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Risk Management Research Opportunities for Off
Shore Oil & Gas Exploration and Production

TULANE ENERGY INSTITUTE



NSF EPSCoR Conference

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NSF EPSCoR Conference

Agenda

- Institute Background
- Offshore: Complex Industry
- Background
- Statistical View
- Supply Chain View
- Individual View

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Risk Management Research Opportunities for Off
Shore Oil & Gas Exploration and Production



Electricity Markets

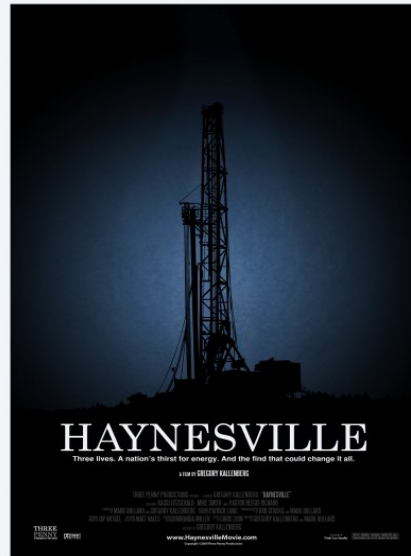
Course Design

- Industry history
- Operational models
 - Fleet makeup, heat rates, outages
 - Duration curves
- Trading Techniques
 - Bidding the fleet
 - Intense simulation exercises
- Advanced Excel and Access Applications
 - Visual Basic and Derivative Valuations



Education

Advanced Energy Trading and Finance



Energy Markets, Economics, and Policy

- History of the Industry
 - Domestic
 - International
- Industry sub-sectors examined
 - Upstream
 - Exploration, Drilling, and Production
 - Downstream
 - Pipelines, Refiners, and Petrochemicals
- Role of New Technology
 - AUVs
 - Non-Conventional Gas
 - Deep Water Oil and Gas

Research

Outreach



Education, Research, Outreach
Energy Markets, Economics, and Policy

- Space age technology
- Incentives for prevention and response: liability vs regulation and inspection
 - Company
 - Industry
 - Government
 - Combination
 - Key issue: where does/should expertise reside?
- Goals of transparency, public confidence
 - Helps for broader national acceptance



Complex Industry



- Economics of infrastructure systems
 - Long lived assets, investments; boom bust
- Supply chain design and integration
 - NSF Project: Supply Chain Integration During Product and Process Design
- Operations of complex systems



World view



- Risk models for rare events
 - 100s of spill data points
 - Airline crashes, nuclear plant accidents, space vehicle crashes
 - Fat vs thin tails
 - “The entire oil and gas industry failed to provide adequate contingency plans...”
 - National Commission Potential Findings,
 - October 13, 2010
- Couples to Economic Impact
 - LED, LSU, Tulane, UL Lafayette



Financial and Statistical Analysis



- Complex system architecture determined by subsystem definitions and linkages
 - Modular vs integral distinction
 - Drive cost, performance, reliability, resiliency, redundancy
 - Design/Construction/Operation
 - Perrow: Complex systems experience non-linear interactions among system elements



Systems and Supply Chain View



- Complex organizational architecture
 - Liability, management, authority
 - “Offshore rigs have complex management problems because of the combination of prime contractors, and equipment manufacturers needed to make them work”
 - National Commission Potential Findings,
 - October 13, 2010
 - Information flows, especially across boundaries
 - Support mechanisms: rules, standards, infrastructure (IT), people



Systems and Supply Chain View



- Training
 - Learning from other industries; high engagement vs low engagement
- Training for Complex Environments
 - Pilot training
 - Air traffic control
 - Nuclear plant operators
 - Mission control operators



Operator View



- Wide ranging expertise needed
 - Design
 - Operation
 - Risk assessment
 - Mitigation planning
 - Recovery planning



Collaborations