A comparison of the Chinese and Russian standards with PRMS
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According to SPE PRMS 2007:

- **RESERVES** are those quantities of petroleum anticipated to be commercially recoverable by application of development projects to known accumulations from a given date forward under defined conditions. Reserves must further satisfy four criteria: they must be: discovered, recoverable, commercial, and remaining (as of the evaluation date) based on the development project(s) applied.

- **CONTINGENT RESOURCES**: …… “more exiting stuff…”

- **PROSPECTIVE RESOURCES**: …… “even more exciting…”
So, what are Reserves?

- **In China and Russia:**
  - The word “Reserves” does not translate easily, and it also refers to volumes in place (e.g. “geological reserves”)
  - “Resources” are non-discovered volumes

- **In Europe, US and Canada:**
  - Generally, we are talking about “sales volumes”
  - “Reserves” booked under SEC, PRMS or COGEH can be substantially different.
  - “Experts” also disagree…

- **In the solid mineral industry:**
  - “Reserves” usually refer to a GRV associated with a grade (CRIRSCO, JORC)

- **In the renewable energy sector:**
  - “Reserves” are mostly linked to facility lifetime (e.g. UNFC)
  - “Resources” are linked to the replenishment rate and are infinite (in theory…)
SPE PRMS

Already discussed today – A few points that I would like to emphasize on:

• No split conditions:
  - Commitment requirements are the same for 1P, 2P, 3P
  - Reserves do NOT move from possible, to probable to proved
  - Similarly, reserves cannot be downgraded reserves from proved to probable. Downgraded projects becomes CR !!! (this is a convenient – yet non compliant - way to overestimate the 2P case).
  - One liner in new PRMS – if it makes it to the final version

• personal notes (not part of PRMS - unfortunately):
  - Avoid the incremental approach if you may. This is coming from the old 1 offset rule from US, and can be confusing.
  - Scrap the terminology "proved", "probable" & "possible". A "probable" project does not exist as such. It is approved (or expected to be soon), or it is not (no split conditions). 1P, 2P, 3P is merely a range of uncertainty.
SPE PRMS

- From the joined efforts of the SPEE and WPC (1997)
- Reporting of 1P, 2P & 3P (Low, Mid and High case)
- Companies tend to focus on 2P (mid case) so
  - The NPV of the company is a mainly best estimate
  - NPV does not (rarely) include 2C volumes
- Project maturity is the same in 1P, 2P & 3P:
  - “Probable” projects are Contingent Resources
  - No split conditions (in theory…..)
  - Full commitment is required (or expected to be forthcoming – justified)
- Economics:
  - Companies can use incremental prices for reporting
  - Price deck is not fixed

* Personal preference: as far as possible, avoid using the “Proved, probable and possible” terminology
Note

This presentation has been built based on the work completed with the GKZ department in the context of the RF2013 guidelines mapping to UNFC2009. This work was headed for the TAG by John Etherington.

Although the GKZ did provide the complete translation for the RF2013 guidelines, they did not build or review this presentation. As such, the information provided are ER’s understanding of RF2013, based on the work completed between the Expert’s team of the UN and the Russian authorities.
**RF2013 is a volume based guideline, with 4 main categories.**

**Simplifying at the utmost:**
- Category “A”: wells have been drilled. The area is developed
- Category “B”: (Undrilled, development approved)
- Category “C”: (Undrilled, under investigation)
- Category “D”: exploration and prospective resources.

**Also (same as in China)**
- "Reserves" = Discovered (in place, recoverable, stranded…)
- "Resources" = Not discovered yet

**RF2013 introduced the concept of**
- $A^*$, $B^*$, $C^*$, $D^*$: Volumes that are recoverable, but sub-economic
- $A^{**}$, $B^{**}$, $C^{**}$, $D^{**}$: Volumes that are technically non-recoverable (e.g. stranded oil).
RF2013 is based on the geological knowledge:

- **Category “C”**
  - C1 corresponds to the undeveloped area which is close to existing exploration wells. The development is not planned yet
  - C2 corresponds to the volumes further away from control wells. Much uncertainty remains and development is not planned yet (based on seismic)

- **Category “B”:**
  - B1 corresponds to the undrilled area which is close to existing wells and ready for development as per FDP.
  - B2 corresponds to volumes further away from control wells, where more uncertainty remains. The development of this area is still covered by the FDP but it "might" (CR???) depend on further drilling. In principle, this is not an upside, and the volumes are still a best estimate (well…….)

- **Category “A”: developed**

For each category, the volumes provided are best estimates (P50 case).
Usual mistakes and assumptions from auditors for mapping RF2013 to PRMS:

- **Category “A” does NOT correspond to the SPE-PRMS proved developed classification.** (e.g. newsletter July 2015)

  RF2013 only provides best estimates. However, if the risk is small, the distribution is narrow compared to other cases and we sometimes approximate $1P = 2P = 3P$.

- **“B1” and “B2” are NOT respectively “probable” and “possible” reserves under PRMS**

  B1 and B2 volumes under the approved FDP are both part of the 2P case (or 2C for B2???) under PRMS, as 2 projects: both are approved, yet carrying different level of risks.

  *"Exploration bias": in theory, B2 is still a best estimate STOIIP, not an upside*

- **Category “C” is similar to B, but it corresponds to Contingent Resources (no development approved yet)**
When we review Reserves under RF2013

- “A” reserves may carry a low risk, but they do not represent a proved PRMS case (1P dev.)
- Maturation in RF2013 is done from D to A
- For all discovered volumes, the classifications B1 & B2, (or C1 & C2):
  - refers to the level of geological certainty around the discovered volumes, not around the projects.
  - only provide mid cases (P50, 2P or 2C) in RF2013, for different discovered area.
  - When development is approved, the volumes are “matured” from C to B.
- We always need to check if the estimated volume in place is decent !!!
Note

This presentation has been built based on the work completed with the MLR department and RIPED. Other members of Petrochina, CNOOC & Sinopec also provided some support in the context of the CCPR2004 guidelines mapping to UNFC2009. This work was headed for the TAG by Dominique Salacz.

Although the MLR did provide the complete translation for the RF2013 guidelines, they did not build or review this presentation (validation of the mapping by the MLR is pending). As such, the information provided are ER’s understanding of CCPR2004, based on the work completed between the Expert’s team of the UN and the Chinese authorities.
Chinese guidelines

CCPR2004

- Mandatory for reporting to the MLR
- Dated 01.01.2004, and based on the old Russian classification
- Volume based system. Maturity depends on Geological knowledge
- Includes 3 main classes:
  - Inferred / Possible
  - Indicated / Probable
  - Measured / Proved

This terminology has nothing to do with the proved, probable and possible classification in PRMS, COGEH...

- All estimations are (more or less) based on the best estimate (similar to RF2013)
Step by step:

- **Discovery of the asset (E.g. Wildcat well)**
  - No development project yet (under appraisal)
  - You have geological **inferred "reserves"** in CCPR2004
  - You have **"possible reserves"** in CCPR2004
  - No economics yet
  - *In PRMS, those volumes would probably be in CR Unclarified*

- **Better geological knowledge:**
  - No approved development project: **concepts** are being investigated in view of future development
  - More appraisal has been done
  - You have geological **Indicated "reserves"** in CCPR2004
  - You have **"probable reserves"** in CCPR2004
  - Preliminary economics are being computed for various scenarios
  - *In PRMS, those volumes might be in Contingent Resources Pending*
Chinese guidelines

Step by step:

- **Increasing geological knowledge (lower uncertainty on STOIIP):**
  - Development plan and financing are approved
  - You have geological Measured "reserves" in CCPR2004
  - You have "proved reserves" in CCPR2004
  - "Firm" economics are completed
  - *In PRMS, those volumes might be called 2P Undeveloped, as projects are signed off*

- **Producing:**
  - Development plan has started
  - You have geological Measured "reserves" in CCPR2004
  - You have "proved producing reserves" in CCPR2004
  - "Firm" economics are completed
  - *In PRMS, those volumes might 2P Undeveloped, as projects are signed off*
When we review Reserves under CCPR2004

• Proved, probable and possible "reserves" have a completely different meaning

• Proved reserves in CCPR are 2P reserves in PRMS (with approved projects)*

  * Note: although it appears that a “conservative” approach might be required

• Probable reserves in CCPR are contingent resources in PRMS. Projects are being investigated, but development has not been approved yet.

• Possible reserves in CCPR remain contingent resources in PRMS (unclarified).

• Maturation of the whole asset is based on appraisal & approval level, in parallel

• Only best estimates are provided, in theory (although we were told recently that the estimations for "proved reserves" need to be conservative)
Thank you

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