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Today’s Oil Industry: High-Tech Tools Improve Your Quality of Life

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Harry Potter
and the Best-Kept Secret
of the Oil Patch

(with apologies to J. K. Rowling)
Typical Outline

- Intro
- Problem
- Solution
- Results
- Conclusions

My Outline

- Intro
- 10 Solutions
- Results
- Problem
- Appeal for Help to Get More Results
Not Your Grandfather’s Industry

**Yesterday**
- Manual
- Hardcopy
- Post or Fax
- Five-spot
- Vertical wells
- Simple, Silos

**Today**
- Automated
- Electronic
- Satellite
- Multilateral
- Designer wells
- Complex, Integrated
The Top Ten Tech Solutions

1. 3D Seismic Interpretation & Visualization
2. 3D Plant Design & Plant Lifecycle Management
3. Measurement & Logging While Drilling
4. Reservoir Modeling and Simulation
5. Real-time Data from Production Operations
6. Satellite & Wireless Applications
7. Knowledge & Content Management
8. Enterprise Resource Management Systems
9. Infrastructure, Security & Data Storage
10. Applications & Systems Integration
#1: 3D Seismic Interpretation

3D Seismic – create models of subsurface formations to identify oil and gas deposits. Increased accuracy in locating resources leads to fewer wells drilled and less waste, for the same volume of oil and gas.

3D seismic models are projected in a 180-degree view so geoscientists can virtually step into the subsurface to explore.
#2: 3D Plant Design & PLM

- Outsourcing
- Collaboration
- As-Built Models
- Training
- Operations
- Maintenance
#3: MWD & LWD Via Web
#4: Reservoir Models & Simulation

- PC-based: Windows or Linux
- Run more simulations & iterations
- Grid => Mesh
- Statistical analysis, probability
- Integrate with downhole hydraulics
#5: Real-Time Data From Production Operations

- **RFID** = radio frequency identification
- **SCADA** = supervisory control & data acquisition
- Process Optimization
#6: Satellite & Wireless

- **IPoVSAT** = Internet Protocol over Very Small Aperture Terminal
- **TDMA** = Time Division Multiple Access
- **802.11 Wi-Fi**
- **WLAN**
#7: Knowledge & Content Management

- Intranet Portals
- Communities of Practice
- Knowledge Bases
#8: ERP, CRM, HR Systems

- E-Commerce & E-Procurement
- Commodities Trading
- Financial and Back-Office Systems
- Customer Resource Management / Sales
- Human Resources Intranet Portals
- Business Intelligence Dashboards
- Business Process Workflow Tools
#9: Infrastructure, Security & Data Storage

- Grid computing
- Firewalls & spam blockers
- Role-based SmartCard access
- Nearline storage
- Paper Well Logs => Digital
- Seismic Tapes => DVD
#10: Applications & Systems Integration

- Web Services – XML
- ASP model – Petris
- SOA, UDDI & SOAP
- Standards: OPC, Fieldbus, POSC, PIDX, PPDM
- Technical ⇔ Financial
- Upstream ⇔ Downstream
Technology Has Resulted in a Significant Increase in Drilling Success Rates

Source: EIA, Monthly Energy Review, August 2004
Newer Technology Reduces Injuries, Improves Safety

Oil & Gas Companies Have Eliminated 275 BCF of Methane Emissions Since 1993

Source: Environmental Protection Agency Gas Star Program
New Technology Means Change; Change Means Job Stress

- Corporate Culture = How we do things here
- Major change is therefore counter-cultural
- Changes in rules & assumptions are resisted
- Changes in organizational structure needed
- Large companies are harder to change
- Training needed
- Too busy
Oil + Gas > Energy

- **Materials**: asphalt, linoleum, rubber
- **Liquids**: antifreeze, refrigerants
- **Plastics**: soccer balls, milk jugs
- **Synthetic fabrics**: nylon, polyester
- **Agriculture**: fertilizers, pesticides
- **Medical**: artificial limbs, bandages
We have an image problem!
Harry Potter

- 16 years old
- Bright, inventive
- Works well with others in teams
- Seeks solutions even when there is little information available
You Can Help Our Image

- Tell the public at every opportunity how clean, high-tech, and responsible our methods are and how important and ubiquitous our products are.
- SPE Magic Suitcase, AADE Knowledge Box
- Presentations in the schools, civic clubs
- SPE.org Energy Education PowerPoint slides
- Toastmasters, Letters to Editor, Talk Shows
Petroleum Industry is High-Tech
Let Us Drill In Our Own Back Yard