



**RYDER SCOTT COMPANY**  
**PETROLEUM CONSULTANTS**

Houston

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## **2009 Ryder Scott Reserves Conference**

### **“Evaluation Challenges in a Changing World”**

#### **“The Probable and Possible Reserves Dilemma”**

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# DISCLAIMER



The information presented in today's presentations represents informed opinions about U.S. SEC reserves reporting regulations but does not purport to be identical to advice to be obtained from the SEC. As with any set of reserves definitions, the applicability of the guidance should be considered on a case by case basis.

Definition of Probable and Possible Reserves

The Probable and Possible Dilemma

Disclosure Requirements

Methods to Forecast Incremental Reserves

Q&A Session

# 2009 SEC Regulations: Probable Reserves

*“Probable reserves are those additional reserves that are less certain to be recovered than proved reserves but which, together with proved reserves, are as likely as not to be recovered.”*

*Source: 210.4-10 (a)(18) pg. 2191*





# Probable Reserves: Deterministic vs. Probabilistic



## Deterministic Methods:

*“When deterministic methods are used, it is as likely as not that actual remaining quantities recovered will exceed the sum of estimated proved plus probable reserves.”*

*Source: 210.4-10 (a)(18)(i) pg. 2191*

## Probabilistic Methods:

*“When probabilistic methods are used, there should be at least a 50% probability that the actual quantities recovered will equal or exceed the proved plus probable reserves estimates.”*

*Source: 210.4-10 (a)(18)(i) pg. 2191*

# 2009 SEC Regulations: Possible Reserves

*“Possible reserves are those additional reserves that are less certain to be recovered than probable reserves.”*

*Source: 210.4-10 (a)(17) pg. 2191*



# Possible Reserves: Deterministic vs. Probabilistic



## Deterministic Methods:

*“When deterministic methods are used, the total quantities ultimately recovered from a project have a low probability of exceeding proved plus probable plus possible reserves.”*

*Source: 210.4-10 (a)(17)(i) pg. 2191*

## Probabilistic Methods:

*“When probabilistic methods are used, there should be at least a 10% probability that the total quantities ultimately recovered will equal or exceed the proved plus probable plus possible reserves estimates.”*

*Source: 210.4-10 (a)(17)(i) pg. 2191*

# 2009 SEC Regulations: Proved Reserves

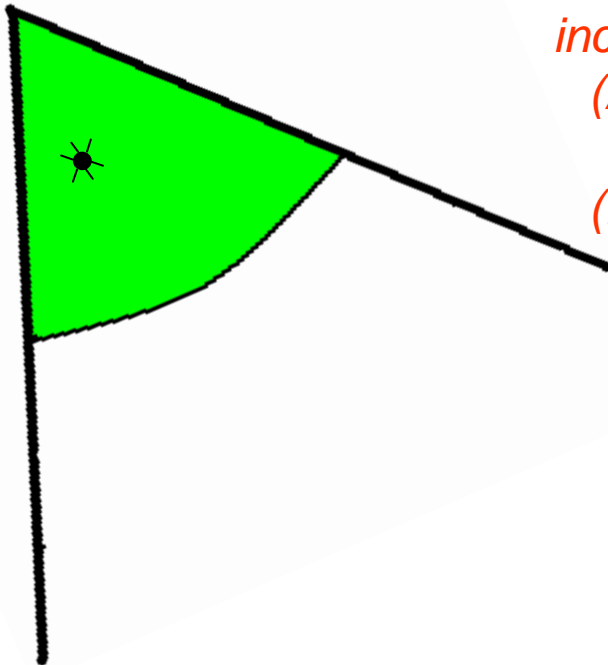
*“Reserves are estimated remaining quantities of oil and gas and related substances anticipated to be economically producible, as of a given date, by application of development projects to known accumulations.”*

*Source: 210.4-10 (a)(26) pg. 2192*

*“The area of the reservoir considered as proved includes:*

- (A) The area identified by drilling and limited by fluid contacts, if any, and*
- (B) Adjacent undrilled portions of the reservoir that can, with reasonable certainty, be judged to be continuous with it and contain economically producible oil or gas on the basis of available geoscience and engineering data.”*

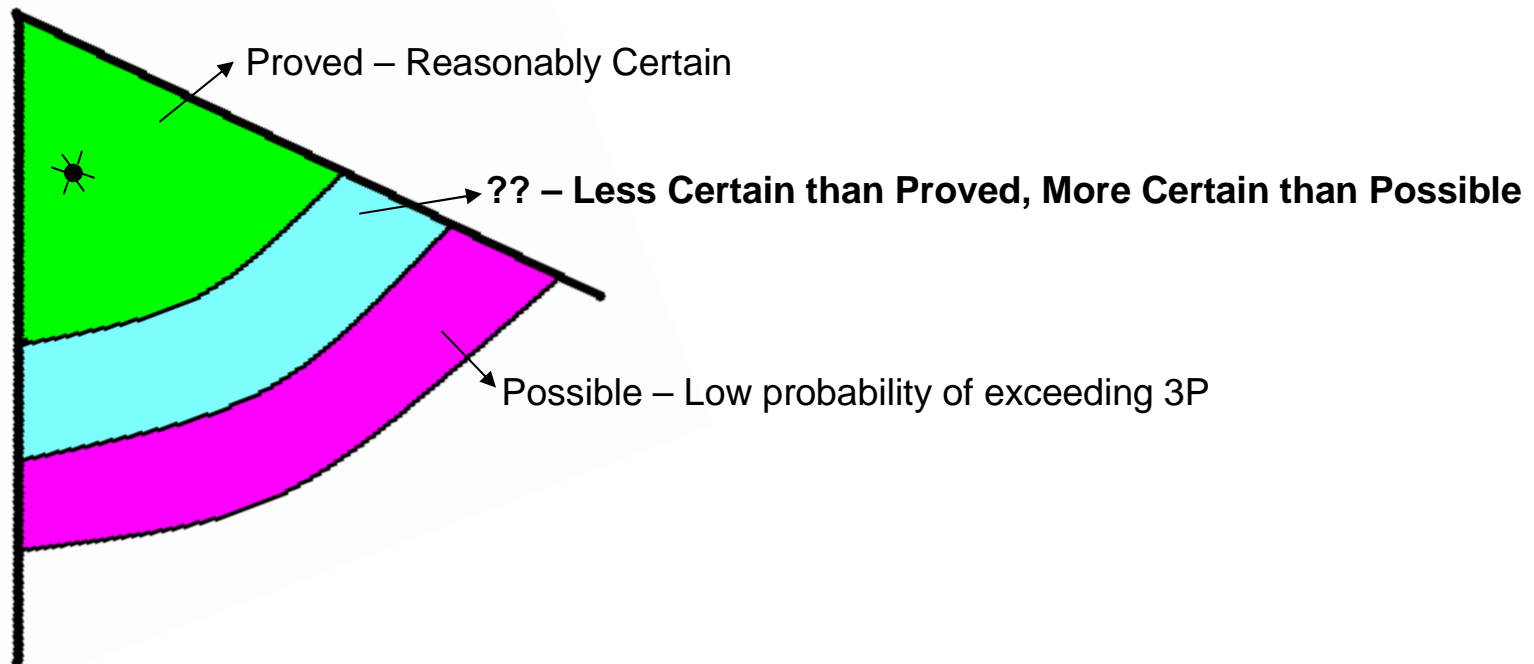
*Source: 210.4-10 (a)(22)(i) pg. 2191*





# Probable Reserves: Can you book downwardip of Proved?

Reserves structurally lower than the Proved area are not addressed in the 2009 SEC Regulations



# Probable Reserves: Can you book downdip of Proved?

Ryder Scott's opinion is that a case can be made to book Probable Reserves downdip of Proved Reserves

*“Rather than defining an extensive glossary of terms in our rules and attempting to constantly update those definitions, we advise companies to look to definitions that are commonly accepted within the oil and gas industry to the extent such definitions are not in, or inconsistent with, our rules.”*

*Source: Section II (J)(5) pg. 2168*

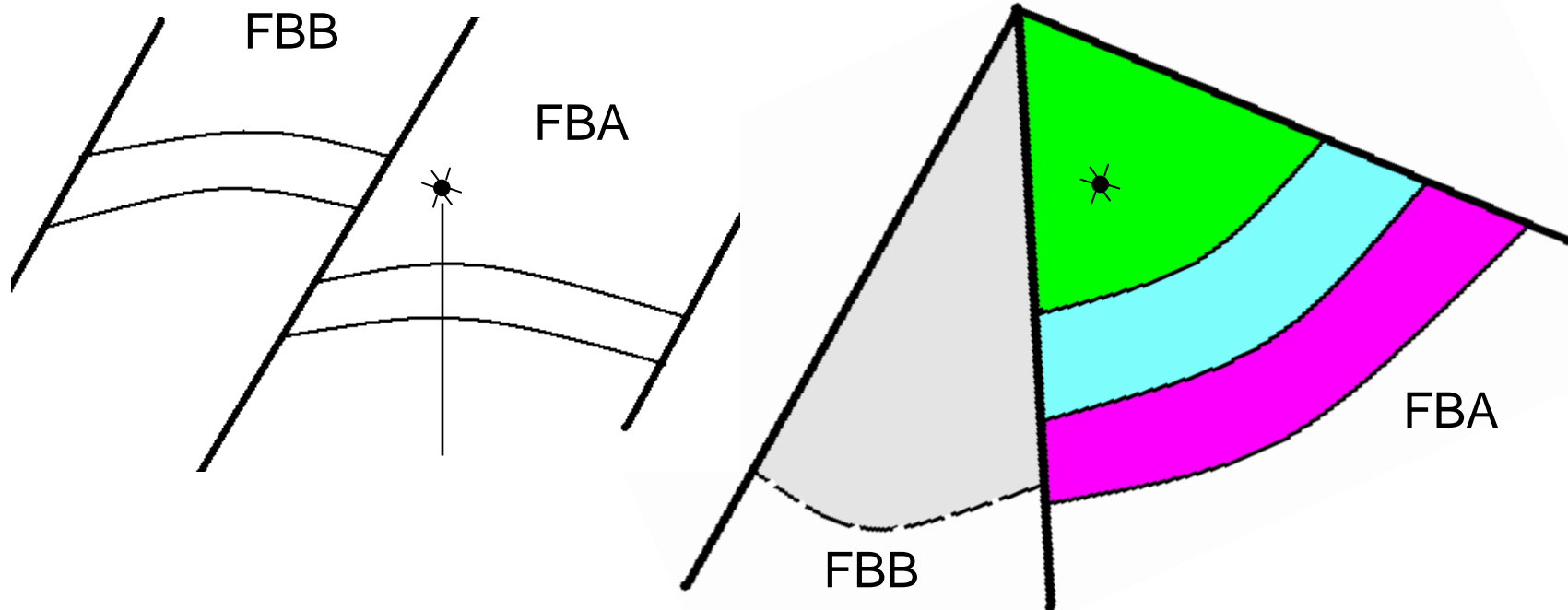
PRMS Definition:

*“Possible (and in some cases, Probable) Reserves may be assigned to areas that are structurally lower than the adjacent Proved or 2P area.”*

*Source: PRMS Table 3: Probable and Possible Reserves*

# Probable and Possible Reserves: Can you book across a fault?

Accumulations separated by a sealing fault (or stratigraphic discontinuity) are addressed in the 2009 SEC Regulations



# Probable and Possible Reserves: Can you book across a fault?



Ryder Scott's opinion is that, in most cases, Probable and Possible Reserves cannot be booked in an unpenetrated fault block, unless such adjacent portions are in communication with the known (proved) reservoir

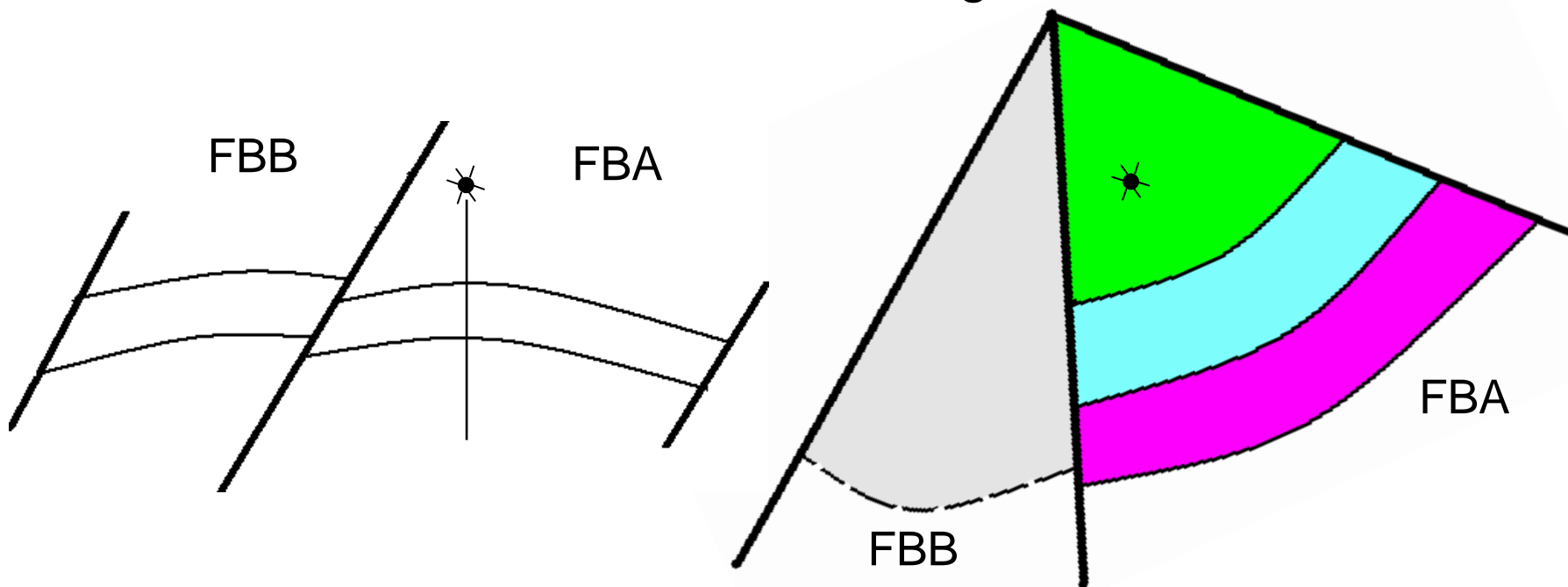
*“Reserves should not be assigned to adjacent reservoirs isolated by major, potentially sealing, faults until those reserves are penetrated and evaluated as economically producible. Reserves should not be assigned to areas that are clearly separated from a known accumulation by a non-productive reservoir (i.e., absence of reservoir, structurally low reservoir, or negative test results). Such areas may contain prospective resources (i.e., potentially recoverable resources from undiscovered accumulations).”*

*Source: 210.4-10 note to (a)(26) pg. 2192*



# Probable and Possible Reserves: Can you book across a fault?

Accumulations separated by a non-sealing fault (or stratigraphic discontinuity), but believed to be in communication with the known (proved) reservoir, are addressed in the 2009 SEC Regulations



# Probable and Possible Reserves: Can you book across a fault?



Ryder Scott's opinion is that a case can be made to book Probable and Possible Reserves in an unpenetrated fault block, if such adjacent portions are in communication with the known (proved) reservoir

*“Possible reserves may be assigned where geoscience and engineering data identify directly adjacent portions of a reservoir within the same accumulation that may be separated from proved areas by faults with displacement less than formation thickness or other geological discontinuities and that have not been penetrated by a wellbore, and the registrant believes that such adjacent portions are in communication with the known (proved) reservoir.”*

*Source: 210.4-10 note to (a)(17)(v) pg. 2191*

# Probable and Possible Reserves: Are Proved Reserves Required?



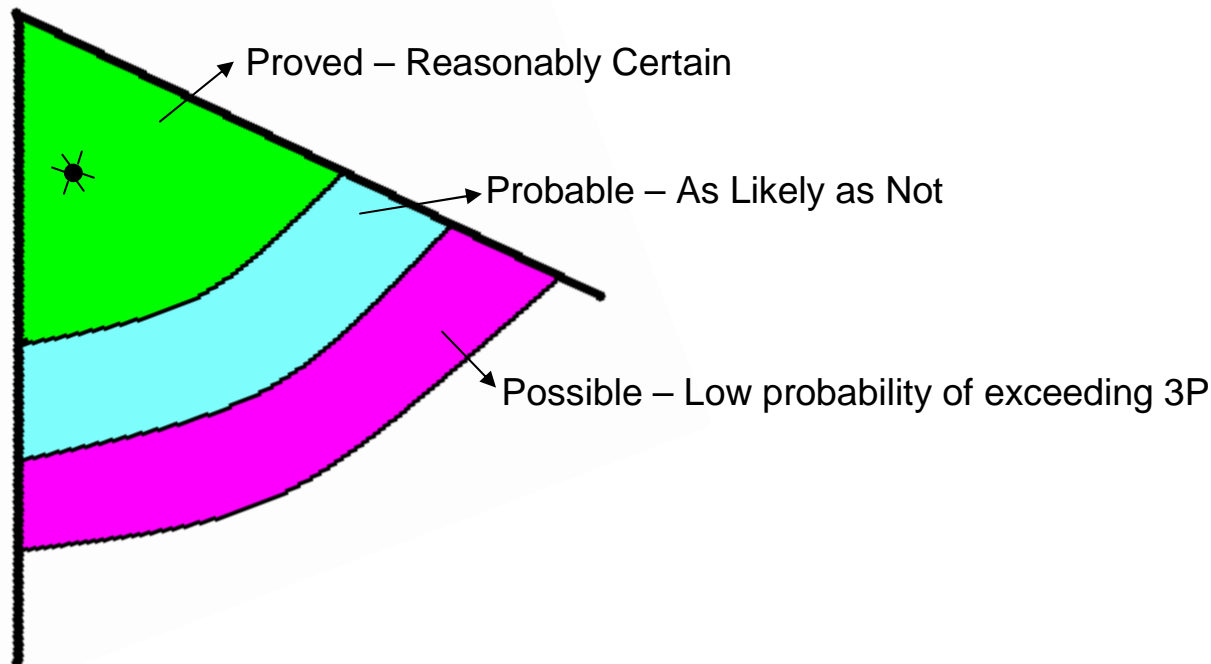
Ryder Scott's opinion is that, in most cases, Probable and Possible Reserves cannot be booked without the presence of Proved Reserves

*“Probable reserves may be assigned to areas of a reservoir adjacent to proved reserves where data control or interpretations of available data are less certain, even if the interpreted reservoir continuity of structure or productivity does not meet the reasonable certainty criterion.”*

*Source: 210.4-10 (a)(18)(ii) pg. 2191*

# Probable and Possible Reserves: Are Proved Reserves Required?

The case where Proved Reserves alone are not economically producible, but the Proved plus Probable reserve case is economically producible, is not specifically addressed in the 2009 SEC Regulations





# Probable and Possible Reserves: Are Proved Reserves Required?



Ryder Scott's opinion is that a case can be made to book all of Proved plus Probable to Probable Reserves if there are no other contingencies other than project economics and the 2P case is economically producible

*“Rather than defining an extensive glossary of terms in our rules and attempting to constantly update those definitions, we advise companies to look to definitions that are commonly accepted within the oil and gas industry to the extent such definitions are not in, or inconsistent with, our rules.”*

*Source: Section II (J)(5) pg. 2168*

*“There may be circumstances in which the project meets criteria to be classified as Reserves using the forecast case but does not meet the external criteria for Proved Reserves. In these specific circumstances, the entity may record 2P and 3P estimates without separately recording Proved. As costs are incurred and development proceeds, the low estimate may eventually satisfy external requirements, and Proved Reserves can then be assigned.”*

*Source: PRMS Section 3.1.2 Economic Criteria*

# Probable and Possible Reserves: Disclosure Requirements

## Optional disclosure of Probable and Possible Reserves

*(Source: 229.1202 (a)(2)(iv-vii) pg. 2194)*

- o Distinguish between Developed and Undeveloped Reserves  
*(Source: 229.1202 (a)(2)(iv-vii) pg. 2194)*
- o Tabular summary by same level of geographic detail as Proved  
*(Source: Section IV (B)(3)(a)(iii) pg. 2172)*
- o Discussion of relative uncertainty associated with these classifications  
*(Source: 229.1202 (a)(5) pg. 2194)*

## MD&A Discussion

- o Required if Probable and Possible disclosed *(Source: Section V pg. 2178)*
  - o Changes in probable and possible reserves and the sources to which such changes are attributable *(Source: Section V pg. 2179)*
  - o Ability to convert probable to proved and possible to probable or proved  
*(Source: Section V pg. 2179)*

# Probable and Possible Reserves: Disclosure Requirements



## Future Net Income & Annual Reconciliation

*(Source: FAS 69 Section 30 and Section 11, respectively)*

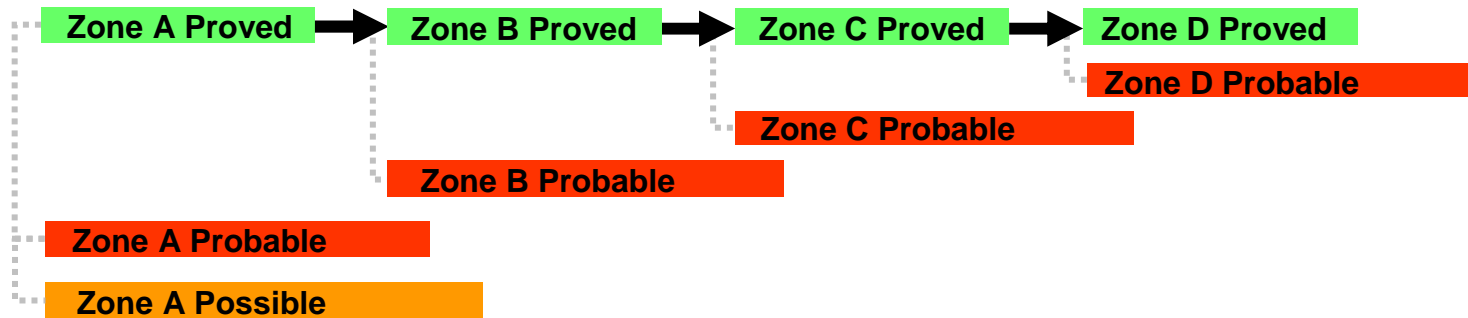
- o Recommend as Best Practice to include in internal documentation

## Optional Reserves Sensitivity Analysis Table – Alternative Pricing Scenario(s) *(Source: 229.1202 (b)(2) pg. 2195)*

- o Ryder Scott's opinion is that , if disclosed, Probable and Possible should be presented with the same alternative pricing scenario(s) as Proved *(Source: Section IV (B)(3)(b) pg. 2174)*
- o Disclosure of assumptions for varying estimates *(Source: 229.1202 (b)(3) pg. 2195)*

# Forecasting Incremental Probable and Possible Reserves

## Method #1: Incremental Probable and Possible timing tied to Proved timing



### Pros

- + Simplistic Approach
- + Consistent Links

### Cons

- Overlap of production
- Unrealistic FNI estimate



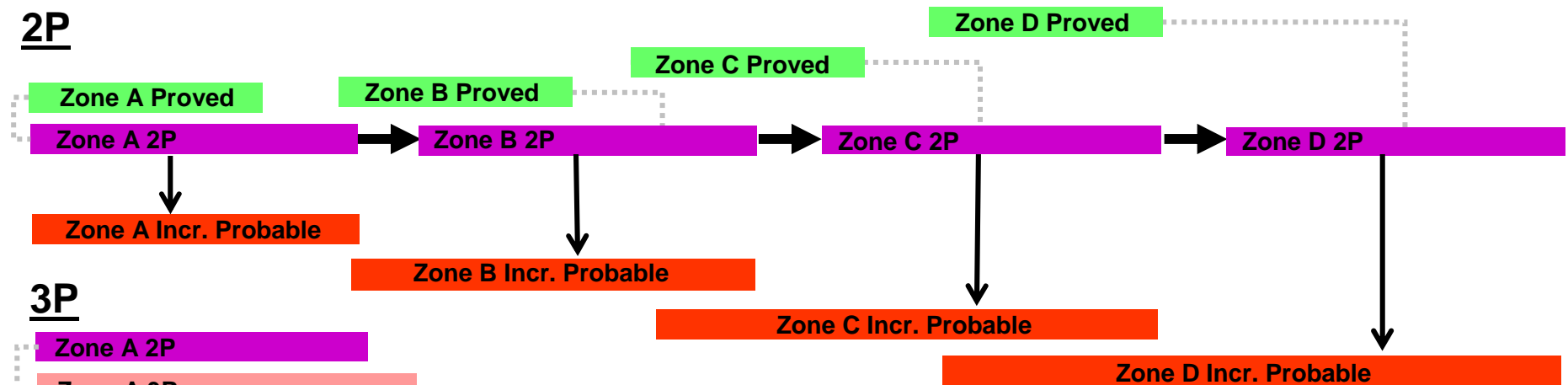
# Forecasting Incremental Probable and Possible Reserves

**Method #2:** Adjust timing of 2P and 3P, but no shift to Proved timing for subtraction in Incremental Probable and Possible

## Proved



## 2P



## 3P



## Pros

- + Realistic FNI estimate
- + Consistent Links

## Cons

- Negatives on Cashflow
- Difficult to Check Incr. Cases

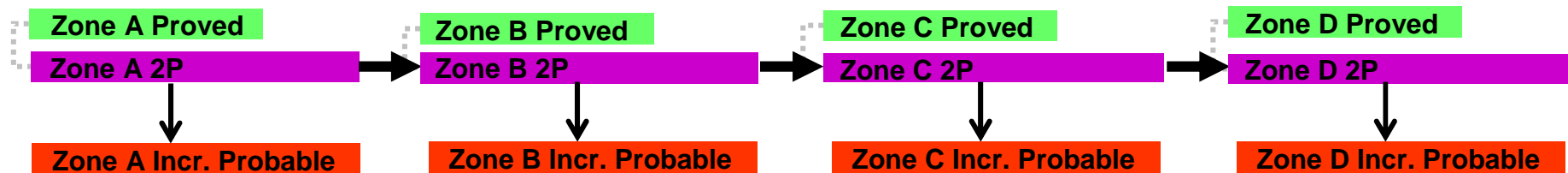
# Forecasting Incremental Probable and Possible Reserves

**Method #3:** Adjusted timing of 2P and 3P, with shift to Proved timing for subtraction in Incremental Probable and Possible

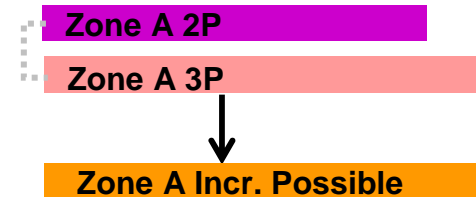
## Proved



## Probable



## Possible



## Pros

- + Reasonable FNI estimate
- + No Negatives on Cashflow

## Cons

- Manual Changes Required
- Can be Time Consuming

## Contact Info

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