An Industry Solution to the Emerging Field Regulatory Environment

EQUIPMENT INTEGRITY AND REGULATORY COMPLIANCE CONSORTIUM:
A Proposal for Industry Collaboration

November 2010

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Agenda

- The Engineer’s Job is Never Done
- A Changing Landscape – Background
- Knowledge Ops – Solutions / Team
- Risk Management
- Drilling Risk Assessment
- Looks Like SOX – Again?
- BOEMRE Regulations & WCID
- Proposal

"Tell the salesman to come back later, I'm busy."
While Your Fighting Your Daily…

- The Demanding Day Job
- We Are Here to Help
- Understanding The Rules
- Vision to Solution
Adding to Your Plate…

- Planning and executing the boring of new wells.
- Estimating the value of a field, calculating expenses and designing or specifying injection or production well equipment.
- Designing drilling equipment, estimating costs and returns, laying out flow control and fluid transfer systems and or planning and auditing active drilling.
- Supervises, schedules, costs, plans and develops all operations associated with drilling the wells.
- Every stage from initial design to testing to completion to abandonment (whether units are mobile, offshore platforms or land).
- Implement and plan all phases of drilling activities, well completions and well operations.
- Coordinate with land and geological dept. personnel for selection of drilling site.
- Review cost estimates.
- Supervise and monitor operation activities.
- Prepare well plans and the execution of daily operations.
- Ensure wells are executed and planned in an environmentally responsible, cost effective and safe manner.

New License-to-Operate
3 Leg Stool of Processes

New BOEMRE
Regs

Forthcoming?
BOEMRE
Real Time Regs

Developing this model is a Project.
Houston, We Have A Problem

- Societal
  - Legitimate Concerns
  - Not Just Poor Perception or Misunderstanding
  - Not Just the USA

- Political
  - Both Sides of the Aisle
  - State & Local

- Engineering Process
  - Systemic & Complex
  - Extending Across Supply Chain

- Risk Management
  - Now Bet-Your-Company!
Our Team

- Former Governor of Alaska Steve Cowper
  - Valdez Incident
  - Alaska Permanent Fund
  - Sovereign Wealth Funds
- Dr. Scott Shemwell
  - Former Member of Halliburton Energy Services Leadership Team
  - Former Chief Operating Officer
  - Authority on Information Management and Field Process Flow, aka Digital Oilfield
  - Over 300 Publications
  - U.S. Merchant Marine Officer
- Robert T. Dowlearn
  - Petroleum Engineer
  - Ernst & Young Center of Excellence
  - Global Delivery of Oil & Gas Solutions
  - Significant Virtual Team - Systems Integration
About Knowledge Ops, Inc.

- Field Operation Processes & Decision Support
  - Field Based Information Infrastructure
    - Operations & Maintenance
    - Logistics
- Our Partners
  - General Dynamics
    - Operations Management Solution
    - 40,000 Users
  - TASC
    - $1.6 Billion Northrop Grumman Spinout
    - Maritime Logistics Management
- Principals have extensive experience in upstream field operations
  - Acknowledged expertise
  - Published
  - Senior executives with major industry players
- Vetted Solutions
  - Industry
  - Military
- Knowledge About Operations
  - Business Process Modeling (BPM)
  - Information and Data Flow
- Spinout
  - Established professional services firm
  - Extensive tested and documented methodology

Solutions Available NOW! No Testing on Your Part Required – Low RISK
Maximizing Field Operations Process & Equipment Integrity: Operational Efficiency & Disaster Planning and Recovery

Asset Management Business Process Flow

Read RFID Tag
Determine Equipment Properties
Perform Work Processes
Update Equipment Database

Extract, Update Equipment Information

Asset Management Information Flow (Aligned with Business Process Flow)

Unique Identification

Equipment / Asset Wiki
1. Right Equipment
2. Field Personnel have access to the right information about the equipment

Unique Identification

Military Grade RFID Tags

Operations Personnel "see" the same information as the home office engineering and management staffs

ENABLING BETTER AND FASTER DECISION MAKING
1. HSE
2. Lower Direct Costs
3. Shorten Decision Cycle Time
4. REDUCED DOWNTIME

Secure Computing Cloud

"All the Field Needs to Know to Safely Operate"

Network Operations Center

Users of this Secure System May Include:
1. Internal Personnel
2. Supply Chain Partners
3. Regulatory Agencies (as required)
4. Others as deemed appropriate

Information & Data May Include All Required by Field Operations and Maintenance and Supported by Key Expertise Located Worldwide

Field Handheld Field Devices

"As required" Information sharing necessary with "partners et al." to accomplish operational goals.

Information Flow
Systemic Risk Management

- Systemic vs. Occupational Only
  - Systemic
    - Man, Machine, Process, Environment Interface
    - Holistic - More than Fault Tree Analysis
    - Linkages are Weak Points
      - Include Supply Chain Linkages
    - The Best Perspective
  - Occupational
    - Simplistic
    - Slogans and OSHA “like” reporting
    - Good not Great (or acceptable today)
  - Systemic is ONLY Viable Approach
    - Real Time Systems
    - Appropriate Human Training
Complexity = Risk Squared

- Black Swan Event
  - High-Consequence----Low-Frequency
  - You buy the entire Risk Curve not just some level of “sigma”

- Major losses occur because operating under conditions of high risk
  - Not a matter of “if” but only “when”

- Complex systems migrate toward states of high risk

- Major Incidents often the Culmination of a Number of Issues
Example--Drilling Risk Assessment Model

- Developed in conjunction with a Super Independent
  - Vetted and proven

- Project Management Institute
  - Best Practices (PMBOK)
  - Data and Information Enabled
    - WTSML
    - Other
  - BPM

- Basis for Emerging Regulations
Drilling Risk Assessment Process

Basic, Generic, Decision Process Template
Project Management Institute Best Practices

PMBOK: Project Management Body of Knowledge

www.pmi.org
Integration with the PMBOK Process Groups

1. Develop project charter
   2 Develop Prelim Proj Scope

1. G&G Line Charter
   2 Engr line charter

1. Project charter
   2 Prelim Proj Scope

Planning Process

Group Process

KnowledgeOps
Integration with the PMBOK Input / Output Processes

1. Develop project charter
2. Develop Preliminary Project Scope
   1. Project charter
   2. Preliminary Project Scope

Group Process
Planning Process
Executing Process
Closing Process
D-Rat Process Model

Sample model, not the final representation of the process. For illustrative purposes only.

Initiation Phase

Planning Phase
From Process to Software Solution

1) Process

2) Logic

3) Subjective
Stage One -- Preliminary D-RAT

Outside Issues
- Organizational Process Assets
  - Low Impact
  - High Impact
- External Factors
  - Low Impact
  - High Impact

From Other Processes
- Project Scope Statement
  - Poorly Defined
  - Well Defined
- Project Resources Availability
  - Low
  - Average
  - High

Earth Model
- Number of Offset Wells
  - Small
  - Large
- Quality of Horizon Maps
  - Low
  - Average
  - High
- Project Resources Capabilities
  - Low
  - Average
  - High

Service Companies
- Company A
  - Low
  - Average
  - High
- Company B
  - Low
  - Average
  - High
- Company C
  - Low
  - Average
  - High

Selection Criteria
- Well Type
  - Shallow
  - Intermediate
  - Deep
- Confidence in Model
  - Low
  - Medium
  - High

Stage Two -- Final D-RAT

Assumptions
- Quality of Drilling Assumptions
  - Low
  - Average
  - High
- Contingencies
  - None
  - Many
- Cost of Additional Data
  - Low
  - High

Human Resources
- HR Availability
  - Low
  - Average
  - High
- HR Capability
  - Low
  - Average
  - High

Options
- Option A
  - Refined G&G Assumptions
    - Low
    - Meet
    - Exceed
  - Meets LEED Criteria
    - Low
    - Meet
    - Exceed
  - Confirm Engineering Assumptions
    - Low
    - Meet
    - Exceed
  - Other Option Summary Profiles
    - Option B
      - Low Quality
      - High Quality
    - Option C
      - Low Quality
      - High Quality

For illustrative purposes only.
Decision Support Model Output

Scenario Output - D-RAT Model

- Quality of Preliminary D-RAT
- Final D-RAT Value Proposition
- Confidence in Final D-RAT

- Best Drilling Option
- Preferred Service Company
- Project Risk

Main Key Performance Indicator

Sample model, not the final representation of the process. For illustrative purposes only.
SOX Requirements

- Sox Compliance is not an option
  - CEO sign off
  - Section 404, internal management process requirements
  - Third Party Oversight

- This is different than BOEMRE Regulations, How?
Typical SOX Template Family

<table>
<thead>
<tr>
<th>Typical Set of SOX Templates may include:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assertion Declaration</td>
<td>Audit Committee Charter</td>
</tr>
<tr>
<td>Audit Report</td>
<td>Chairperson Assignment Memo</td>
</tr>
<tr>
<td>Compliance Form Package Index</td>
<td>Compliance Funding Authorization</td>
</tr>
<tr>
<td>Compliance Project Definition</td>
<td>Compliance Project Org. Chart</td>
</tr>
<tr>
<td>Compliance Readiness Checklist</td>
<td>Compl. Risk Assessment Plan</td>
</tr>
<tr>
<td>Compliance Risk Register</td>
<td>Compliance Scope Document</td>
</tr>
<tr>
<td>Compliance Test Plan</td>
<td>Control Environment Survey</td>
</tr>
<tr>
<td>Disclosure Committee Charter</td>
<td>Disclosure Plan</td>
</tr>
<tr>
<td>Gap Analysis</td>
<td>Internal Audit Cmtee. Charter</td>
</tr>
<tr>
<td>Risk Control Matrix</td>
<td>SOX Act Brief</td>
</tr>
</tbody>
</table>

Total of 32 separate processes integrated into single solution.
Process How SOX Unfolded

- Go By for New Regulations
  - Compilation of Bills (compromise)
  - Typical *Bill-to-Law* Process
  - Three year implementation

- Objected to
  - Industry declared costs unreasonable
  - Legislation unnecessary

- Silver Lining . . .
  - Corporate Governance
Corporate Governance; circa 2002

- Additional Benefit of SOX
  - In 2002, McKinsey / Global Corporate Governance Forum
    - Over 75% of 200+ fund managers would be willing to pay more for stock in companies with strong governance.
    - North America and Europe market value averaged 12-14% higher for firms with strong shareholder rights


- By 2005 this gap had closed
Compliance Management

- Industry Standard Important
  - Process
  - Data Standards (WTSML etc)

- 80 / 20 Rule
  - To Where the Puck Will Be
    - Get Out Ahead
    - New Rules of Engagement (new battle)
  - Start NOW
    - Public Relations
    - Government Relations
    - Early adopters of SOX spent 10% LESS on Compliance
      - Saved Millions of $$
Go with What You Know

- From **BOEMRE** (Oct 12, 2010)
  - Increased Oil Company Accountability
  - New Blowout Preventer Standards
  - Well Design and Cementing Requirements
  - Independent Third Party Certification.

- From **The Sarbanes-Oxley Act of 2002**
  - Compliance is mandatory
  - CEO, CFO sign off
  - Section 404, internal management process requirements
  - Third Party Oversight

**Must Incorporate WCID and potential Real Time Oversight**
Operating Procedures Task Force: Well Construction Interfacing Document (WCID)

- Well construction interface / Basis of design
  - Location & environment
  - Geologic and geophysical
  - Well design
  - Well barriers (with much detail)
  - Casing design
  - Well execution plan (with detail)
  - Critical well Risk Assessments
  - Operator’s MOC

- Drilling contractor safety case and lease operator SMS interface
  - Management structure / RR’s / Acct
  - Drilling Contractor MOC
  - Personnel management
  - Well control procedures
  - Risk management processes
  - Emergency response
  - Monitoring, auditing and review
A Posited Construct

- The industry will have to meet new regulatory requirements
  - NOT an option
  - Get out ahead of the puck!

- Ultimately a Business Process Model (BPM) Solution
  - Process and information requirements
  - Field Operations
    - Outside the ERP Firewall

- License to Operate
  - Bet Your Company
  - Shareholder Value at Risk?
  - Meets the Fiduciary Test
Constituents (Private & Public)

- Industry Actors
  - Operators
  - Drilling Contractors
  - Equipment Providers (PESA members)
  - Software Providers
  - Systems Integrators
  - Regulatory Agencies
  - Academic Institutes
  - Other

- Public At Large
  - Assurance
  - Political Aspects

- Complex Political and Agency Interaction
  - Behavioral not Bottom Line Driven

- Wallace S. Sayre Model of the Federal Decision-making System
  - Process
    - Alliance building
    - Bargaining/Negotiation
    - Compromise
  - Limitations
    - Rationality lacking
    - Innovation depressed
    - Public interest not represented

These are the complex and convoluted human interactions the drilling industry faces today
Proposal

- Industry Consortium
  - Proven business model
  - Works well for standards
- Most Successful when Commercial Firms Involved
  - Focused on requirements
  - Rapid response to situation
- Cost Sharing
  - Mitigates Risk
  - Partnering Assures Success
- Tiered Support
  - Academic (University of Houston, College of Technology is interested)
  - Industry Participation
- Assures Viable Solution Emerges
  - Timely
  - Accurate
  - Documented
- Bottom Line
  - Industry Solution
  - Rapidly
  - Cost Effective
Consortium Participants

Broad Based (Aligned) Industry Driven Solution

KOl Enabled Industry Consortium

Primary Participants

Secondary Participants

IT Industry
Universities
Process Control
Equipment Suppliers
Energy Services
Government Grants
Suppliers

Industry Solution
Consortium Process

- To be finalized by participants
- Series of workshops
  - Facilitated by KOI
  - Report back to members
- Designed for Speed
- 80/20 Rule
  - Get Deliverables to members ASAP
- Does not preclude individual corporate efforts
Scope of Work & Deliverables

- **Pilot—4 Months**
  - The Preliminary Process Assessment
  - The Preliminary Architecture and Taxonomy Development
  - Industry Value Proposition development and final presentation to consortium (including the Go Forward Plan)
  - Proof of Concept and its industry applicability
  - Risk Assessment including gap analysis for the project implementation
  - Detailed Prioritization and Implementation Plan for the next Phases
  - Detailed Cost Assessment
  - Members only Wiki web site

- **Value to Industry**
  - Jump start a complex, convoluted process
  - Cost sharing
  - Inform constituents of “Forward Progress”
  - Enhanced Governance—Increased Shareholder value

- **Phase II**
  - Implementation process underway
  - Integration to ERP, as required

- **Ongoing**
  - Integration into Operations
  - “The Way We Do Business”

Flow chart:
- **Pilot**
- **Phase II**
- **Ongoing**
- Q4 10
- Q1-3 11
- Q4+ 11
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