

### Identifying Future Resource Potential Using a Reservoir Technical Limits Approach

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Technologies exist to push oilfield recovery factors beyond 70%, and gasfield recovery to >90%, yet global average field recovery factors remain <40% for oil and <70% for gas. There is clearly a huge prize for increasing recovery, but there are reasons why this has not happened already. Usually one or more of the following critical success factors are lacking: reservoir understanding, access to appropriate technologies and ability to develop new ones, ability to determine effectively which technologies suit each field and to implement them profitably, ability to articulate the potential prize in each field, effective focussing of corporate R&D onto the highest-value technologies. BP's Reservoir Technical Limits (RTL™) approach is a way of systematically approaching each field to ensure that these critical success factors are met, enabling new resources are to be identified and progressed towards production.

The RTL approach consists of applying the following steps to an oil or gas field:

- (1)-Use screening tools to determine a range of recovery-enhancing activities that could be applicable (EOR, infill, facilities mods etc).
- (2)-Assess current field performance using reservoir efficiency factors, representing (a) the recovery process at the microscopic scale, (b) the connectedness of the reservoir to a producing well; (c) the sweep effectiveness within the drained volume; and (d) the ability to lift the full tail of production. Maximizing these efficiency factors maximizes recovery factor.
- (3)-Quantify the gap between current efficiency factors and best-in-class values using analogue data.
- (4)-Systematically match the activities(1) to the gaps (3) to generate a set of opportunities, with their expected additional resource volumes.
- (5)-Prioritize the opportunities based on doability and timescale.
- (6)-Re-calculate the predicted efficiency factors after implementation of the opportunities; QC the resultant recovery factors using an internal consistency check and an external comparison with analogue data.
- (7)-Incorporate the activities into the field depletion plan
- (8)-Roll up the field data globally to help focus corporate R&D.

This approach has been applied to >200 fields over the last 6 years, generating a stream of resource growth opportunities, many of which have been actioned and turned into reserves and production. This is illustrated in several case studies.