

J P KENNY

**MTS SYMPOSIUM
SESSION 2: MAJOR CONCEPT DRIVERS**



DELIVERS. EVOLVES.

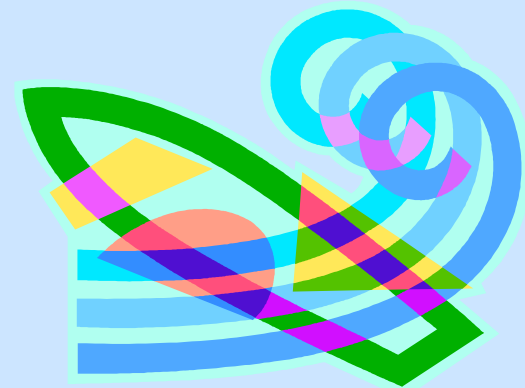
WHOLE LIFE SOLUTIONS FOR PIPELINE AND SUBSEA SYSTEMS

Presentation 3: System Selection

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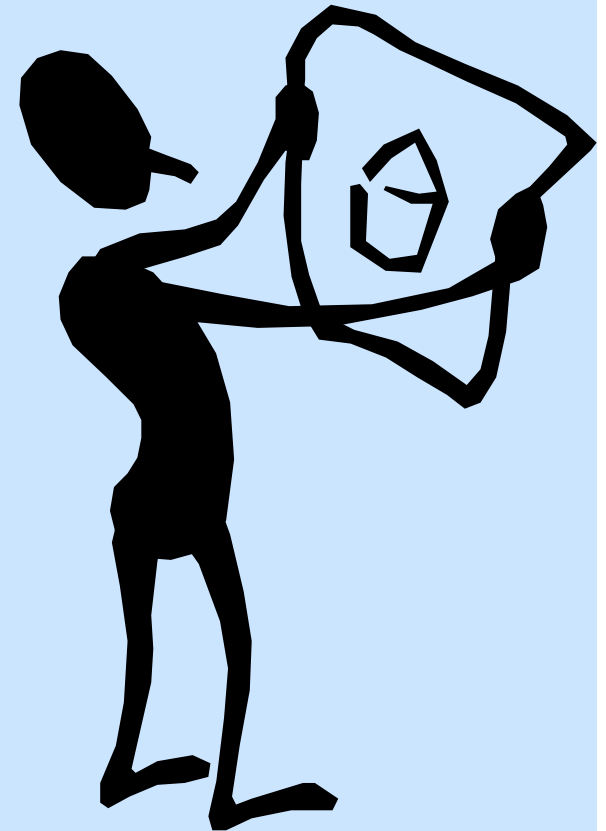
Design Basis

- Physical Data
 - Water Depth, Distance to Transportation Nodes
 - Wind/Wave/Current, Tides, Soil Strength
 - Fluid Properties
- Functional Requirements
 - Performance
 - Production Function
 - Well Count
 - Processing Capacity and Product Specifications
 - Philosophies
 - Safety
 - Environment
 - Operations (Including Controls, Manning, Sparring, Firefighting, Resupply)



Development Planning With Minimal Information

- Configuration
 - Tieback
 - In-Field Host
- Well Information
 - Reserves and Recovery/Well → Well Count
 - Well Rate and GOR → Oil and Gas Rates
 - Drainage Radius and Well Reach → # Drill Centers
 - Water and Gas Injectors Added
- Other Physical Data
 - Water Depth
 - Offset from Transportation Infrastructure

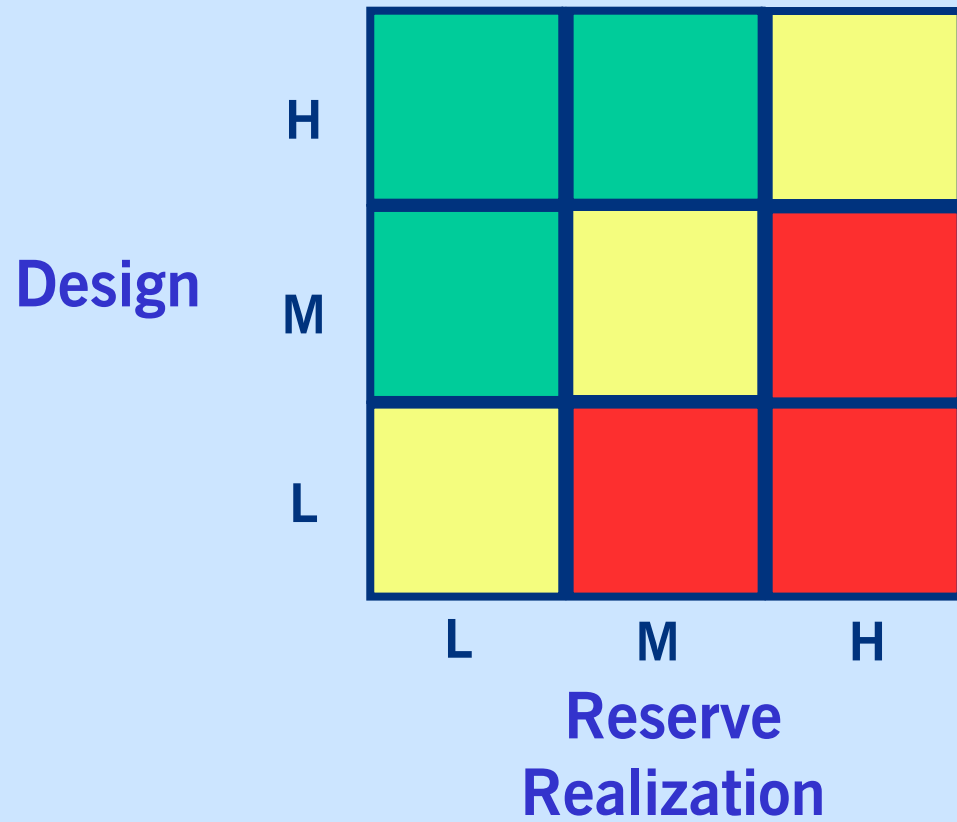


Development Planning With Minimal Information

- Judgement Item Examples
 - Facility Processing Capacity
 - Water Injection Replacement Ratio
 - Number of Wells Per Manifold
 - Flowline and Export Pipeline Capacities
 - Unit Cost Information
- Resources
 - Curve Fit of Industry Data
 - Preliminary Design Tools → Curve Fits
 - Consultant Studies
- Identify the Significant Cost Drivers
 - Mooring → Water Depth
 - Hull → Topsides Throughput and Drilling Payload
 - Topsides → Oil and Gas Throughput
 - Risers → Diameter and Water Depth
 - Pipelines → Length and Diameter
 - Subsea → Well Count



Robustness - Right, Wrong, or Robust?



DELIVERS. EVOLVES.

WHOLE LIFE SOLUTIONS FOR PIPELINE AND SUBSEA SYSTEMS

Summary

- Reservoir information will change until final production.
 - How we respond to the uncertainty is within our control.
- There is an manageable number of high value tradeoff decisions.
- Good development cost accuracy can be generated based on relatively few pieces of information.
 - The caveat is that one of the pieces of information is reserve size.
- There are strategies that allow robust development planning in the face of large reserve uncertainty.

