APPLICATION OF THE UNFC TO SELECTED PROJECTS IN THE ALBERTINE GRABEN - WESTERN UGANDA

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The Petroleum Authority of Uganda
1. Overview of the Albertine Graben in Uganda

2. Application of UNFC to selected projects in the Albertine Graben

3. Conclusion
The Albertine Graben forms the northernmost part of the Western arm of the East African Rift System.

It is an Extensional province of Cenozoic age, though transpression/compression structures have been interpreted.

Hydrocarbon discoveries have been made in the western Arm in Uganda and Eastern arm in Kenya, de-risking the rift system.
OVERVIEW OF THE ALBERTINE GRABEN

- 2006 – Commercial Discovery
- 21 Discoveries; 88% drilling success rate
- 6.0Bbbls STOIIP; 1.4Bbbls recoverable
- 9 PLs over 14 discoveries
- 3 PLAs under review
- 3 ELs issued in Sept-Oct 2017
- Exploration of new acreage ongoing
Objective;
- To test applicability of UNFC scheme on the Albertine graben fields
- To compare the maturity of the different Albertine graben fields
- To make recommendations to the UNFC scheme accordingly

Key considerations;
- Four (4) Projects selected.
- Project characterization based on available data (*confidentiality issues*)
- Economics, Environmental and social considerations
- Project status and feasibility
APPLICATION OF UNFC IN THE ALBERTINE GRABEN

The 2D representation of the UNFC classification scheme

<table>
<thead>
<tr>
<th>Total Commodity Initially in place</th>
<th>Sales Production</th>
<th>Non-Sales Production</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extracted</td>
<td>Class</td>
<td>Sub-class</td>
<td>E</td>
</tr>
<tr>
<td>Future recovery by commercial development projects or mining operations</td>
<td>Commercial Projects</td>
<td>On Production</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Approved for development</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Justified for development</td>
<td>1</td>
</tr>
<tr>
<td>Potential future recovery by contingent development projects or mining operations</td>
<td>Potentially Commercial Projects</td>
<td>Development Pending</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Development on hold</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Non-Commercial Projects</td>
<td>Development Unclarified</td>
<td>3.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Development not Viable</td>
<td>3.3</td>
</tr>
<tr>
<td>Additional quantities in place associated with known deposits</td>
<td>Exploration Projects</td>
<td>3.2</td>
<td>3</td>
</tr>
<tr>
<td>Potential future recovery by successful exploration activities</td>
<td></td>
<td>3.3</td>
<td>4</td>
</tr>
<tr>
<td>Additional quantities in place associated with potential deposits</td>
<td></td>
<td>3.3</td>
<td>4</td>
</tr>
</tbody>
</table>
**Project Overview;**
- 10 wells drilled to appraise structure
- Recoverable Volumes = 217Mbbl (good RF)
- Waterflood to be considered at first Oil
- 31OP & 31WI planned for development

**Project Status**
- Production Licensee (PL) awarded.
- JVPs expected to conclude FID mid-yr.
- First oil is expected in 2021/2022

<table>
<thead>
<tr>
<th>E (Economic viability)</th>
<th>F (Project feasibility)</th>
<th>G (Geological Knowledge)</th>
<th>Class</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| 1.1                    | 1.3                    | 1.2.3                    | Justified for Development | - Project is economic  
- Detailed evaluation has confirmed project feasibility |
APPLICATION OF UNFC IN THE ALBERTINE GRABEN

Project overview;
- Five (5) wells drilled to appraise structure
- Recoverable Volumes = 16Mbbl (poor RF)
- Waterflood to be considered at first Oil
- 12OP & 9WI planned for development

Project Status
- Production License (PL) awarded.
- Tie-in to major fields expected after 7 years
- Project meant to support major fields at plateau

<table>
<thead>
<tr>
<th>E (Economic viability)</th>
<th>F (Project feasibility)</th>
<th>G (Geological Knowledge)</th>
<th>Class</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2.2</td>
<td>1.2.3</td>
<td>Development On Hold</td>
<td>- Project expected to be commercial</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Project activities delayed</td>
</tr>
</tbody>
</table>
APPLICATION OF UNFC IN THE ALBERTINE GRABEN

Project Overview:
- Two wells drilled, oil shows but no flow
- Estimated Recoverable Volumes = 9Mbbl (Average RF)
- No development plan yet
- Part of block in the lake

Project Status
- No commitment for development
- 2D seismic acquisition ongoing
- Lake drilling solution planned for 2020

<table>
<thead>
<tr>
<th>E (Economic viability)</th>
<th>F (Project feasibility)</th>
<th>G (Geological Knowledge)</th>
<th>Class</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2</td>
<td>3</td>
<td>4</td>
<td>Prospective</td>
<td>- Project economics undefined due to limited data</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Project feasibility undefined due to limited data</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Q'qties estimated from indirect evidence</td>
</tr>
</tbody>
</table>
APPLICATION OF UNFC IN THE ALBERTINE GRABEN

Project Overview:
- Six (6) wells drilled to appraise structure
- Recoverable Volumes = 14Mbbl (Poor RF)
- Waterflood to be considered at first Oil
- 9OP & 5WI proposed for development

Project Status
- Field Development Plan not yet approved by Gov’t.
- Shallow reservoirs
- Located within National Park
- Marginal Economics

<table>
<thead>
<tr>
<th>E (Economic viability)</th>
<th>F (Project feasibility)</th>
<th>G (Geological Knowledge)</th>
<th>Class</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2</td>
<td>2.2</td>
<td>1.2.3</td>
<td>Development Unclarified</td>
<td>Project economics undefined due to limited data</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Project activities delayed</td>
</tr>
</tbody>
</table>
# APPLICATION OF UNFC IN THE ALBERTINE GRABEN

Projects ranking based on maturity level

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Development Plan</th>
<th>Project Summary</th>
<th>UNFC Sub-Class</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project A</td>
<td>Recoverable = 217Mmbbls WF, 31OP &amp; 31WI</td>
<td>Production Licensee (PL) awarded. FID within mid-year 2019.</td>
<td>Justified for Development</td>
<td>1.1</td>
<td>1.3</td>
<td>1,2,3</td>
</tr>
<tr>
<td>Project B</td>
<td>Recoverable = 16Mmbbls WF, 12OP &amp; 9WI</td>
<td>PL awarded. Tie-in after 7yrs subject to availability of ullage.</td>
<td>Development on Hold</td>
<td>2</td>
<td>2.2</td>
<td>1,2,3</td>
</tr>
<tr>
<td>Project D</td>
<td>Recoverable = 14Mmbbls WF, 9OP &amp; 5WI</td>
<td>Application for PL submitted, not yet approved. Reservoir quality, Economics and Environmental concerns (National Park)</td>
<td>Development Unclarified</td>
<td>3.2</td>
<td>2.2</td>
<td>1,2,3</td>
</tr>
<tr>
<td>Project C</td>
<td>Recoverable = 9Mmbbls</td>
<td>No development plan yet. Under exploration, two wells encountered oil shows but no flow. Seismic reprocessing and interpretation ongoing.</td>
<td>Prospective resources</td>
<td>3.2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
CONCLUSION

- The Albertine graben is currently the most prolific basin in the East African region.
- The basin has remarkable biodiversity with more than 75 mammalian species and 450 bird species (environmental resources/assets?).
- UNFC considers environmental and social aspects which are critical for the Albertine graben.
- UNFC has eased the definition of resource projects (uncertainty and feasibility) but specific resource management/accounting systems are still necessary (PRMS + Others + UNRMS?).
- Africa aims to achieve value addition, and fair and equitable sharing of benefits arising from resource management which requires collective responsibility (Industry & Authorities)
- To achieve the SDGs, resource management needs to translate into revenue management.
THANK YOU