[AV]Unconventional Thinking*

Bill Haskett[1]

Search and Discovery Article #110217 (2015)**
Posted September 7, 2015

*Adapted from presentation at the AAPG DPA Playmaker, Calgary, Alberta, March 31, 2015

[1]Senior Principal– Energy Strategy at Decision Strategies Inc., Houston, Texas (bhaskett@decisionstrategies.com)

Abstract

The unconventional revolution in exploration and production has changed more than just our drilling density and completion procedures. As upstream professionals, we have the opportunity to aid the success of our projects by including business principles within our interpretation and recommendations. Failure to do so erodes value and threatens competitive advantage. Companies are typically successful when they take material interests in material plays and implement prioritized learning plans. Pilot configuration with respect to decision thresholds is critical. Ultimately, it becomes more important to achieve confidence that the prospect held by a company is greater than what is needed to proceed, rather than strive for precision on what is present. Earth Scientists have the ability to create and maintain competitive advantage.

Reference Cited

Haskett, W.J., and P.J. Brown, 2005, Evaluation of unconventional resource plays: SPE Annual Technical Conference and Exhibition, Dallas, Texas, SPE 96879.

Unconventional Thinking
AAPG Calgary Playmakers

Bill Haskett

Senior Principal – Energy Strategy

DECISION STRATEGIES

Above All…

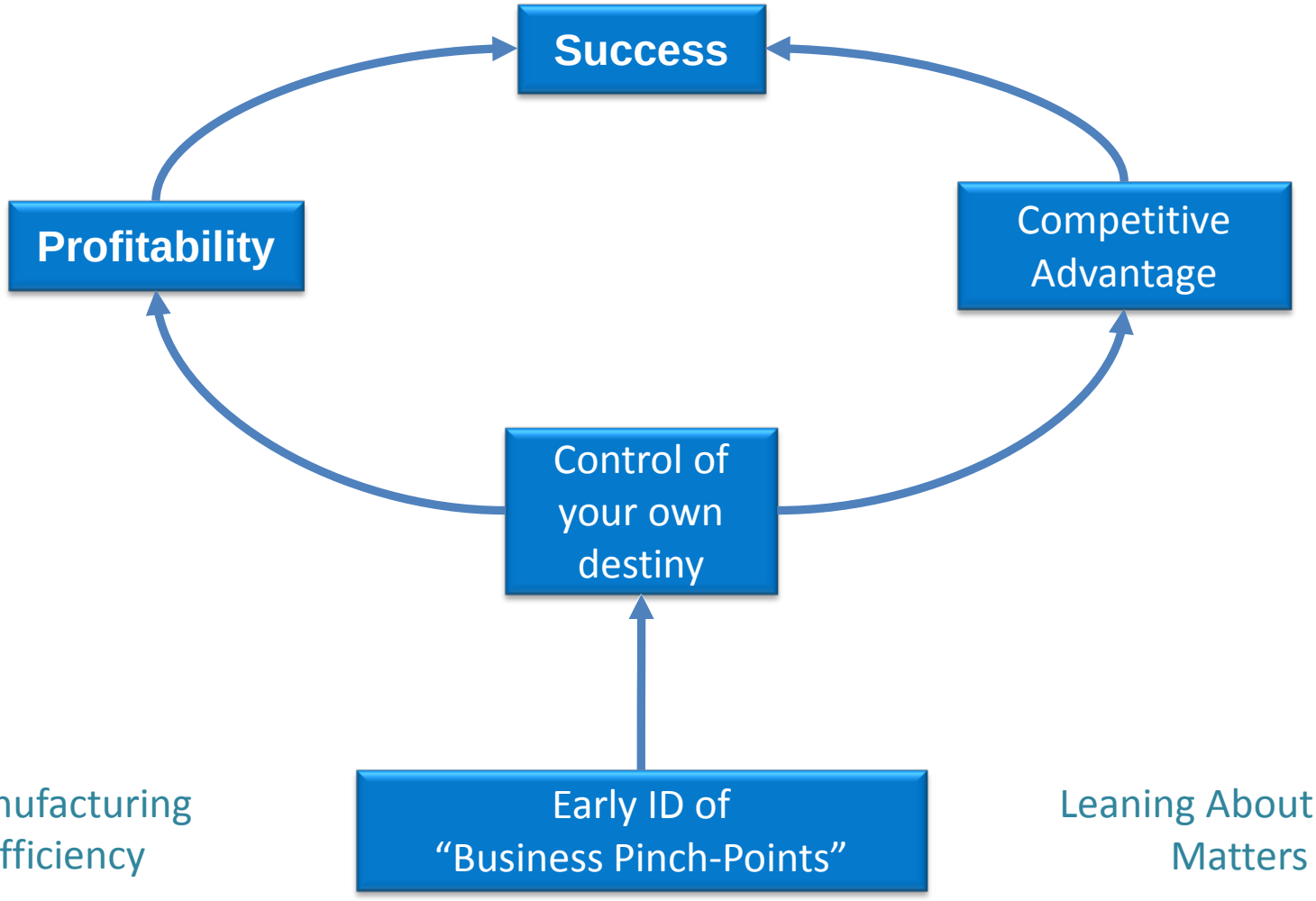
You have to have good rock.

Nothing can save you if you don’t…

Think Strategy From The Beginning

(the four arena strategy model)

Success demands efficiency and advantage

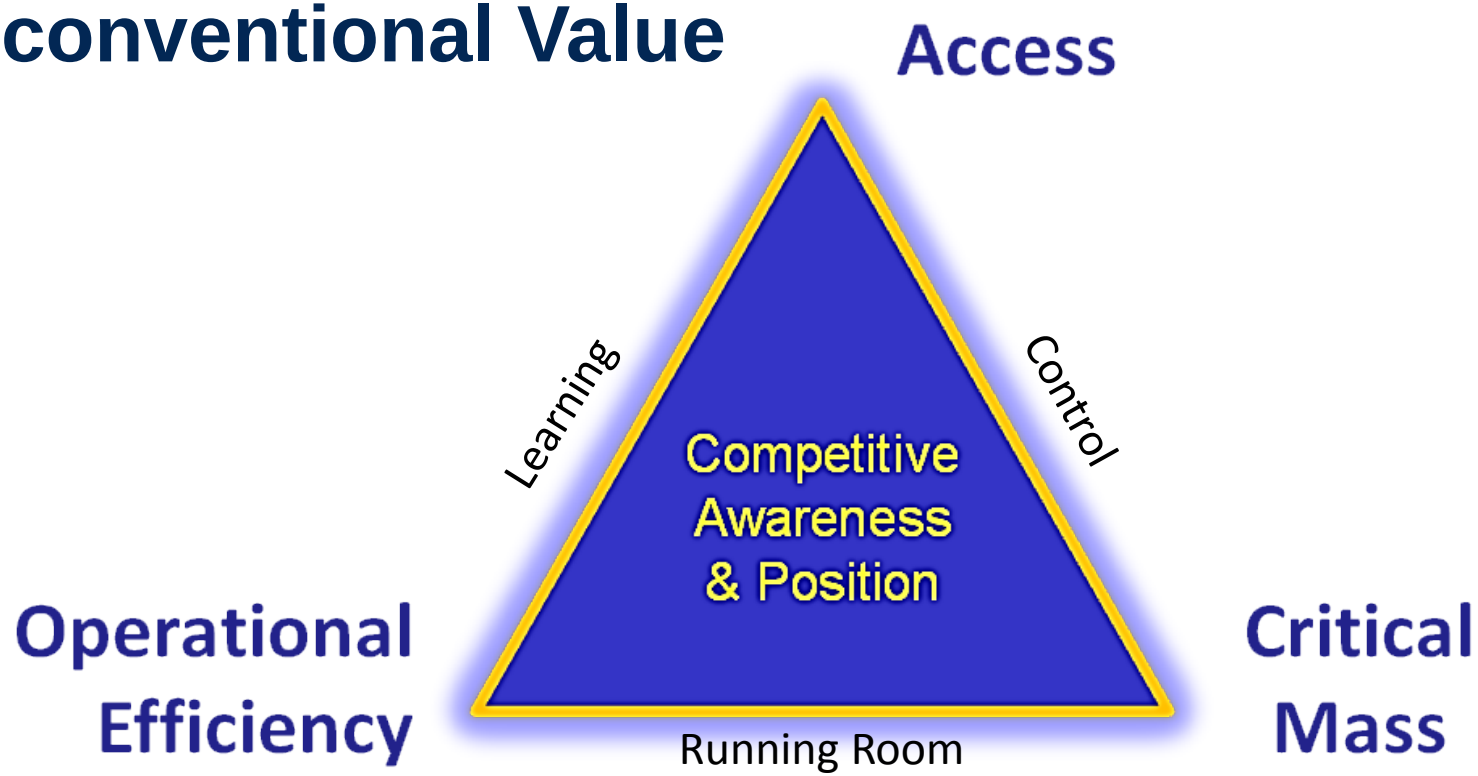


Manufacturing Efficiency

Leaning About What Matters

Unfortunately, most technical teams don't think "Business"

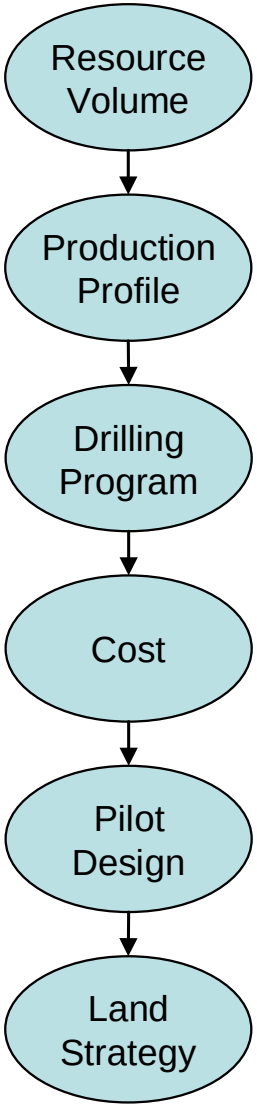
Three Essential Elements for Unconventional Value



Ultimately, companies strive for **material interest in material plays.**

This is what you are trying to assess early in an opportunity!

There is no “I” in Shale!



Earth Science

Engineering

Drilling Technology

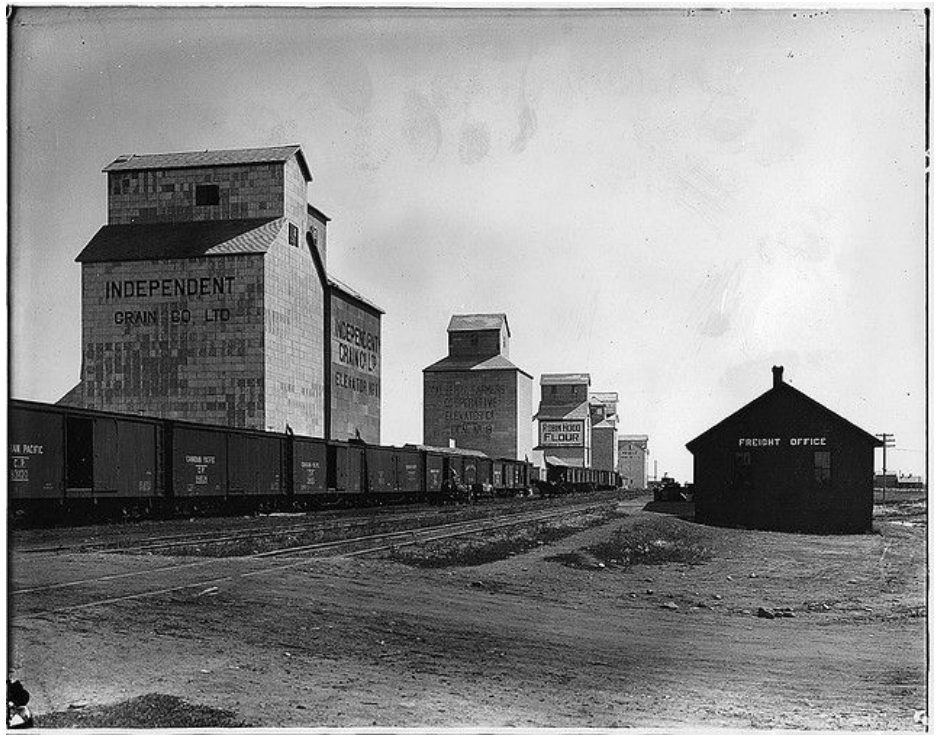
Finance & Planning

Stimulation Technology

Land Personnel

An Integrated Multi-disciplinary Approach is Critical

Beware of silos



Internal team

Lease us 300,000 acres and don't spend over $150,000.

What happened??

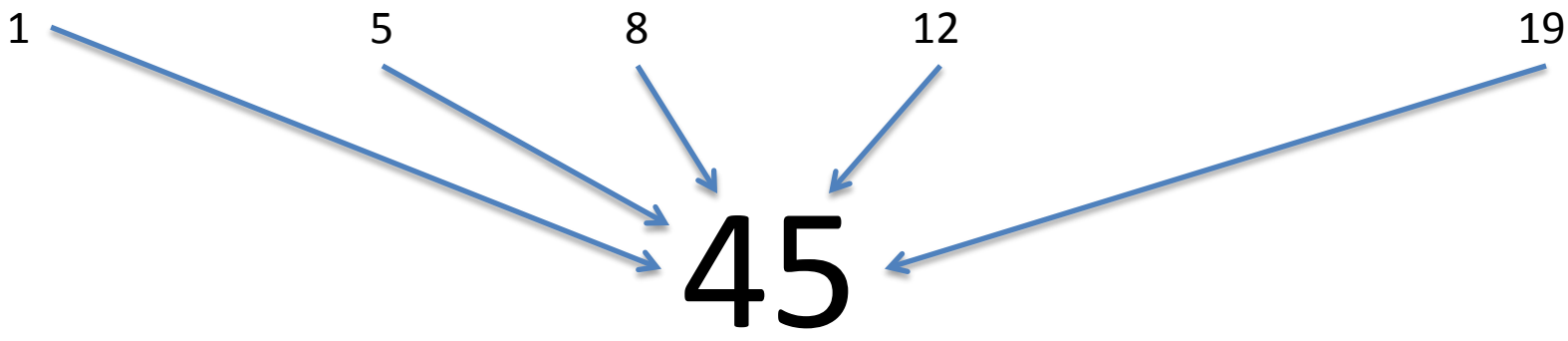
- 350,000 ac were leased for $100,000
- The land was cheap because it had no production potential

Iiiii

= Shale

The Statistical Approach

A b c d E f g H i j k L m n o p q r S …



45 / 5 = 9

While there may be no “i” in Shale… it does average “i”

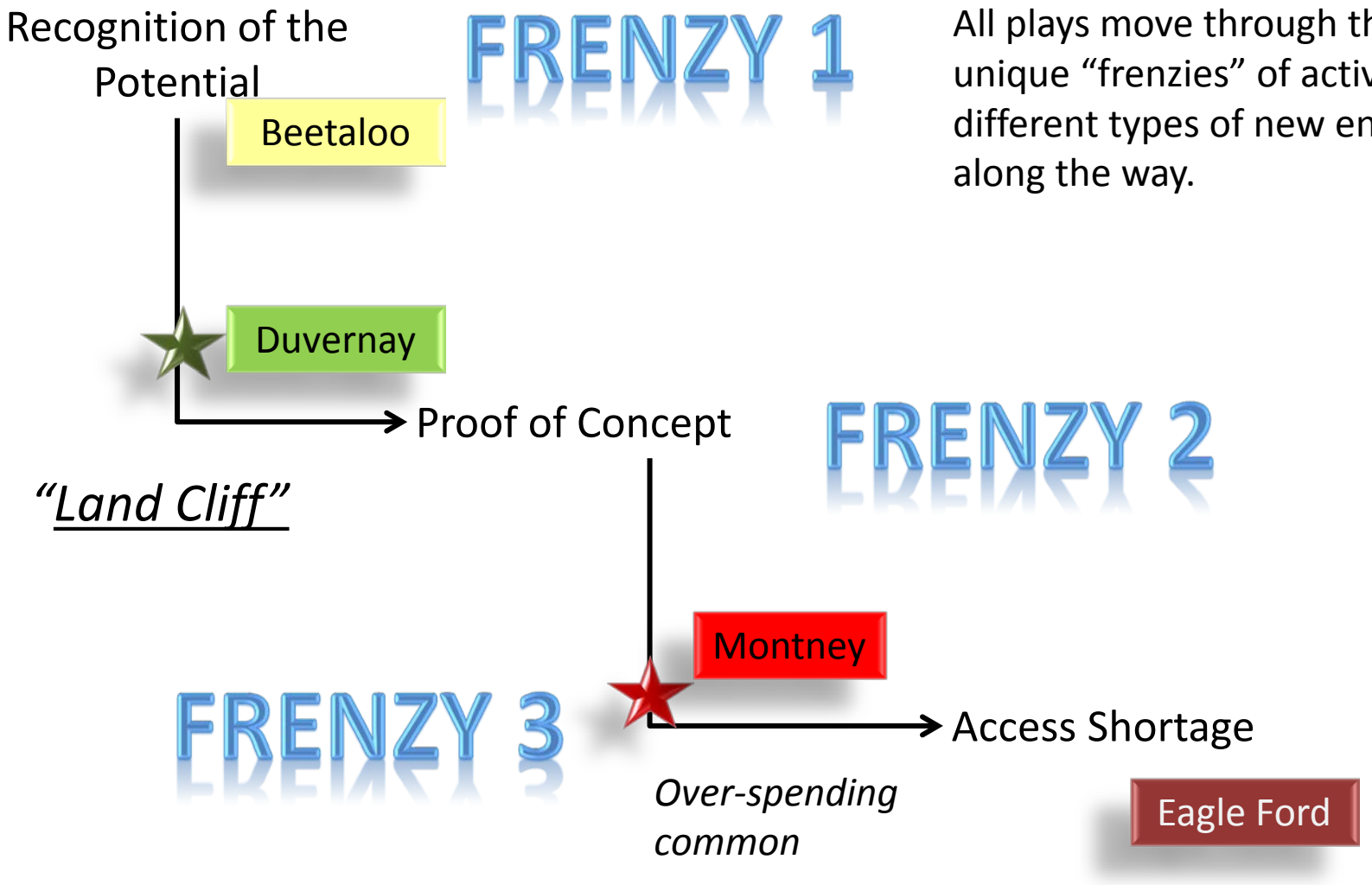
Feeling Cheated? Think I'm a Stats Nerd?

Welcome to the world of the AVERAGE.

- Everybody wants a number.
    - When we communicate what we expect, we anchor people.
        - Decisions aren't made at the expected result.
- Never expect the expected… yet… that is what we communicate

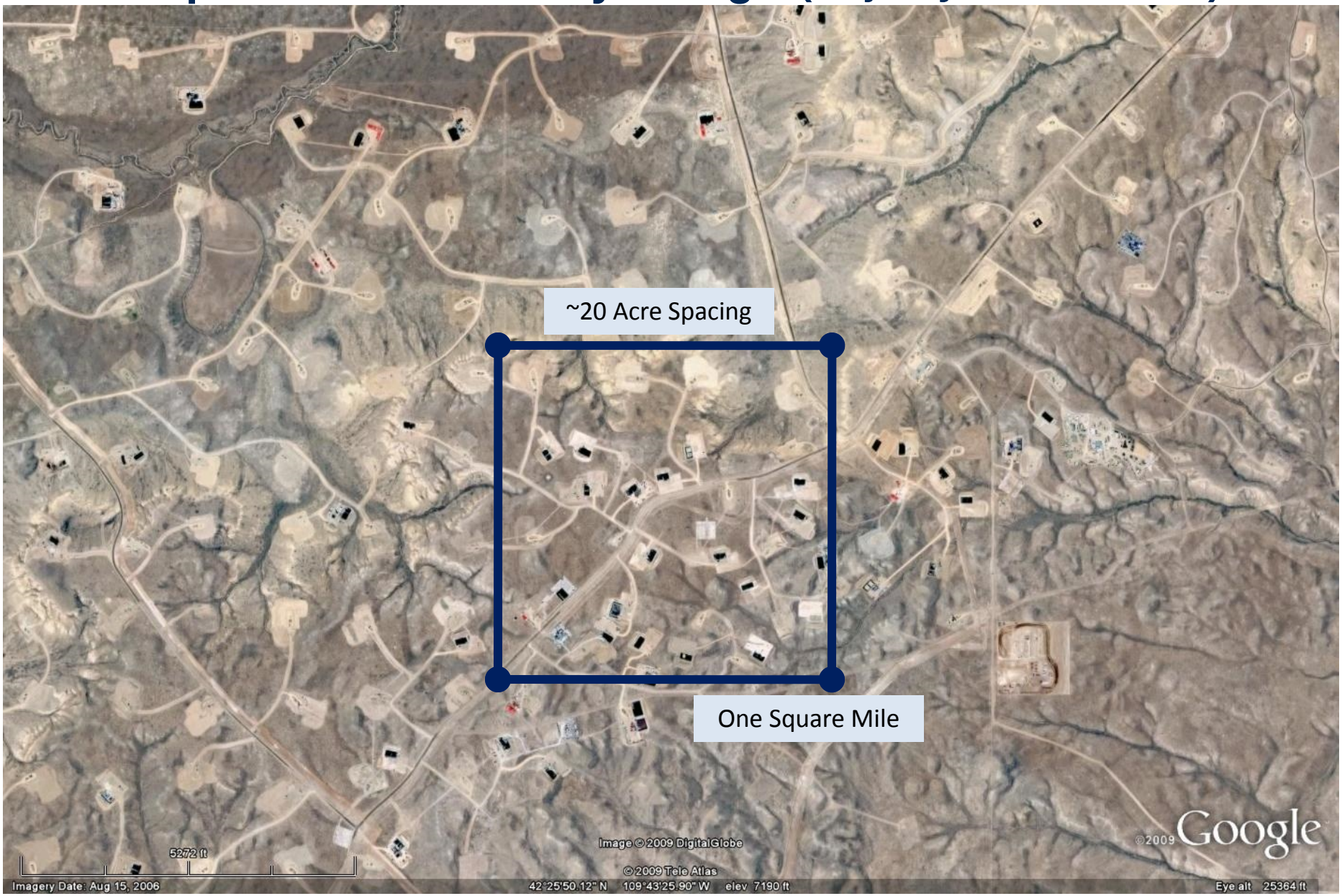
Real Uncertainty Rapidly Becomes A Trust Issue

Play Entry – The "Three Frenzies" Model

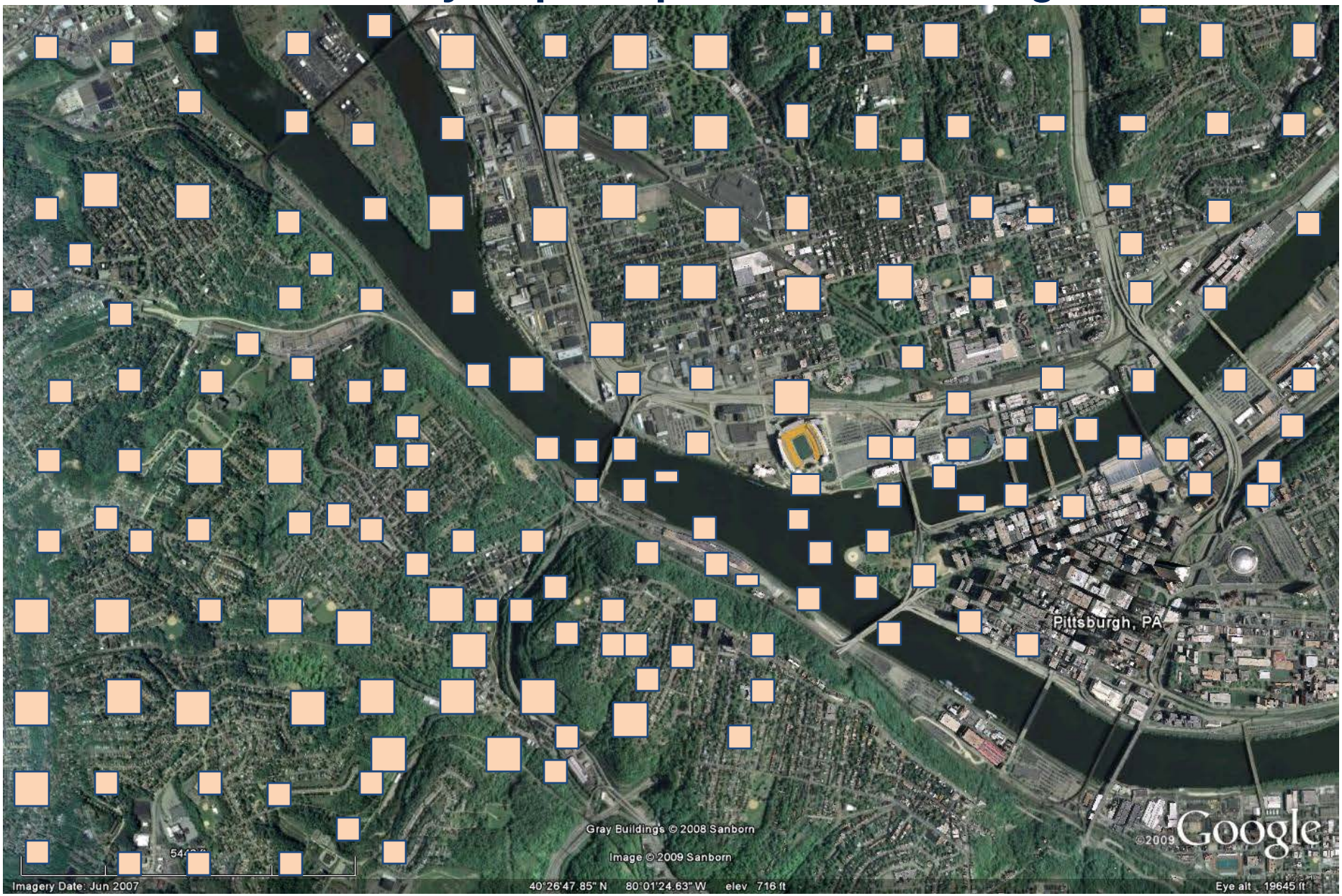


All plays move through three unique "frenzies" of activity with different types of new entrants along the way.

Example: Jonah Field Wyoming – (Majority vertical wells)



Jonah Well Density Superimposed on Pittsburgh



Human Bias: Before the Decision is Made…

- Perceived threat of Pain is stronger for failed action than it is for failed inaction.

- People tend to hold even more tightly to their beliefs when confronted with contradictory evidence.

(Teamwork and an integrated decision management approach provide clarity and direction)

After the Decision is Made…

"Regret for the things we did can be tempered by time; it is regret for the things we did not do that is inconsolable."

Sidney J. Harris

It is all just *FUD*, and FUD sells!

The Energy Industry is mired in FUD. FUD is reinforced by HSE failures.

F Fear

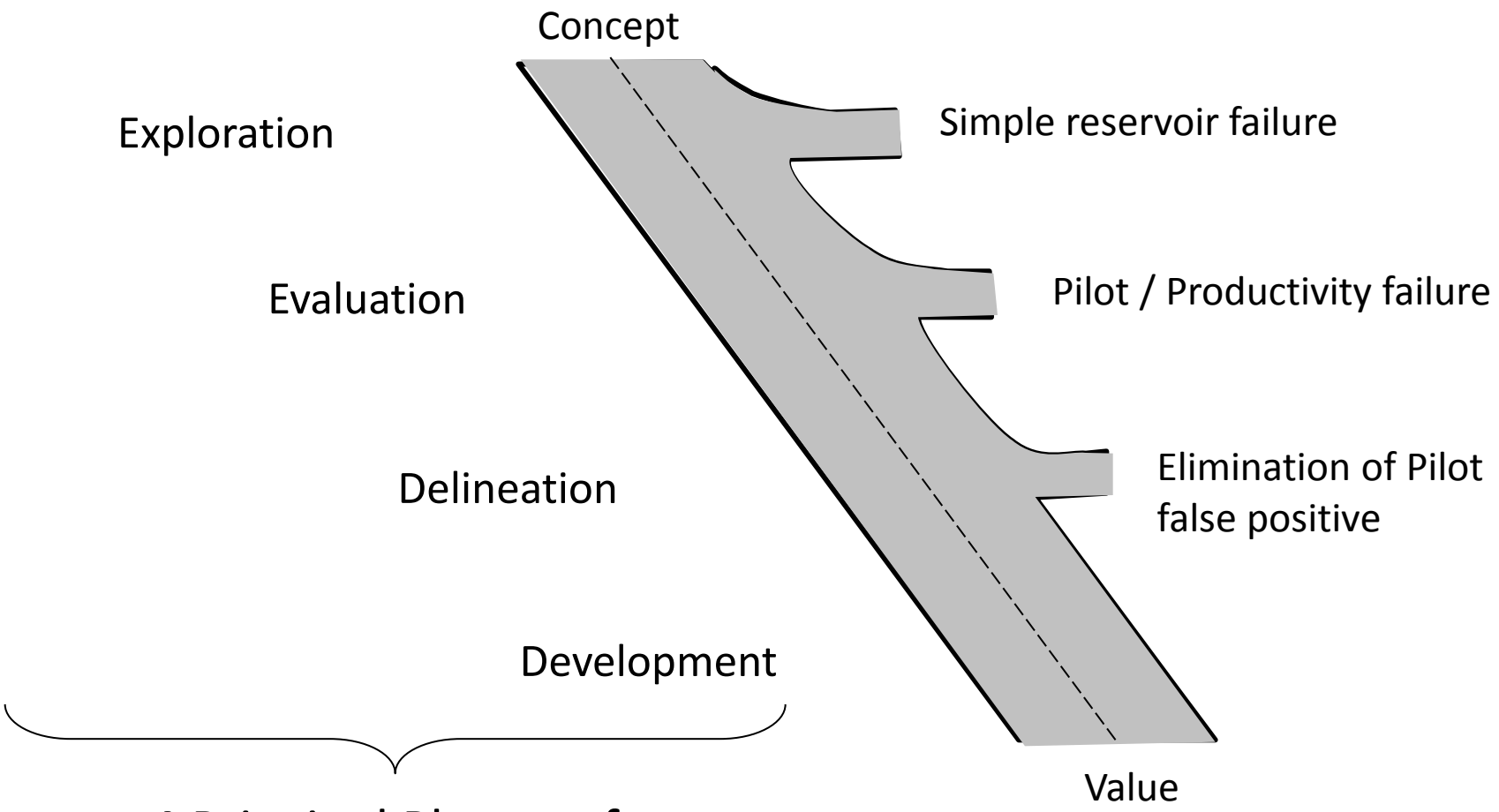
U Uncertainty

D Doubt

Know what it takes to EXIT an opportunity

"Off-Ramp" Planning

Downside Identification and Mitigation



4 Principal Phases of
Unconventional Plays

Conventional Mindset

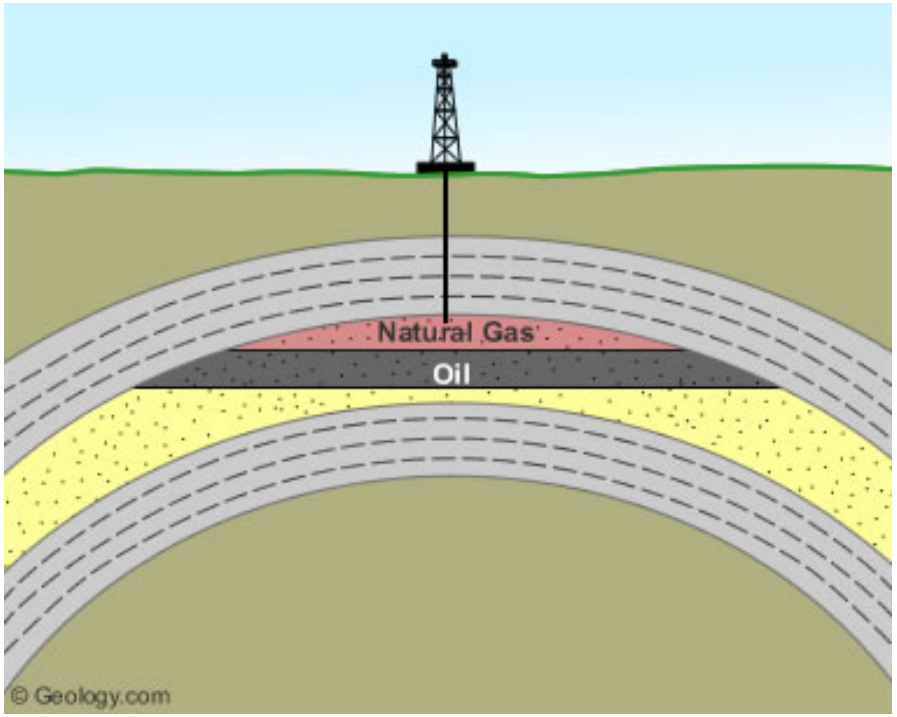
Drill the “BEST” location

The Container

Reservoir

Vertical Seal

Trap or Lateral Seal



The Contents

Source

Timely Migration

There are Two types of Learnings

Discrete - chance events that are either present or not present for a given area…

- Productivity
- Thermal maturity

Go or No Go

Population based - A result that becomes more reliable with sampling…

Usually pertains to averages such as

- Porosity
- Pseudo-Field Thickness
- IP

Efficiency & Profit

Holdovers from a Conventional Mindset

Drill the best place first

Drill the best place first

Drill the best place first

What is a Sweet Spot?

- Limited area of increased inherent production and recovery
- Typically making up the top 10 to 20 percent of the well distribution.
- Often, but not always, indicated… allegedly… by specific geophysical signatures… theories… guesses… Ouija boards…

  … and expensive products.

A Sweet Spot is NOT…

- A general region of favorable conditions…
- That is a “Part Play”.

  In significantly dispersed plays, use real data on thickness, composition, effective organics, maturity…
- Or take the easy way and use the Sales-Indicator, or inverse FI-Indicator

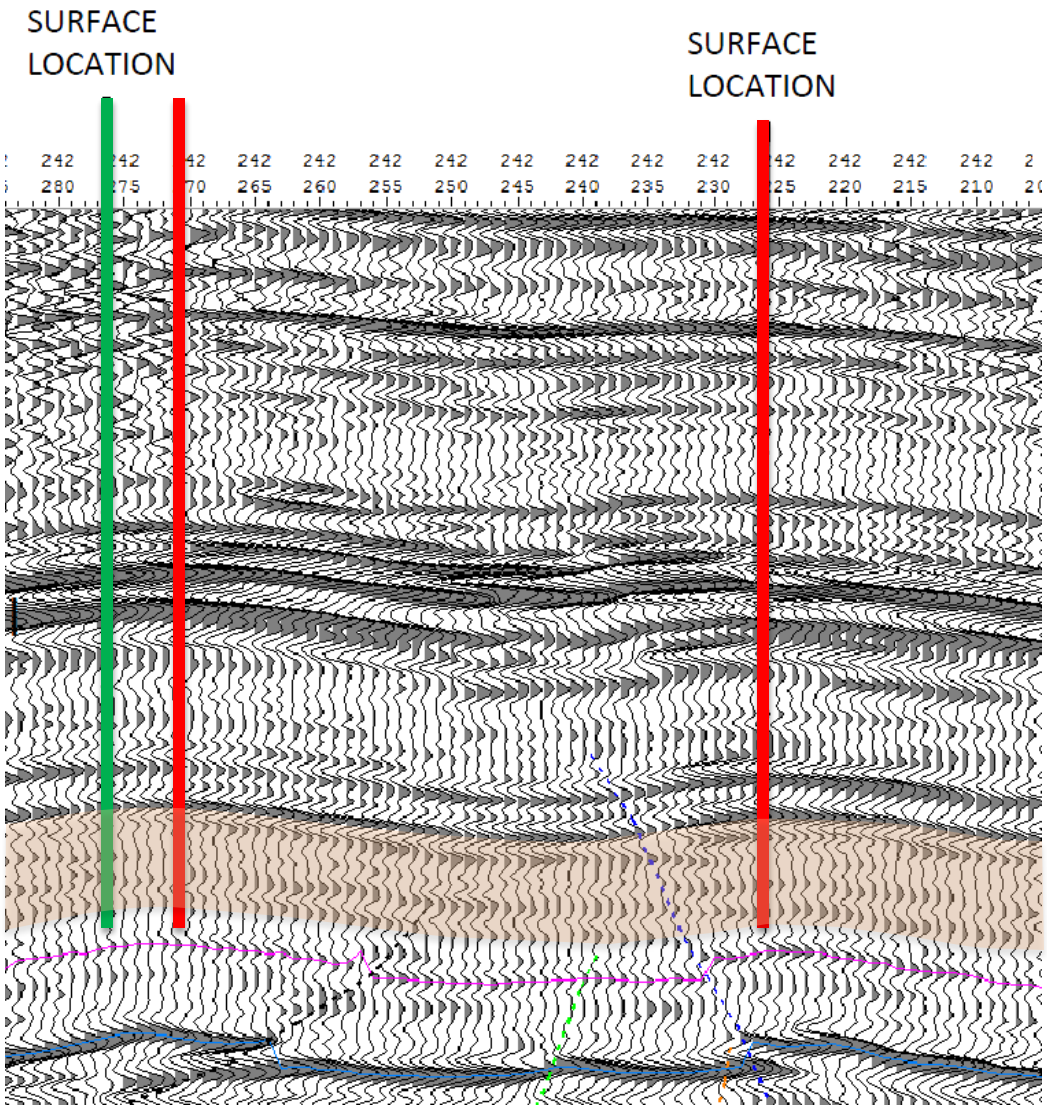
Sweet Spot Exploration is Value Destructive

- Unreliable and Biased assessment
- Leads to improper sampling
- Impedes learning and operational efficiency, “Engineers stop working”
- Subject to materiality concerns
- Sweet spot exploration is a destructive holdover from a “conventional” mindset.

Sweet Spot Methods… Promotion of Bias

- Seldom mentions reliability of the product being sold
- Advocacy approach eliminates alternate hypotheses
- Poor use of analogues
- Reward conflicts… self interest

The “Obvious” Place isn’t Always the Best



Reliability?

Exception…

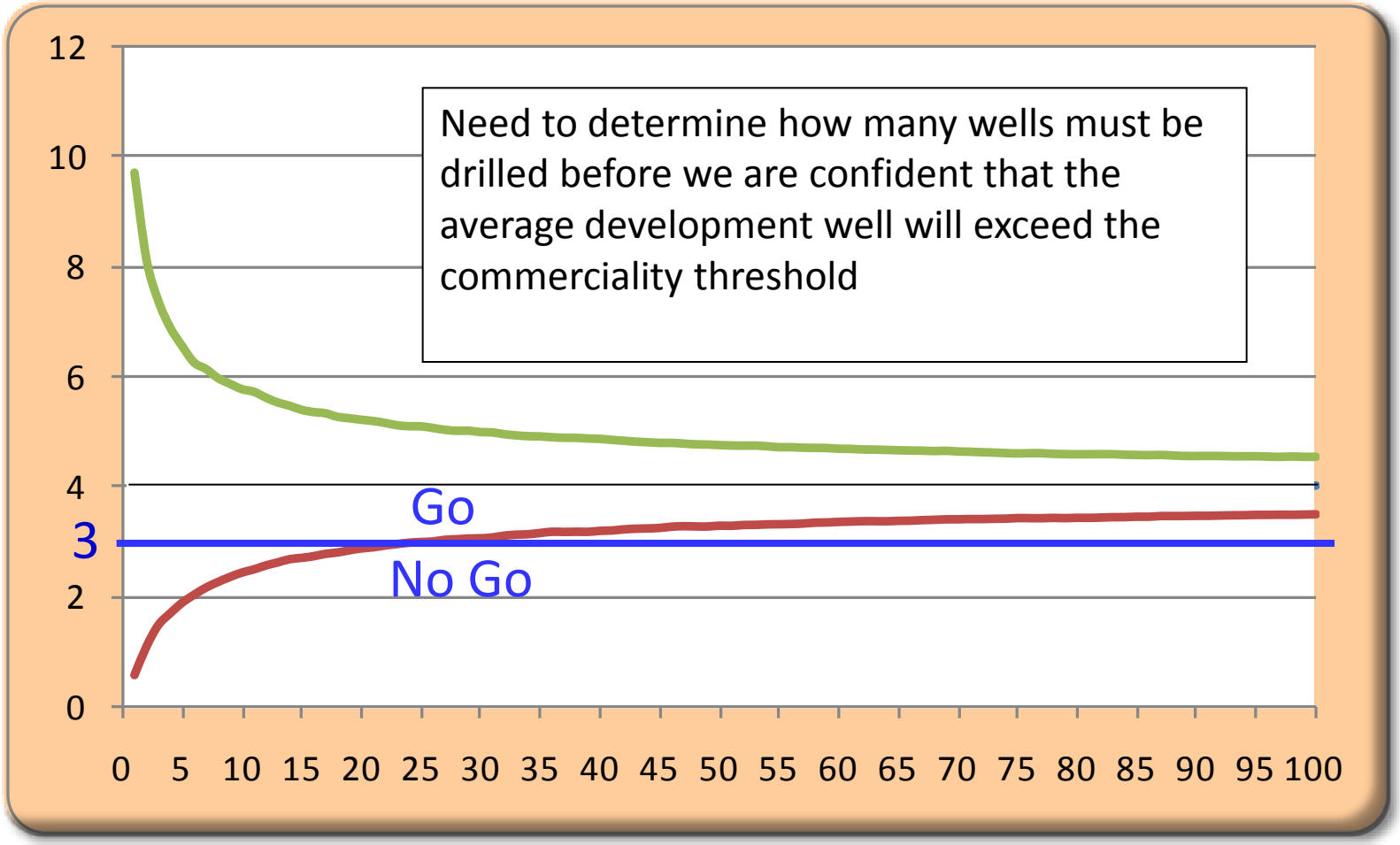
Where the sweet spot area itself provides a material play extent

Large enough to be able to contribute completion and production learning

Large enough to be able to apply the learnings to deliver profit

When you are in the Development Phase

What's the Purpose of a Pilot Project?



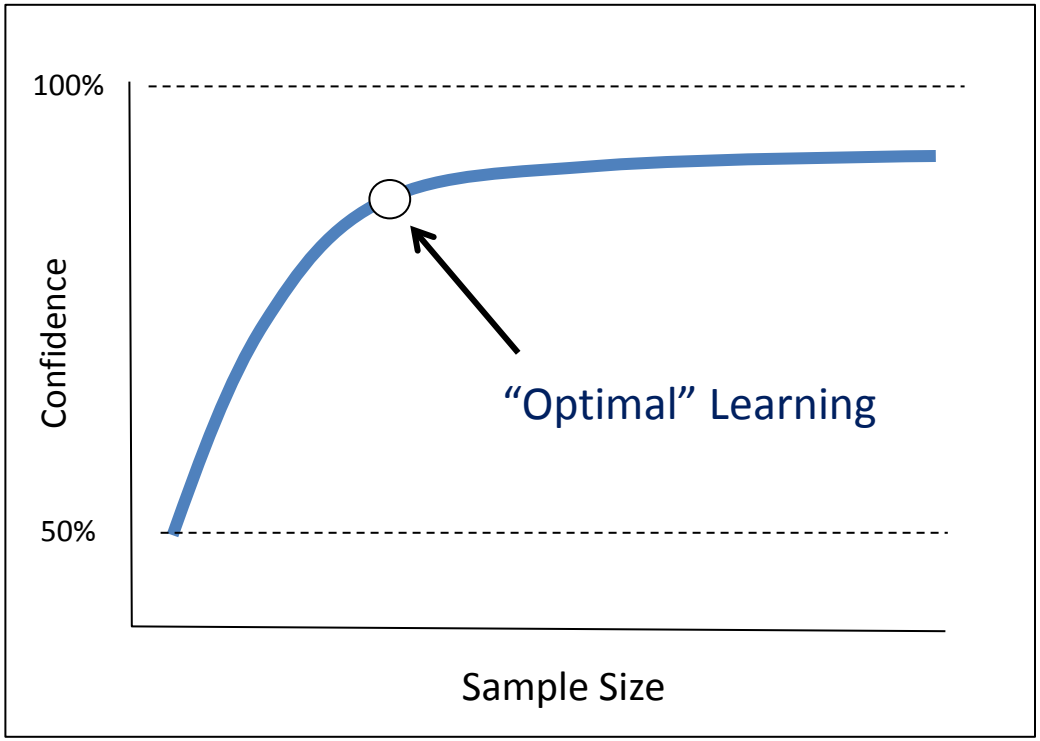
The Purpose of a Pilot…

… Is to determine with an acceptable level of confidence that what you have is at least as much as what you need to have in order to create/sustain a viable project.

Precision is unwarranted

Thresholds have both discrete and population learning

- As the sample population increases, confidence in the decision increases…
- Usually.
- Pilots will never provide 100% confidence.
- They only teach you about what you plan to learn



How much confidence do you need?

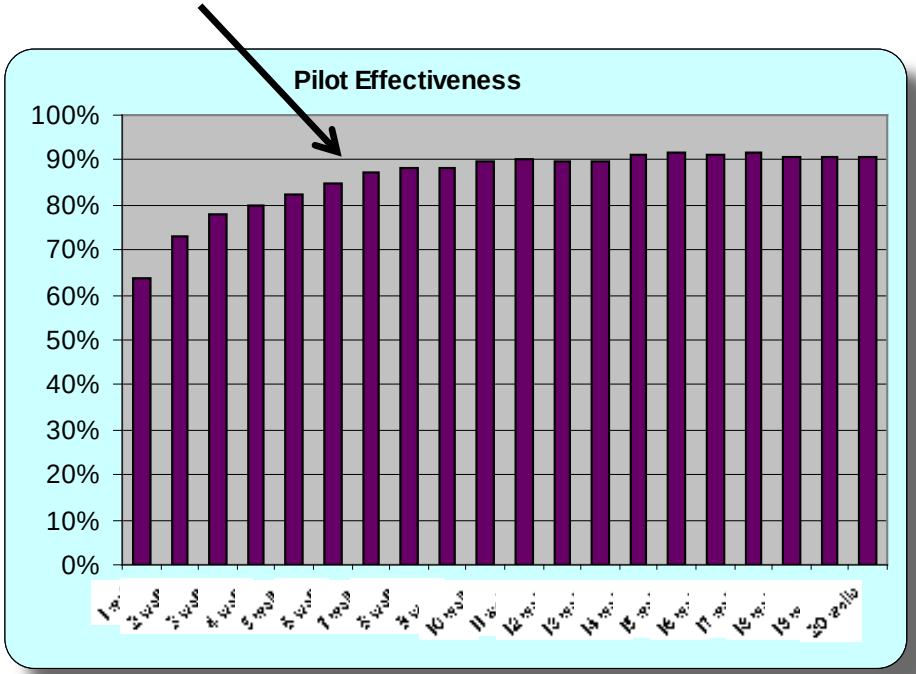
How Many Pilot Wells Do I Need?

	Pilot Good Proj. Good	Pilot Good Proj. Bad	Pilot Bad Proj. Good	Pilot Bad Proj. Bad	Pilot Effective
1 well	61%	6%	31%	3%	64%
2 wells	71%	6%	21%	2%	73%
3 wells	76%	6%	16%	2%	78%
4 wells	77%	6%	14%	3%	80%
5 wells	81%	7%	11%	2%	82%
6 wells	83%	7%	8%	2%	85%
7 wells	86%	7%	5%	1%	87%
8 wells	87%	8%	4%	1%	88%
9 wells	87%	8%	4%	1%	88%
10 wells	89%	8%	2%	1%	90%
11 wells	90%	8%	2%	1%	90%
12 wells	90%	8%	2%	0%	90%
13 wells	89%	8%	2%	0%	90%
14 wells	91%	8%	1%	0%	91%
15 wells	91%	8%	0%	0%	92%
16 wells	91%	8%	0%	0%	91%
17 wells	91%	8%	0%	0%	92%
18 wells	91%	8%	1%	0%	91%
19 wells	91%	8%	1%	0%	91%
20 wells	91%	9%	1%	0%	91%

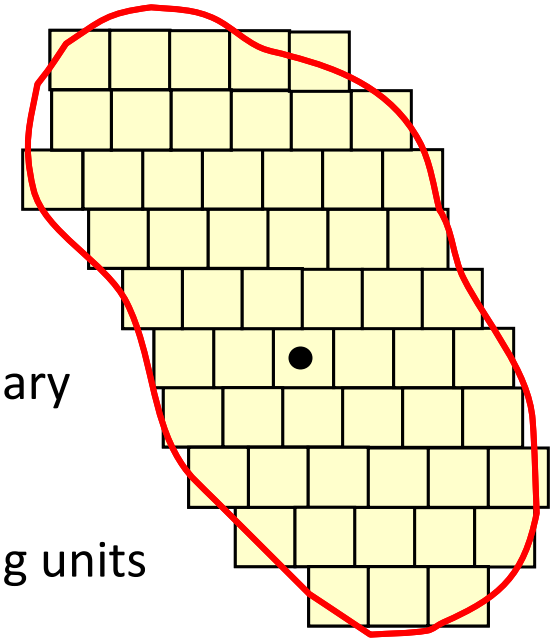
False results!

Early wells are most critical… incremental learning should diminish with additional drilling

Optimal Number of Wells

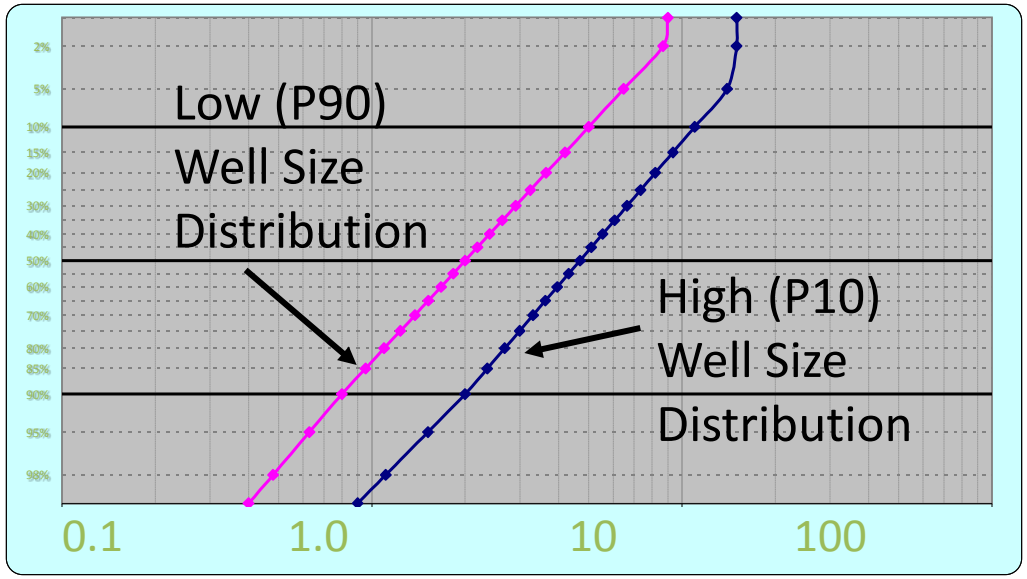


You are exploring for a family of wells within a distribution of families



Play boundary

Well spacing units

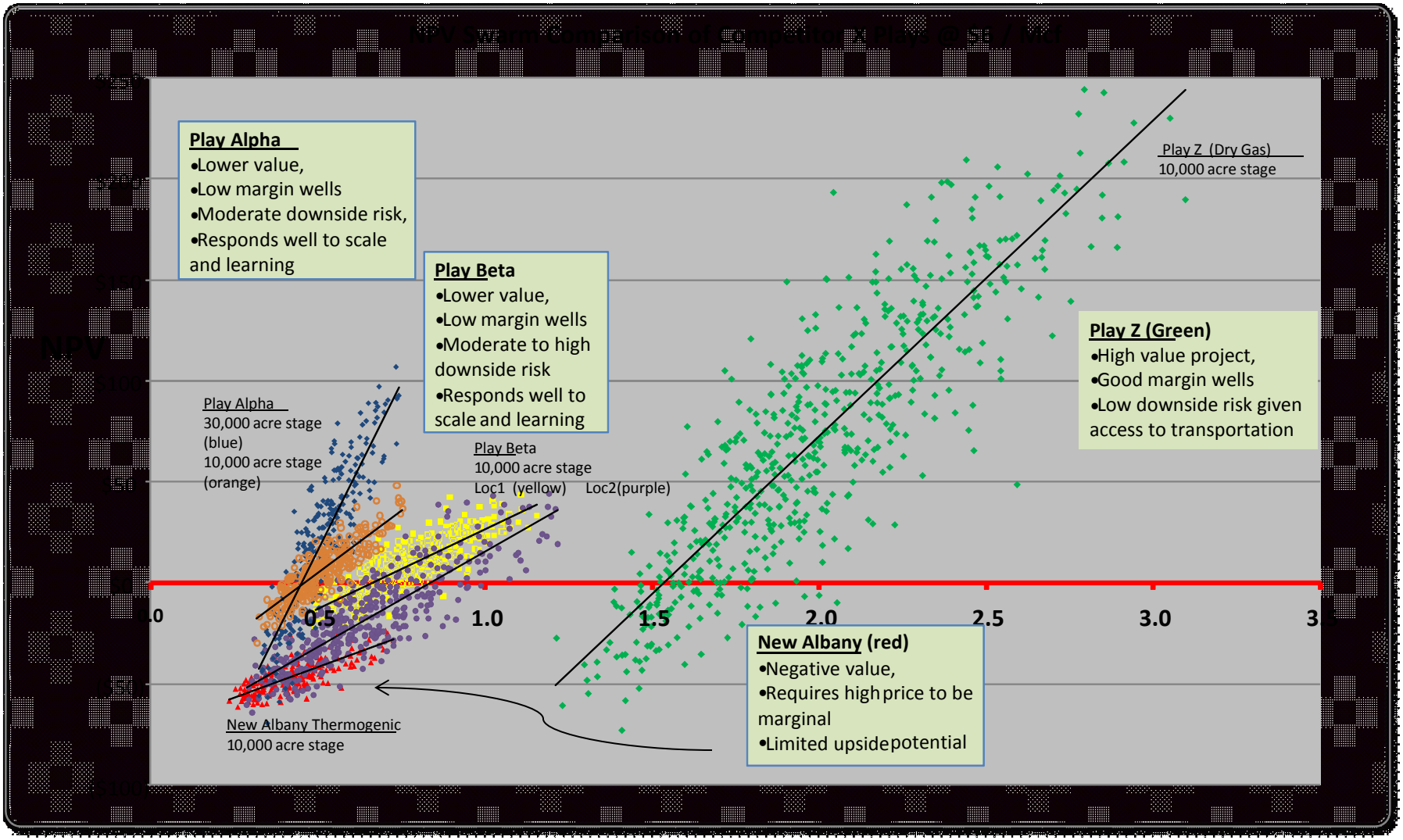


Estimated Ultimate Recovery per Well (BCF)

You may not know if you are correct for many wells

Haskett and Brown, SPE 96879

Sweet Spotting distorts play comparison

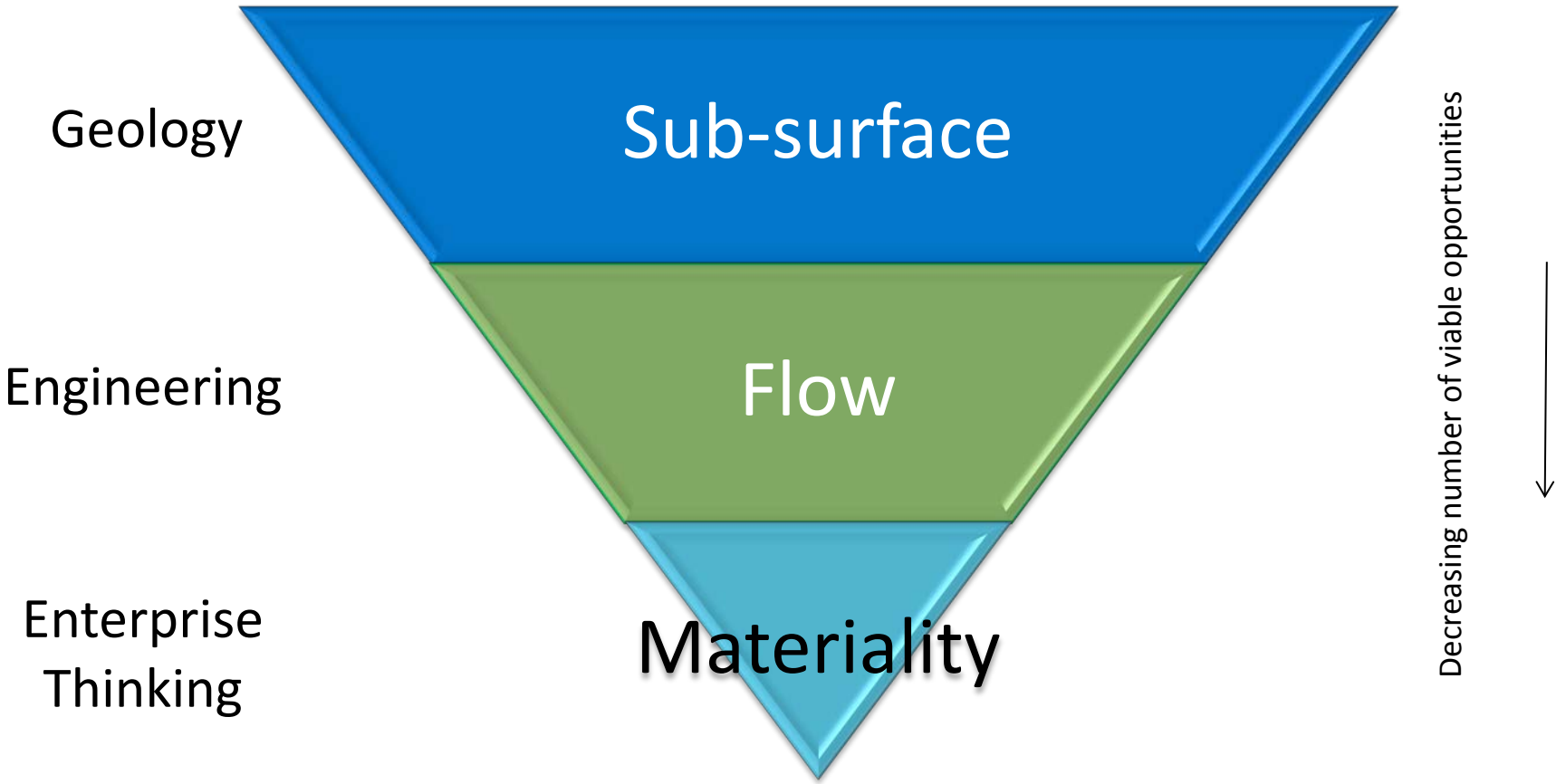


6 Simple Rules For Value in Unconventional

- Enter with Purpose, fairly sample
- Embrace Uncertainty, you only know what you know
- Seek to understand your Material Interest in Material Plays
- Create, Maintain, your real Competitive Advantage
- Have an Exit Plan, but don't give up too early

Nothing can make up for bad rock!

The Three –Level Deliverability Screen



Without all three, competitors will receive the value.

To succeed in unconventional, strive for a material interest in a material Play.

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Bill Haskett
Senior Principal – Energy Strategy
bhaskett@decisionstrategies.com
713-526-2410

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