



Collaboration for improved decision making in drilling

CODIO - A Demo 2000 and industry funded project

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20th October 2011*



Agenda

- IO Background and History in ConocoPhillips
- Challenges in drilling operations, today and in the near future
- How has IO improved the situation, what are the remaining gaps
- The role of information technology in supporting IO processes
- The CODIO solution for collaboration and decision making



IO Background and History in ConocoPhillips



Safety

Risk

Cost

Revenue

Improved HSE

- Do more onshore - more time for offshore to do HSE activity
- Improved communication / planning / collaboration fundamental - HSE Excellence

Reduction of risk

- Establish onshore barriers
- Onshore monitoring of vital signs - additional eyes
- Quality decision and / reduction in response time

Reduction in cost

- Reduced manning - less people offshore - by doing activity onshore
- Improved productivity by better planning/preparation onshore

Improved production

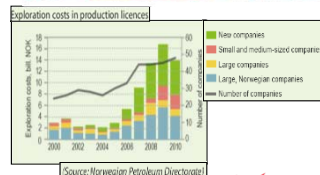
- Improved coordination of production reduction activity - wells and facility
- Improved regularity - improved monitoring and predictability
- Optimization - online condition monitoring of wells and facility
- Travel less

**Our new
Operating Model
More proactive
and predictable**

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Challenges in drilling operations, today and in the near future

- People and organisations
 - Diverse workforce - Physically and geographically dispersed
 - Demographics and generation gap
 - More people involved in decisions
 - Regulatory pressure
 - HSE expectations
 - Knowledge sharing
 - Resistance to change
- Process
 - Standards
 - Communications
- Technology
 - Dependent on robust IT infrastructure
 - Connections - between companies - interfaces
 - Security
 - Data quality concerns
- Others
 - High NPT
 - High costs on the NCS
 - Drilling complexity
 - Remoteness - example in the Arctic



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How has IO improved the situation, what are the remaining gaps

- Value creation well documented for IO on the NCS
 - Improved use of data and information
 - Improved planning and preparation
 - Improved communication and collaboration
 - Improved decision making
 - Improved contractor involvement
 - Improved regularity and efficiency
 - Improved predictability
- IO value potential still high
 - Collaboration and communication
 - Situational awareness
 - Integration of functions and companies
 - Data quality concerns
 - Documentation/Visualization of decision making process
 - Knowledge sharing
 - Training and education
 - Cross company
 - Use of Simulators
 - Universities and Academia
 - Costs and high NPT still a challenge on the NCS
 - Business models – more work to be done
 - Industry demographics are still here

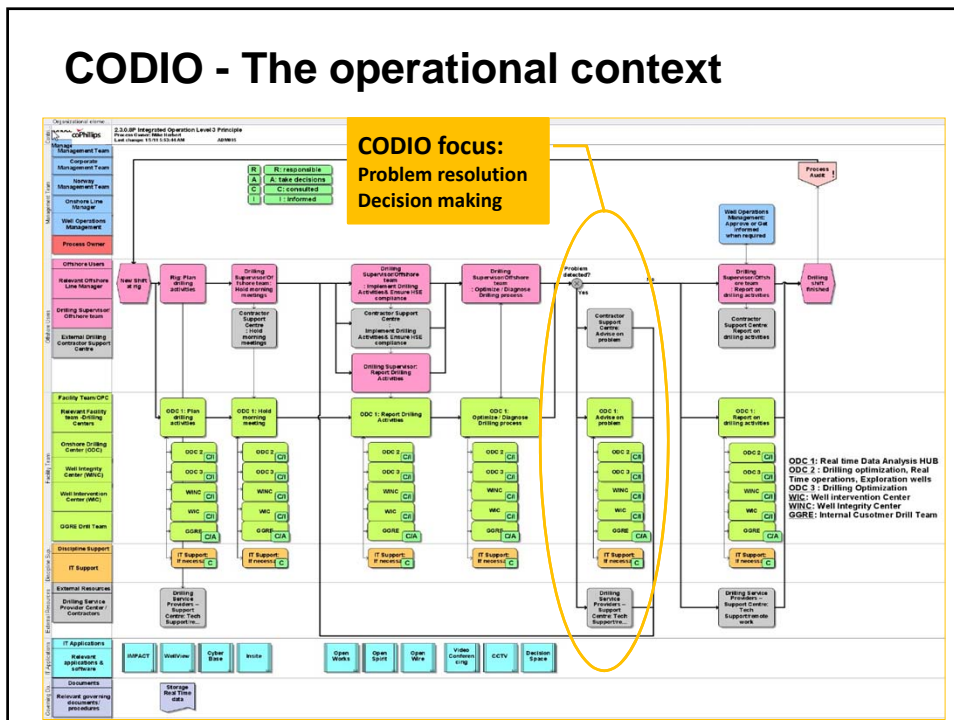
The role of information technology in supporting IO processes

- IT is already an indispensable part of IO – but has more to offer!

- IT for data integration and visualization
- IT for improved awareness and collaboration
- IT for faster and better decision making
- IT for work process support and compliance



CODIO - The operational context



CODIO - Scoping of the solution

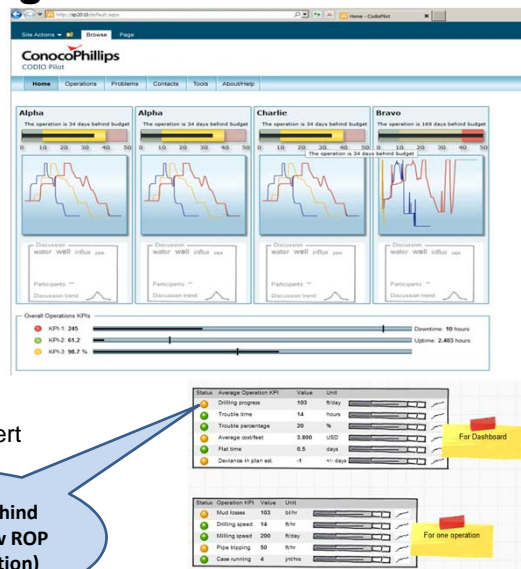
COllaborative Decision making in IO

- **Applicability area.** Focus on collaboration and decision making needed to resolve “Problems detected” in drilling operations
- **Collaboration support.** Facilitate and support informal and light-weight collaboration between actors in problem resolution
- **Relevant information.** Bring forth and present relevant information for problem resolution, suppress irrelevant information
- **Decision support.** Implement a flexible “Assess-Decide-Act” framework for decision support
- **Knowledge management.** Each problem episode, whether successfully resolved or not, may result in a lesson learned
- **Rich visualization.** Use visualization to maximal effect in the users’ interactions with CODIO



CODIO - Data integration and visualization

- High-level dashboard for monitoring – status “at-a-glance”
- Trend visualization and performance KPIs
- Data streams from multiple sources streamed to role-based portals
- Traffic light indicators and alert messages



Alert: We are behind budget due to low ROP (Rate of Penetration)

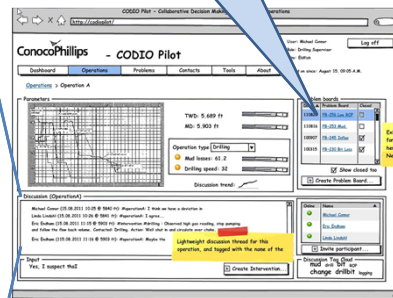
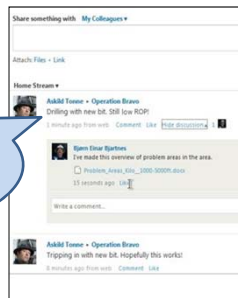


CODIO - Improved awareness and collaboration

- Common workspaces for sharing and communicating
- Discussion boards and micro-blogging
- Immediate access to standard communication tools
- Drill-down to problem boards

I believe the reason for low ROP is that we hit a layer of stringers

We need to look into this. Let's create a problem board



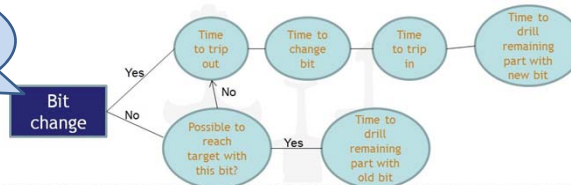
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CODIO - Faster and better decision making

- Collaborative analysis of nature of the problem
- Access to specialized analysis tools
- Exploration of decision alternatives
- Formal decision models – decision trees with uncertainty handling

Let's run through the decision model to see if we should trip out and change bit, or just drill on

Here is what the drill bit looked like after we hit a similar layer in EK-04/8

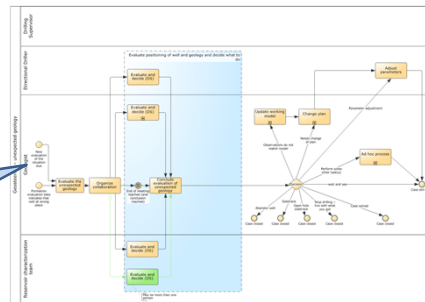


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CODIO - Work process support and compliance

- Work processes defined in management system
- Important for regulatory and safety reasons
- “Executable” work processes to ensure compliance
- Help to follow defined workflow
- Active task guidance

Ok, in order to trip out and change the bit we need to follow this work process. Let's ask for guidance!

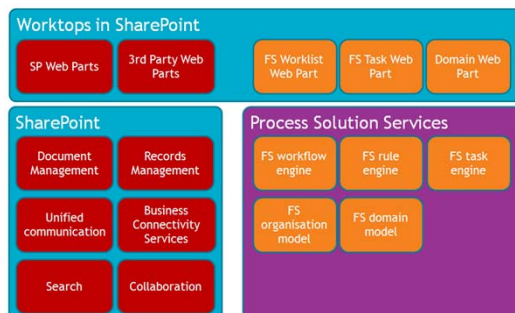


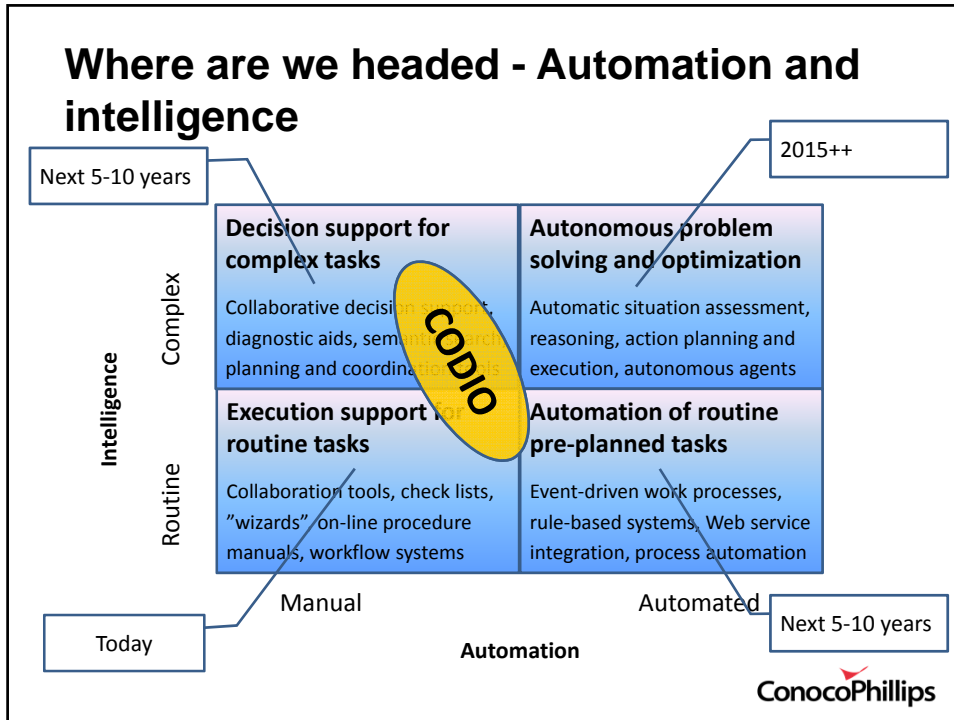
(Illustration only)



CODIO – Embedded in Microsoft SharePoint 2010

- Industry standard platform for collaboration and information sharing
- Integration with “everyday tools” for mail, tasks, calendars, etc.
- “Web parts” for extensions and custom tailoring
- Access to databases and tools
- Standard features for search, document management, authentication, security, ..
- Standardized browser-based look-and-feel





Thank you for your attention!

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