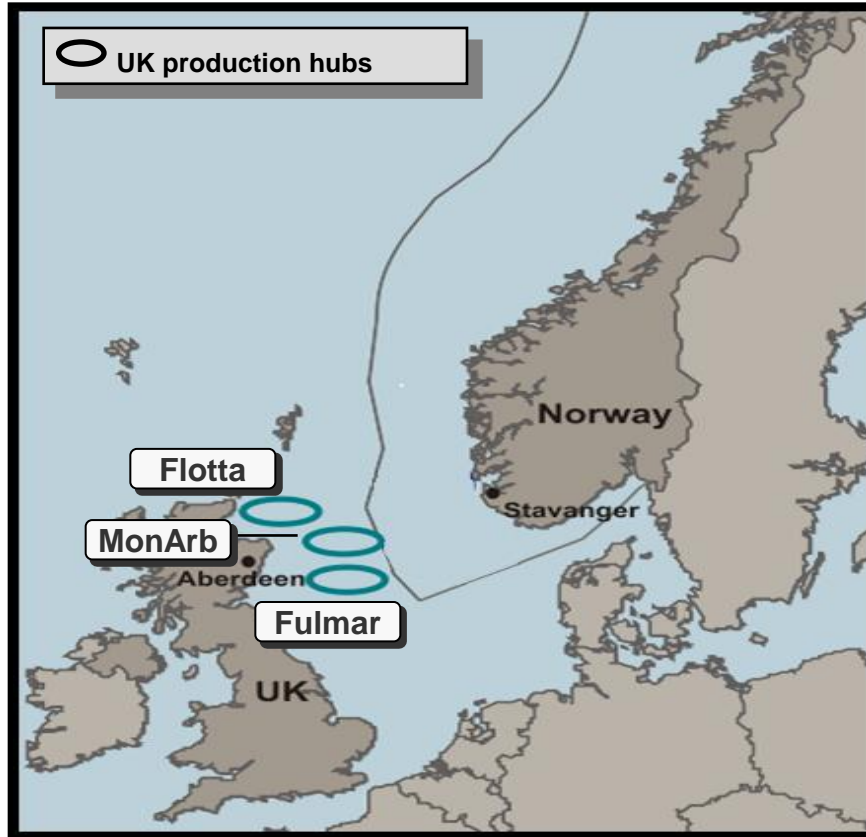
# Critical Equipment Monitoring

Presented by **Sam Scott – Talisman Sinopec Energy (UK) Limited**  
**Ian Gore – CSE Controls Limited**

# 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), Bleholm (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
- 3<sup>rd</sup> party packages:
  - tend to be focused on single type of equipment
  - often high requirements for instrumentation
  - high licence costs.





# SPOTLIGHT

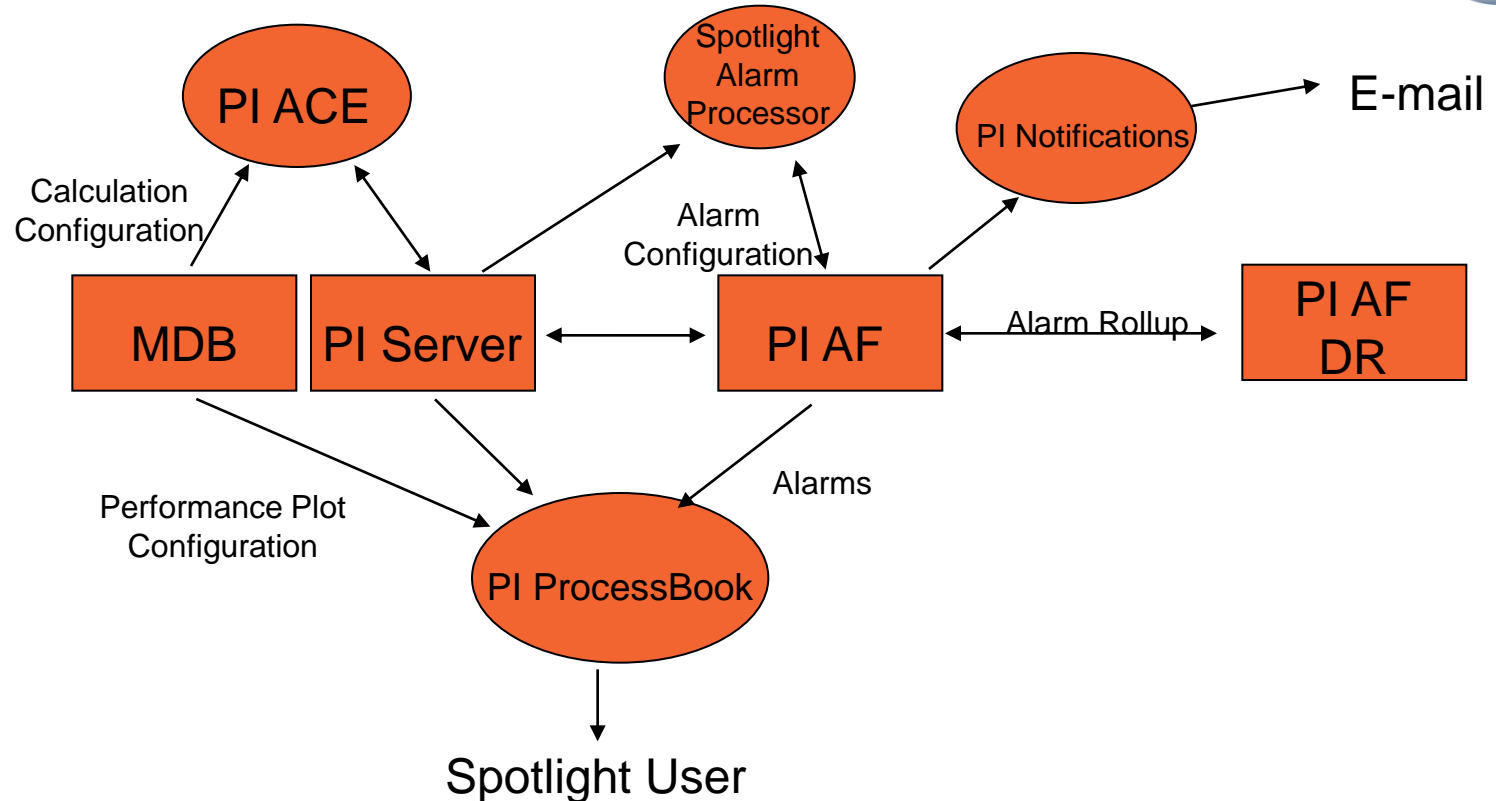
- Data is presented in a consistent manner across all equipment.
- Standard equipment displays showing process values and equipment operating points
- Summary displays rolling up information from detailed displays
- Calculation of performance values related to equipment
- Continuous monitoring of live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

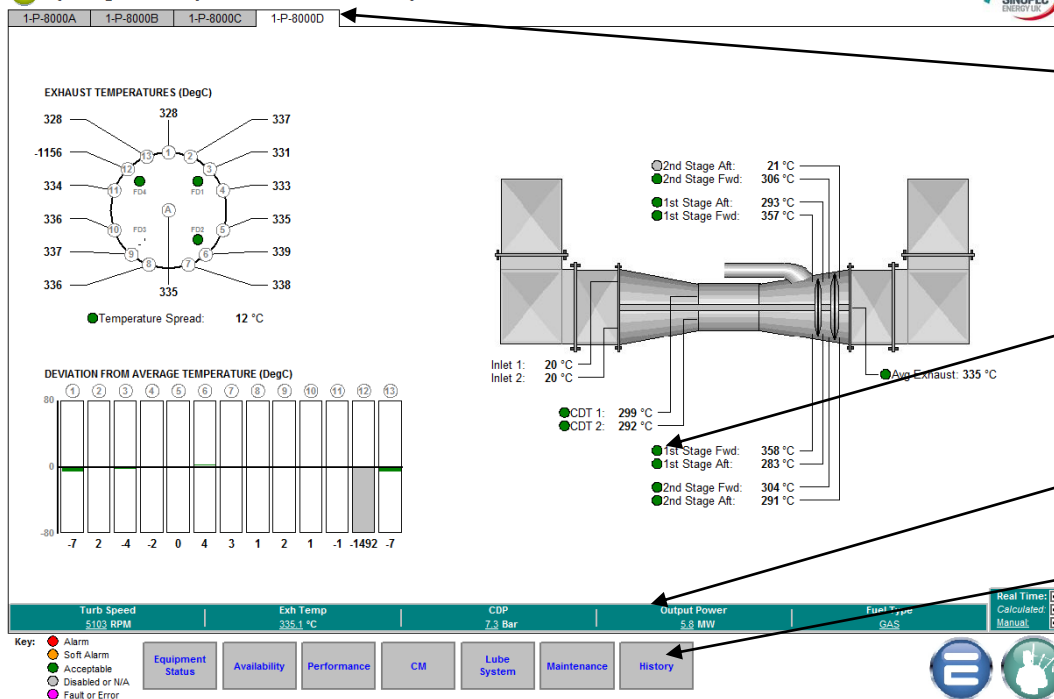
# Spotlight Architecture



# Spotlight Display – Basics



## Spotlight on Piper B: 1-P-8000D Temperature Detail



Navigate to similar displays on other equipment

Traffic Lights for alarms

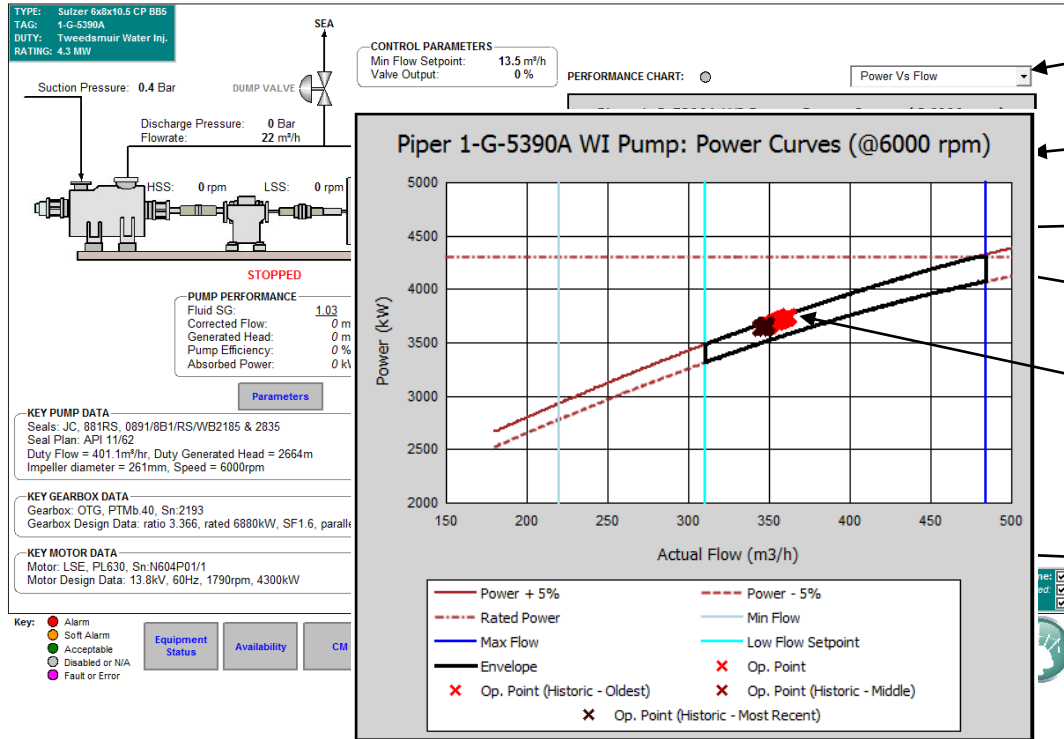
Summary bar showing key data

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



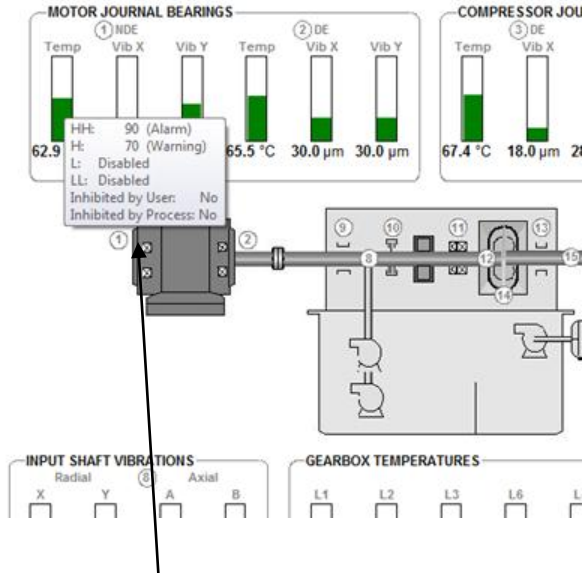
Overview	Auk	Bleo Holm	Buchan	Claymore	Clyde	Flotta	Fulmar	MonArb	Piper	Saltire	Tartan					
<b>Gas Compression</b>						<b>Main Oil Line</b>										
	Run	Avail.	Perf.	CM	Lube	Seal	Maint		Run	Avail.	Perf.	CM	Lube	Seal	Maint	
K-3110A	○	○	○	○	○	○	●	1-G-2600A	○	○	○	○	○	○	○	●
K-3110B	●	○	●	●	●	●	●	1-G-2600C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

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

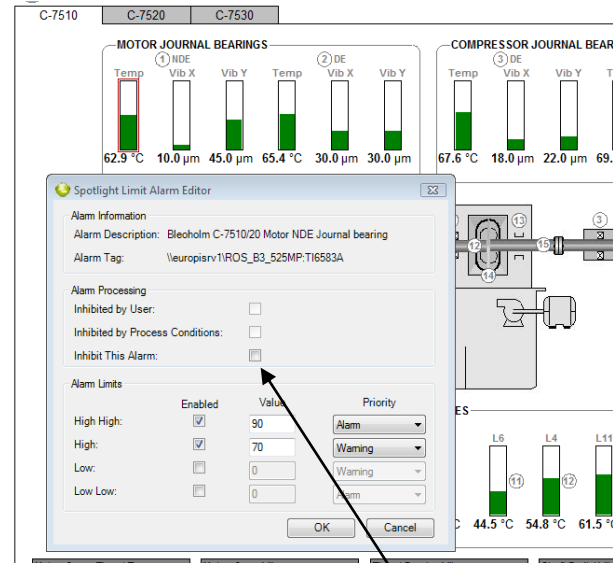
Links to detailed displays for each item of equipment

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 AF Configuration software interface. The main window is titled 'Elements' and displays a tree structure of equipment elements. The selected element is 'Buchan'. The 'General' tab is active, showing a list of configuration parameters and their values. The 'Child Elements' tab is also visible, showing a list of child elements. The interface includes a toolbar with buttons for Database, Query Date, Back, Check In, and Refresh. The 'Elements' tree shows a hierarchy of elements, with 'Buchan' selected. The 'General' tab shows a list of parameters with columns for Name and Value. The 'Child Elements' tab shows a list of child elements with columns for Name and Value.

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: SpotlightLimitAlarmNotifications861 Path: Piper B/Compressors/K-3110B Lube System/Compressor.Active Thrust Temp/LimitAlarm/Notifications[SpotlightLimitAlarmNotifications861]

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 @ 7000bbbls
- 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



# SPOTLIGHT

## ON ROTATING EQUIPMENT

## Contact Information

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