

Sensory Networks in BP

Mike Haley

BP, Chief Technology Office

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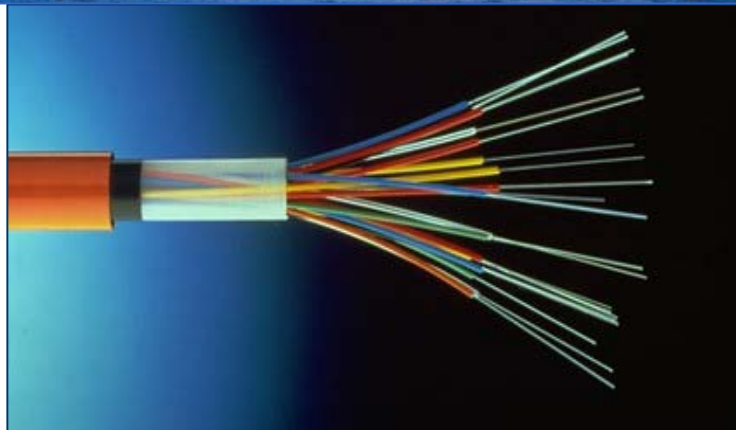
The Segment focus of our business



Exploration & Production



Gas, Power & Renewables



Petrochemicals



Refining & Marketing

What are the BP opportunities?



Applications are being actively considered across the business spectrum



Improve:

- 1. Supply Chain, Logistics and Distribution**
- 2. Asset Management & Maintenance**
- 3. Retail Operations**
- 4. Health, Safety, Security & Environment (HSSE)**



High Potential Opportunities



**Chemicals Rail Car
Telematics**



Lubricants Supply Chain



**HSSE
Road
Safety**



**Ship Engine
Vibration Monitoring**



**Remote LPG Tank
Monitoring**



Audit

**LPG
Cylinder
Tracking**



People Tracking



**Operator Rounds
Optimization**



Pipelines

Digitise operator rounds to improve efficiency and avoid unplanned maintenance

- Support Refining drive for a “**highly reliable organization**” by capturing the **complex work rules** into mobile applications
 - Processes are followed the same way each time
 - Best practices are captured and enforced
 - Unique identification of asset (RFID/Barcode)
 - Audit trail
- Automatically generate work orders
- **Transforms work from responding to breakdowns to preventing them**



- **Refinery** using handhelds and middleware and RFID/Barcodes to identify assets, streamlining operator rounds, audit trail.
- **Application** solutions selected; embedding complex work rules
- **CTO** supporting the business

Reduce time and cost of asset tracking at Retail sites

- The asset churn cycle in South Africa has been a challenge
 - \$700 million in assets including pumps, tanks, microwaves, refrigerators etc. at 1200 stations, 15 depots
- By tagging assets can providing sales managers and maintenance people with data and tracking can happen more frequently and “in the background” – normal process.



Cash-less Gas Station

- Tag cars – filler neck, Reader on pump
- Linked to car computer – mileage
- Driver identifies himself with another tag for payment
- Fleet owners billed overnight – automatic payment.

Successful deployment of technology solutions in South Africa

Improve safety and operations efficiency at chemical plants, refineries and E&P facilities by locating workers

- Track workers that perform tasks in large, remote or dangerous environments and quickly locate workers in an emergency
- Warnings can be provided to workers in hazardous environments



- Trials have proved concept
- Trial in refining will prove operational feasibility by addressing intrinsically safe, form factor, size and cost issues



Protective Clothing & Equipment Check

- Leaving Control (safe) Environment
- Attempt to enter a confined space/vessel.....
 - Is correct clothing being worn?
 - Safety Equipment – Hard Hat, Goggles, Gloves etc?
 - Is breathing apparatus detected?
 - Is there a “permit to work”?
 - Is there more than one person present and who are they?
 - Do those present have valid training certificates?
- Integration with local handhelds or backend systems

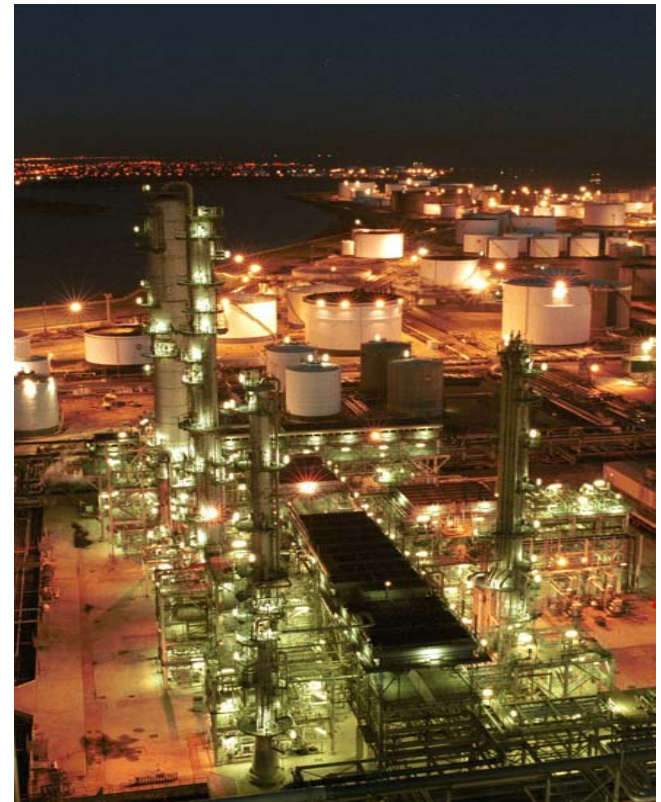


Wireless Refinery Measurements



Reduce unplanned maintenance by using wireless technology to gather information

- Trial of mote technology in a refinery to capture “secondary readings” and environmental data in refineries
- Mote/sensors will cost a fraction of the cost of wired sensors
- Drawing upon Loch Rannoch experience as we work out how to bring motes, sensors together with intrinsically safe requirements into a fully packaged solution



Refining considers this one of their top six initiatives

Moving Toward a Real Time Enterprise



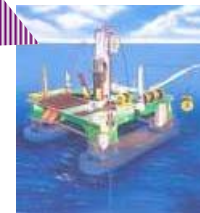
"What if the moment a business event takes place, all systems and people within the enterprise are instantly aware of the occurrence and equipped to act accordingly?"

This is the concept of a Real Time Enterprise

MI Leveraging knowledge assets in "always on" real time business



Field of the Future Real time analysis triggering alerts and action



Sensory Networks Applications Connecting physical and digital assets



Industrial

Data automatically integrated into decision support systems



Retail/Lubricants

Customer intelligence-based decisions in real time

Thank you

