



AAPG: ACE 2016
**TALKING RESPONSIBLY ABOUT YOUR
CONTINGENT RESOURCE OIL SANDS PROJECT**

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INTRO

GOALS

- Create meaningful disclosure
 - Relevant
 - Not misleading
 - Focus on: NI 51-101 and COGEH – Reserves Other Than Resources (ROTR)
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WHAT'S CHANGED

As of July 1, 2015 the following changes apply to disclosure of contingent (and prospective) resources:

- Independent evaluation of contingent & prospective resources
 - Resources must be sub-classified by project maturity
 - Resources must be risked for chance of commerciality
 - Contingencies and steps to remove them should be discussed
 - Economics required for development pending sub-class
 - Companies must, at a minimum, provide an estimate of capital to first on-stream date in their disclosure
 - Abandonment & reclamation for existing and future development to be included in the determination of net future revenue
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WHAT IS A PROJECT?

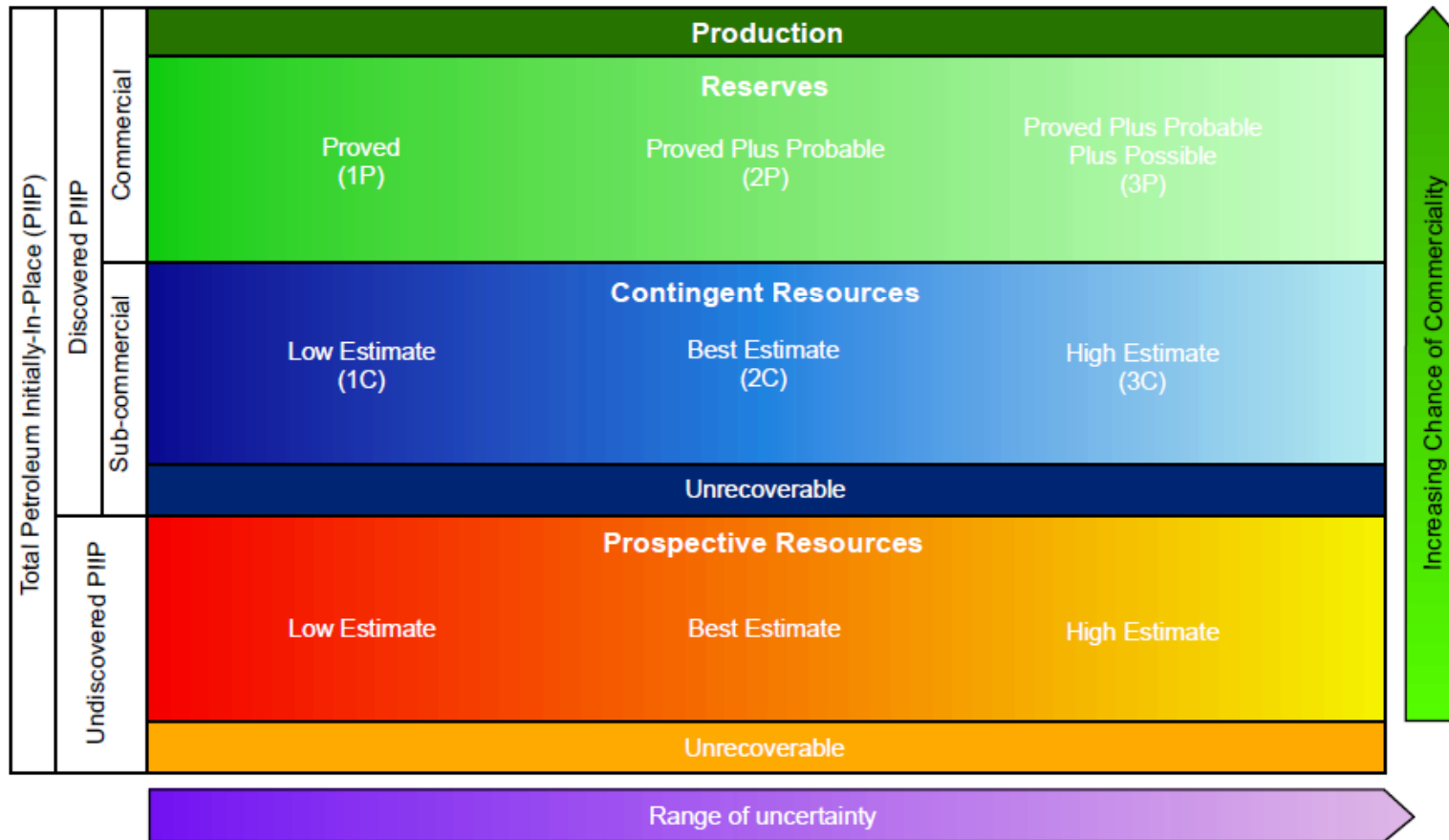
- Represents a single investment decision
- Could be a well or drilling program for conventional resources
- For oil sands: typically a “phase” of development
- COGEH Volume 2, Section 2.4 & 2.4.6 PRMS Guidelines



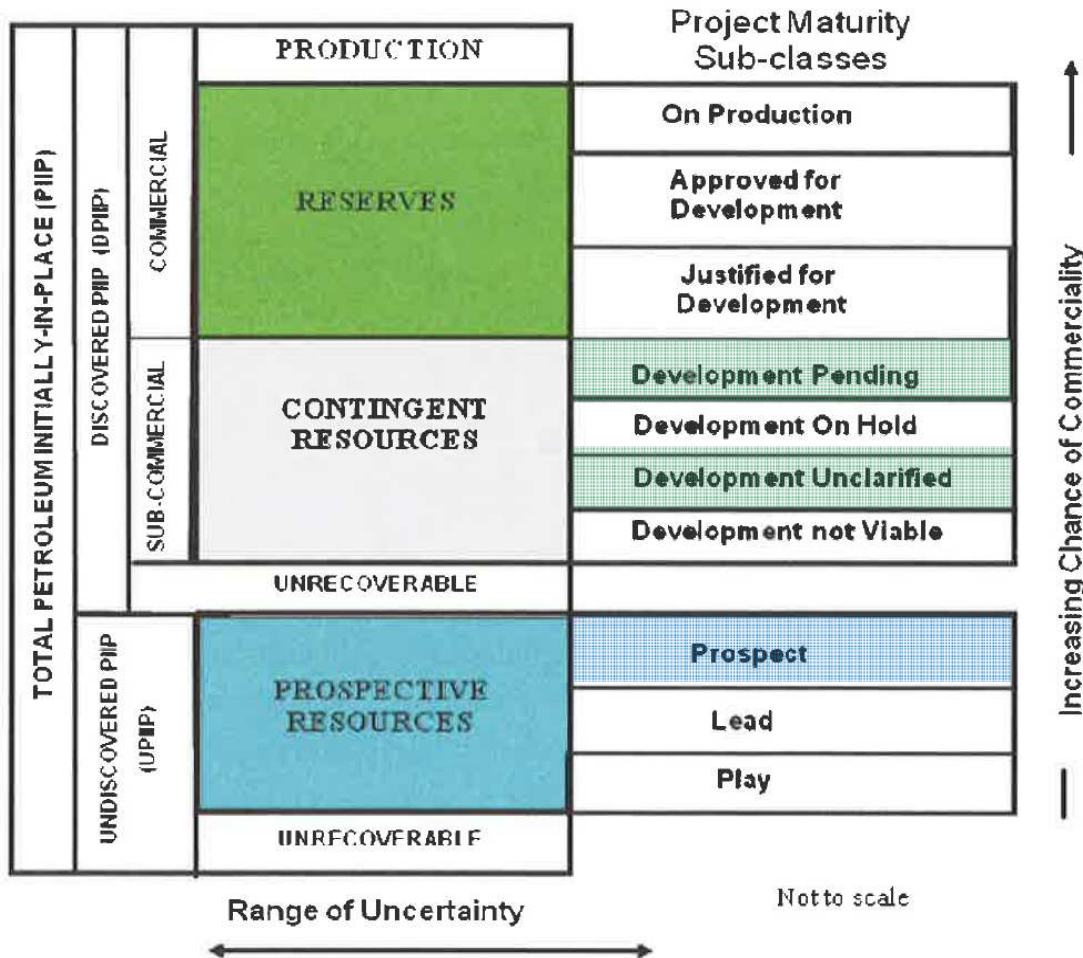
Suncor Energy Inc.

RESERVES & RESOURCES

Resource and Reserve Classification



SUB CLASSIFICATIONS



Most Common for Oilsands:

- Dev. Pending
- Dev. Unclassified
- Prospect

Figure 2-3. PRMS, Modified to Show Development On Hold and Development Unclassified Separately.

SUB CLASSIFICATIONS

- Sub-classifying contingent resources provides ***increased resolution*** on the commerciality status
 - Proper sub class is based on economic, technology, development, timing and other
 - Individual statuses also factor into assessing chance of development
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CONTINGENT RESOURCES

	Economic Status	Technology Status	Development Plan Status	Development Timeline	Other Contingencies
Development Pending	Economic	Established	(Pre) Development Study	Reserves or Similar	Typically None
Development On Hold	Economic	Established	(Pre) Development Study	<i>May be Unknown</i>	<i>Yes, likely to be resolved</i>
Development Unclassified	Economic or <i>Undetermined</i>	Established Or <i>Under Development</i>	Pre Development or <i>Conceptual</i>	Can be <i>Future</i> Project	Typically None
Development Not Viable	Economic, Undetermined or <i>Sub-Economic</i>	Established Or Under Development	Pre Development or Conceptual	Can be Future Project	Typically None
Unrecoverable	<i>Typically Uneconomic</i>	<i>Experimental</i>	<i>No Plan</i>	<i>Indefinite</i>	<i>Yes, unlikely to be resolved</i>

RISKING RESOURCES

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- Chance of development is the product of five factors:
 - Economic Factor (NPV, ROR etc,)
 - Technology Factor (Established or under development)
 - Development Plan Factor (Development study, pre-development, conceptual)
 - Development Timeline Factor (How far out is the start date?)
 - Other Contingency Factor
 - Contingent resources:
 - Chance of Commerciality = Chance of Development
 - Prospective resources
 - Chance of Commerciality = Chance of Development * Chance of Discovery
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What's Appropriate Big Picture?

Project Maturity Sub-Class	Range for Chance of Development
Development Pending	80% to <100%
Development On Hold	50% to <80%
Development Unclarified	20% to <80%*
Development Not Viable	>0% to <50%

*Expect 50% to <80% with established technology status – potentially < 50% with technology under development status subject to technology risks & corporate decision gates status

Factors influencing quantification within the sub-class range

- Relative delineation density
- Relative ROR
- Quality of capital cost estimates
- Quality relative to analogues
- Relative timeframe for development

SUMMARY

- Contingent resources must be sub classified
 - Disclosed volumes and net present value should be risked by the chance of commerciality in disclosure
 - Contingencies and steps to remove them should be discussed
 - Economics or capital to first production required, depending on sub-classification, including full cycle abandonment & reclamation costs
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THANK YOU

ADDITIONAL INFORMATION

EXAMPLE – BEST ESTIMATE

TIME ↓	Stage of Development	Unrisked Prospective (MMbbl)	CoC (%)	Risked Prospective (MMbbl)	Unrisked Contingent (MMbbl)	CoC (%)	Risked Contingent (MMbbl)	Reserves (MMbbl)
	Undiscovered project	500	32.5	162.5	-	-	-	-
	1/2 delineated to 1 well/sec	250	45.5	113.8	250 ⁽¹⁾	65	162.5	-
	Delineated to discovered	-	-	-	500 ⁽¹⁾	65	325	-
	IDA delineated to 1 well/160 acres + 3D, appl'n prep underway	-	-	-	500 ⁽²⁾	90	450	-
	Appl'n filed, ½ delineated to 1 well/160 acres + 3D	-	-	-	250 ⁽²⁾	95	237.5	250
	On-stream , fully delineated	-	-	-	-	-	-	500

CoC = Chance of Commerciality

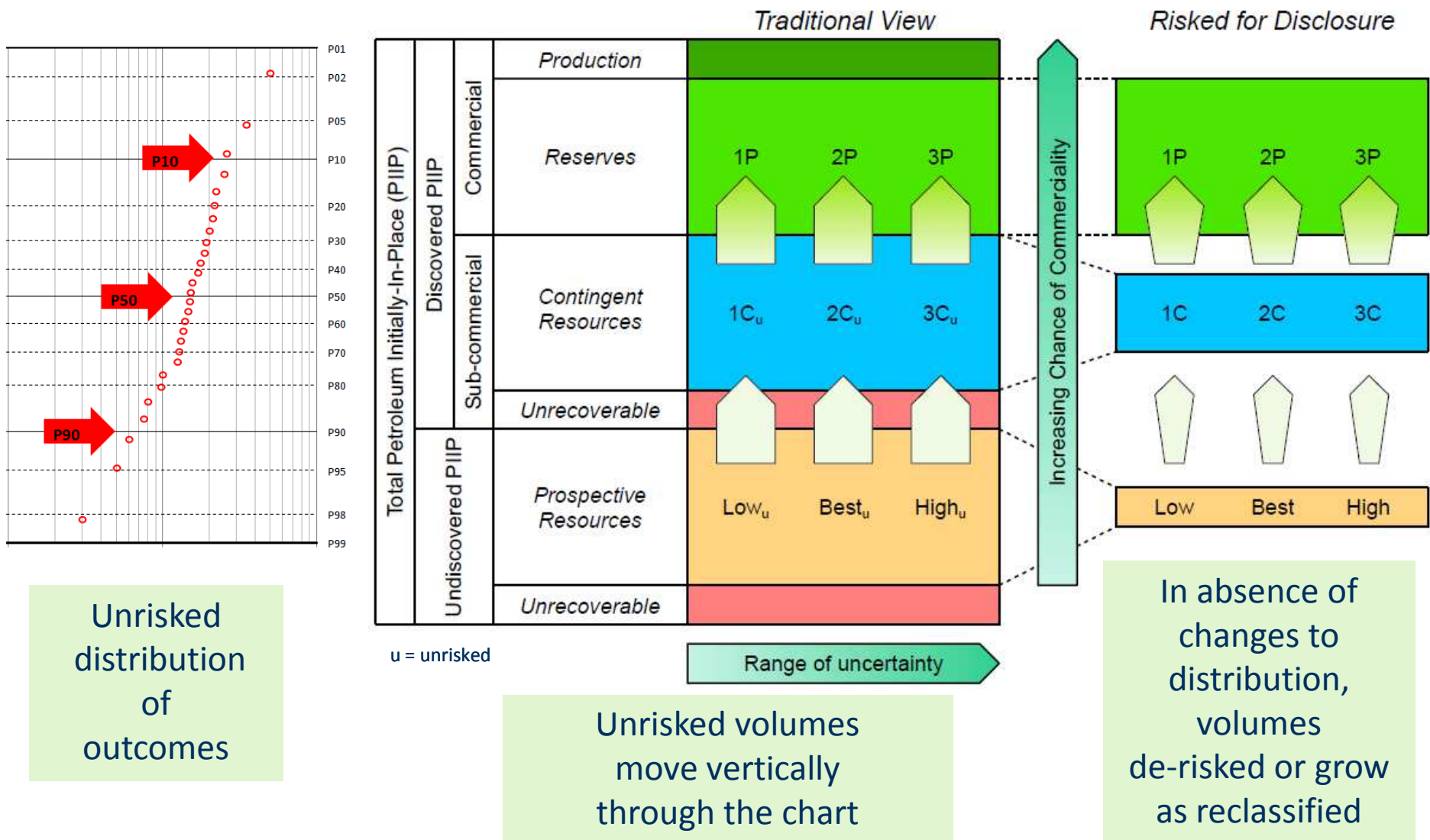
- 1 – Unclassified
- 2 – Pending

Assumptions:

- East McMurray play using established technology
- Economics are robust
- Single CPF required to develop in 25 years
- Original mapping does not change with progressive delineation

PROGRESSION

Resource and Reserve Classification



ROTR Preface

... “the evaluator is responsible for information on technical contingencies, and the client on non-technical contingencies.”

ROTR Project Maturity Status

“The boundaries between the maturity sub-classes represent “decision gates” that reflect the actions (business decisions) required by the resource owner to move the project up the maturity “ladder” towards commercial production.”

Bottom Line: The evaluator needs your help as the developer to understand the corporate decision gate status and chance of commerciality for each project.

DEVELOPMENT - PENDING

Development Pending is where resolution of the final conditions for development is being actively pursued (high chance of development)

Established technology – Economic – **Pre-development or development study – Reasonable timeframe**

- High chance of commerciality
- Contingencies can be influenced directly by developer
- Removal of contingencies under active pursuit
- Undertaking residual data acquisition and studies designed to move to investment decision
- High probability of no technical issues
- Reasonable timeframe for development & resolution of contingencies
- Non technical contingencies more likely than not to be removed
- Significant justification required to maintain status for extended period of time
- If cannot be developed in reasonable timeframe, reclassify as on hold or not viable

Almost
“like”
reserves

Company’s responsibility to define the development plan – development pending sub-class is not appropriate in absence of this definition

DEVELOPMENT ON HOLD

Development On Hold is where there is a reasonable chance of development but there are major non-technical contingencies to be resolved that are usually beyond the control of the operator

Established technology – Economic – Pre-development or development study – **Uncertainty in Outcome & Timeframe for Contingency Removal**

- Development more likely than not
- Delayed due to major non-technical contingencies subject to the decisions of others, developer has little to no influence over outcome
- Limited situations where an otherwise development pending project may be delayed by developer for strategic or other reasons
- Judgment of evaluator as to whether a request for regulatory approval, political or social license can be considered factors influenced by the developer
- High probability of no technical issues
- No other issues beyond the major non-technical contingencies
- Outcome and timing of removal of contingencies are subject to significant uncertainty
- Timeline may be longer than for development pending or reserves but must be justified
- Sub-class can be maintained indefinitely with explanation

A downgrade of reserves or dev pending

DEVELOPMENT UNCLARIFIED

Development Unclassified is where the evaluation is incomplete and there is ongoing activity to resolve any risks or uncertainties

Established technology or **Technology Under Development** – Economic or Economic Status **Undetermined** – **Conceptual**, Pre-development or development study – **Evaluation Ongoing**

- Significant further appraisal ongoing even though BIIP is largely defined
- Appraisal = delineation, technical studies, field testing, planning and cost studies
- Contingencies may not be fully defined
- Typically period between discovery & completion of the development plan
- Sub-class should not be maintained indefinitely without activity directed to resolving issues or a reasonable explanation as to why activity is not ongoing
- Reclassify to development not viable if there is no current or planned activity
- Negative appraisal may lead to development not viable or unrecoverable assessment

Common
sub-class if
not
dev pending

• If all contingencies are defined & action taken to resolve them, development unclassified is not appropriate – reclassify as development on hold or not viable

DEVELOPMENT NOT VIABLE

Development Not Viable is where no further data acquisition or evaluation is currently planned and hence there is a low chance of development

Established technology or Technology Under Development – Economic, **Sub-economic** or Economic Status Undetermined – Conceptual, Pre-development or development study – **No plans to pursue**

- Represents the decision not to pursue the project or undertake any further data collection
- Represents a potential opportunity that may be recognized in the event of a change in technology, fiscal or commercial conditions
- Sub-class may be maintained indefinitely with explanation

Common
sub-class if
sub-economic
status

EXAMPLE – BEST ESTIMATE

Undiscovered Project

- maps based on regional drilling
- unrisks prospective resources assessed at 500 MMbbl
- sub-class: prospect
- chance of discovery assessed at 50%
- robust economics in east McMurray play, uses established technology, single phase required to exploit in 25 years
- chance of development assessed at 65%
- chance of commerciality = 32.5%
- risked prospective resources = 162.5 MMbbl

EXAMPLE – BEST ESTIMATE

Delineation Initiated

- ½ of resource delineated to 1 well per section (assume map sheets unchanged)
- unrisks prospective resources assessed at 250 MMbbl & unrisks contingent resources assessed at 250 MMbbl
- sub-class “prospect” for prospective & “unclarified” for contingent
- chance of discovery assessed at 70% for portion of map sheet which remains undiscovered
- chance of development assessed at 65%
- chance of commerciality prospective = 45.5% & chance of commerciality contingent = 65%
- risked prospective resources = 113.8 MMbbl & risked contingent resources = 162.5 MMbbl

EXAMPLE – BEST ESTIMATE

Delineated to Discovered Project Status

- All of resource delineated to 1 well per section (assume map sheets unchanged)
- unrisked contingent resources assessed at 500 MMbbl
- sub-class “unclarified” for contingent resources
- chance of discovery assessed at 100%
- chance of development assessed at 65% for contingent resources
- chance of commerciality contingent = 65% for contingent resources
- risked contingent resources = 325 MMbbl

EXAMPLE – BEST ESTIMATE

IDA Delineated to Reserves Status, Regulatory Application Preparation Underway

- IDA delineated to 1 well/160 acres plus 3D seismic (assume map sheets unchanged)
- time to first production = 8 years
- unrisked contingent resources assessed at 500 MMbbl
- sub-class “pending” for contingent resources
- chance of discovery assessed at 100%
- chance of development assessed at 90% for contingent resources
- chance of commerciality contingent = 90% for contingent resources
- risked contingent resources = 450 MMbbl

EXAMPLE – BEST ESTIMATE

Regulatory Application Filed

- ½ of resource delineated to 1 well/160 acres plus 3D seismic (assume map sheets unchanged)
- time to first production = 6 years
- reserves assessed at 250 MMbbl & unrisksed contingent resources assessed at 250 MMbbl
- sub-class “justified for development” for reserves & “pending” for contingent resources
- chance of discovery assessed at 100%
- chance of development assessed at 95% for contingent resources
- chance of commerciality contingent = 95% for contingent resources
- reserves = 250 MMbbl & risksed contingent resources = 237.5 MMbbl

EXAMPLE – BEST ESTIMATE

Project On-stream, Lands Fully Delineated

- all of resource delineated to 1 well/160 acres plus 3D seismic (assume map sheets unchanged)
- reserves assessed at 500 MMbbl
- producing and sub-class “approved for development” for sustaining pads
- chance of discovery assessed at 100%
- chance of development assessed at 100%
- chance of commerciality contingent = 100%
- reserves = 500 MMbbl

BACK-UP SLIDES

Economic status

***Economic** contingent resources are those contingent resources that are currently economically recoverable based on the same fiscal conditions used in the assessment of reserves.*

***Sub-Economic** contingent resources are those contingent resources that are not currently economically recoverable based on the same fiscal conditions used in the assessment of reserves but are currently economic based on reasonably high fiscal conditions. (GLJ prepares reasonably high price forecasts quarterly along with our primary price forecast. These forecasts are used to determine the threshold for economic status assessment in sub-economic projects.)*

***Economic Status Undetermined** applies when evaluation are incomplete such that it is premature to identify the economic viability of a project.*

*Projects that are determined to be uneconomic not economic are classified as **Unrecoverable** – those resources that are not currently economic based on reasonably high fiscal conditions.*

BACK-UP SLIDES

Technology status

***Established technology** has been defined as “methods that have been proven to be successful in commercial applications”*

***Technology Under Development** is a recovery process or process improvement that has been determined to be technically viable via field test and is being field tested further to determine its economic viability in the subject reservoir.*

***Experimental technology** is a technology that is being tested in the field to determine the technical viability of applying the process or process improvement project to unrecoverable DPIIP in a subject reservoir.*

BACK-UP SLIDES

Project evaluation scenario status

A **development study** is the most detailed step in the development of a project evaluation scenario. It is based on a detailed geological and engineering study and economic analysis of information on the specific project, and provides sufficient information for the creation of a development plan, from which a development decision can be made.

A **pre-development study** is an intermediate step in the development of a project evaluation scenario. The PIIP has been reasonably well defined and the remaining uncertainty lies largely in the recovery factor and the economic viability. The level of economic analysis is sufficient to assess development options and overall project viability, but is insufficient for a final investment decision or for seeking outside major financing.

A **conceptual study** (or scoping study) is the initial stage of the development of a project evaluation scenario. There will usually be limited information and major parameters will be mostly assumed. A project evaluations scenario may be based on the general experience of the evaluator, often without meaningful input from the resource owner or client and, as a result, the level of accuracy will be low. While the results may be sufficient for initial delineation of the resources and for identifying the need for additional technical data, they will be insufficient for making economic decision regarding development.