Being Realistic About Risk*

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Search and Discovery Article #70383 (2019)**
Posted February 25, 2019

*Adapted from oral presentation given at 2018 AAPG Annual Convention & Exhibition, Salt Lake City, Utah, May 20-23, 2018
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Abstract

Where has the Risk gone? Our Industry has traditionally approached Risk from a resource/reserves perspective… “Find it and they will come”, but that has never truly been the case. Risk is a business concept, not technical. The continued evolution of our efforts has forced us to bring new technologies and new realities, including concepts such as uncertainty management, operational efficiency, competitive advantage, and materiality into our business planning. Risk is still with us. Its identification and management are not optional.

Profit, especially in the unconventional realm, is harvested via operational efficiency… doing the right thing at the right time in the right way… no less and no more. The fastest way to increase the value of a portfolio is to avoid the “bad stuff”. But Operational Risk is asymmetric. The penalty varies depending the direction of error. Optimal development starts with a sound geotechnical foundation. We must bridge technical to business in our thinking, our planning, and our actions, thereby making business-based decision-support key to success. It will frequently include the tactical elements: Indifference Assessment, Value of Information, and Value of Control.

Risk management at the portfolio level should take Competitive Advantage and Materiality into account. Control becomes a critical success factor. Remember, if you cannot control or establish materiality, being in the way may have value. Geologists should have input to business strategy and planning. Dealing with Risk starts at rock level. Business success, including Risk identification and management starts with sound earth-science that transitions into sound strategy.
Being Realistic About Risk

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AAPG ACE 2018
What is Risk?

• Our Industry Historically – The **Chance** of Failure

• Everybody Else – The likelihood and extent of Financial penalty

What is a High Risk Project?

New Tech  New Process  New People

Resource → Project Efficiency
So What Are You Going To Do About It?

What if we are wrong? Understand your Pain and Regret.

You spend too much and move too slowly. You can do better.

Know where your **Decision** point is. Use threshold decision principles.

Risk is Asymmetrical – Take advantage of that.

Pay attention to Critical Path dangers.  
(Project Risk Management)
What If We Are Wrong?

Indifference Assessments

Value of Information

Confidence Requirement

Quantitative

Feasibility

Numbers

Competitive

Advantage

Pain and Regret Assessment

Pre-Mortems

Value of Control
Pain and Regret

Regret: The probability that the thing you don’t want to happen happens.
This requires...
• Thresholds
  • The acceptable level of inefficiency
  • Economic Criteria with 0 NPV as the starting point
  • Minimum acceptable outcomes
• Recognition of a full range of outcomes
• An appreciation of Confidence as a metric

Pain: The penalty felt when that thing you don’t want to happen happens.
This affects...
• Cost and Schedule
• Production efficiency
Pain and Regret

Probability of Regret

- Low
- High

- Avoid or Transfer
- Clarify and Mitigate
- Accept
- Guard for Cumulative Effect

High

High

Low

Low
Materiality and Control Make A Difference

Especially in Competitive Situations
Infrastructure Sizing
Capex vs NPV

NPV ($mm)

$0 $20 $40 $60 $80 $100 $120 $140 $160 $180 $200

Total Capex ($MM)

0 500 1,000 1,500 2,000

Class 1
Class 2
Class 3
Class 4
Class 5
Infrastructure Sizing – Value Penalty

Reserves vs NPV

![Graph showing NPV vs Reserves for different classes of infrastructure. The graph plots NPV (in $MM) against Reserves (in MMBO) with Class 1 Cap, Class 2 Cap, Class 3 Cap, and Class 4 Cap indicated on the graph. The x-axis ranges from 0 to 600 MMBO, and the y-axis ranges from $0 to $500 MM. Each class has a distinct trend line representing its relationship with NPV.]
Primary Threshold Decision Principle

Knowing what you have is less important than having confidence that what you have is greater than what you need.
Decision Thresholds

Decision Threshold

Do X  |  Do Y

Outcome uncertainty

No Go  |  Go

Just Do It

Outcome uncertainty

Weak Confidence
- Obtain clarity
- Value of Information
- Pain and Regret
What’s the Purpose of a Pilot Project?

Need to determine how many wells must be drilled before we are confident that the average development well will exceed the commerciality threshold.
Risk Erodes Confidence

Learning Erodes Risk

Confidence of making a reliable decision

Efficient Learning maximizes early Confidence

Systemic Risk

Non-Systemic Risk
Asymmetric Penalty

**Sweetspot Development Timing**

- False Exploration
- Develop Too Early
- Sweetspot Plan
- Develop Too Late

- Cost of Being Wrong
- Optimal Value
- NPV Curve

- Value Available
- NPV
Development Well Placement

• We have a development plan that places wells a certain distance apart
• But it is a decision fraught with uncertainty

What is the Risk?

The Value of Learning = the program with learning minus the program without learning
Error Threat – Recognizing Asymmetric Risk

Lost Resource – Lost Production

Drilling at 850’ spacing
When optimal is 650’

Effective Drainage

Redundant Drilling/Completion – Impaired Capital/Time

Drilling at 850’ spacing
When optimal is 1050’

Effective Drainage

Redundant Drainage
Value Destruction From Inefficient Development

Intended Spacing 850’

Wells drilled at 850’ spacing when optimal completion provides smaller effective frac radius results in lost resource. Wells drilled at 850’ spacing when optimal completion provides greater effective frac radius results in over-drilling.

($14MM) Zone of Lost Resource

Note the asymmetric threat. Prioritized Learning requirements result.

($80MM) Zone of Capital Inefficiency

OPM Spacing test at 1000’

Actual Optimal Spacing

Current Intent

650’

850’

1050’

NPV
Critical path management
Near critical path assessment

• Critical and “Dangerous” must be spotted and managed
Dealing with Risk...

• Know where your decision would change
• Assess your Confidence
• Risk is Asymmetric, that gives you an “optimal” starting point
• Always ask “What if we are wrong”

• Take a project level approach to Risk and downside threat.
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