IBM C&P Solutions

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Connected Solutions

- Corporate applications (standardized)
- Local applications (different per asset)
- Turnaround Optimisation
- SMART Alarms
- MAXIMO
- Real-time IT architecture with RSM
- Location Awareness & Security
- Common access to information
- Local & global operation centres
Integrated Operations

Common challenges ..
- Returns at peak
- Reserves replacement struggle
- Production volumes increases are flat
- Costs still rising
- Capex rising at 10%
- Profitability has not risen with prices
- Higher dividends and buybacks

Are driving the sector to ..
- Improve recovery rates
- Reduce finding and development costs
- Improve time to first oil
- Manage portfolio more effectively

... by being smarter and more creative
in management of physical and information assets

Technology advances …
- Downhole sensors
- Networks
- Data management, search, analysis
- Optimisation solutions
- Collaboration & visualisation
- Web services & integration architectures

… and as a result
- “Integrated Operations” (or FotF, Smartfields, i-field, iValue, etc)
- Realising the vision for the real-time and remote management of assets, irrespective of their geography or complexity, to optimise the reservoir-to-market cycle.
Intelligent Oil Fields

- Utilisation of real-time systems, enhanced analytical tools, improved data and knowledge management to change the way oil & gas companies work
- Integrating People, Process, and Technology to improve performance by leveraging frequently-captured data, delivered and acted-upon in real-time
- Enhancing productivity by connecting people and/or communities (e.g. offshore and onshore) with real time or near real time data, information and enhanced video links
Intelligent Oil Fields

- Achieving increased value through the optimisation of core business capabilities / processes

- Benefits include:
  - Accelerated / increased production & Recovery
  - Improved Operating Efficiency, Decreased Maintenance,
  - Optimised vendor & Logistics Support,
  - Accelerated Training & nationalisation of Workforce
  - Improved HSSE, Reduced NPT
Integrated Information Framework and Architecture

The Specific Upstream Challenge

- Many oil & gas installations with significantly different applications
- Corporate target to standardize processes and applications for management and operation of the installations
- An IT architecture supporting a fast and cost-efficient rollout of standardized applications and processes a prerequisite

Must integrate and cooperate with many ongoing projects

- Service-oriented
- Based on key industry standards like ISO1323 & I3A
Turnaround Optimisation

- A management and planning dashboard solution that manages, plans and optimises turnarounds.
- Efficient management of turnarounds and unforeseen (but plan-able) shutdowns
- Identification of optimal timing and duration of future turnarounds for a single asset
- Optimisation of turnarounds across assets establishing long term turnaround plans (10 years)
Turnaround Optimisation

Develop a **decision support solution** - work processes, methods and applications - **that reduce production losses and costs** caused by turnarounds and unplanned shutdowns

**[A] Knowledge analyzer**

- Efficient management of turnarounds and unforeseen (but planable) shutdowns
  - Supporting best practice
  - Measuring preparedness (and risks)
  - Benchmarking
  - Drill down analysis of PUF loss factors

**[B] Risk analyzer**

- Identification of optimal timing and duration of future turnarounds for a single asset
  - Establishing work processes for data gathering and analysis
  - Developing methods and tools for modelling and optimization of turnaround scenarios
  - Visualising benefits and risks

**[C] Optimizer**

- Optimization of turnarounds across assets
  - Establishing long term turnaround plan (10 years)
  - Identifying bottlenecks caused by e.g. infrastructure dependencies, resource requirements etc.
  - Developing methods and tools for optimization of turnarounds across assets

Efficient management of turnarounds and unforeseen (but planable) shutdowns

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Location Awareness & Safety

**Challenge**

Comply with environmental safety regulations to track location of all on-site personnel at all times. Ensure personnel safety in emergencies and improve personnel utilization. Monitor entry to danger zones and entry qualifications for personnel and contractors.

**Solution**

Personnel wear active tags while on site which are read by RFID receivers. Worker location is automatically updated. Data is integrated with the HR system to determine restricted zone access. A visual console provides real-time data to operations personnel. Zones are virtual and can be changed. Materials which are restricted to zones, such as dangerous tools, also can be tagged and managed.

**Benefits**

- Meets Government Safety Regulations
- Improves service level by routing “qualified” technicians to emergency situations
- Optimizes worker utilization
Location Awareness & Safety

• Real time solution leveraging advances in the latest RFID, Detection & Communication technologies to improve C&P industry safety and security
• Automatically identifies, locates, and accounts for workers, contractors, and visitors in hazardous areas
• Strengthens safety and security facility-wide by finding and accounting for personnel in emergencies
• Detects unauthorized access into security areas
• Benefits
  – Meet Government Safety Regulations
  – Labor reduction by more efficient utilization of resource
  – Improved service level by routing utilization of worker
Location Awareness & Safety

Ref. the ATLAS interactive demo
Smart Alarms / Smart Processes

- Common, end-to-end approach, for monitoring & managing multiple production equipment types and systems
- A open framework, incorporating existing & new technologies
- Complements any existing alarm infrastructure, automates diagnostic response, deploys standard workflow to:
  - Improve quality & speed of the “on-the-ground” response
  - Enhance productivity of scarce specialist resources by reducing “distractions” & enabling focus on complex problems
Smart Alarms / Smart Processes

Information Integration Framework

EXISTING APPLICATIONS & SOURCES

- OPERATIONAL REPOSITORY
- ERP system
- Plant and Asset Management
- SCADA/Safety and Automation System
- Surveillance system
- Historian

Proof of Concept
Smart Alarms / Smart Processes

• Event Early Warning
  – Sophisticated algorithm’s to provide “early warning” of downhole and topside problems
  – Provides “smarter”, more accurate alarming
  – Works as a web-service to be integrated into client environment

• Semantic Engine
  – Provides a way to harvest and apply knowledge
  – Turns knowledge into “active” knowledge
  – Can be applied anywhere knowledge and reasoning are key (ie. Operations)
  – Part of an overall KM Program

A unique, proprietary technology that allows for the harvesting and application of knowledge to assist with Knowledge Management and Real Time Intelligent Advisory Automation to support and automate ongoing operations.